NPTEL Video Course - Mechanical Engineering - Convective Heat and Mass Transfer

Subject Co-ordinator - Prof. A.W. Date
Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction
Lecture 2 - Flow Classifications
Lecture 3 - Laws of Convection
Lecture 4 - Scalar Transport Equations
Lecture 5 - Laminar Boundary Layers
Lecture 6 - Similarity Method
Lecture 7 - Similarity Solutions Velocity BL
Lecture 8 - Similarity Solutions Temperature BL - I
Lecture 9 - Similarity Solutions Temperature BL - II
Lecture 10 - Integral BL Equations
Lecture 11 - Integral Solutions Laminar Velocity BL
Lecture 12 - Integral Solutions Laminar Temperature BL
Lecture 13 - Superposition Theory
Lecture 14 - Laminar Internal Flows
Lecture 15 - Fully-Developed Laminar Flows - 1
Lecture 16 - Fully-Developed Laminar Flows - 2
Lecture 17 - Fully-Developed Laminar Flows Heat Transfer - 1
Lecture 18 - Fully-Developed Laminar Flows Heat Transfer - 2
Lecture 19 - Laminar Internal Developing Flows Heat Transfer
Lecture 20 - Superposition Technique
Lecture 21 - Nature of Turbulent Flows
Lecture 22A - Sustaining Mechanism of Turbulence - 1
Lecture 22B - Sustaining Mechanism of Turbulence - 1
Lecture 23 - Sustaining Mechanism of Turbulence - 2
Lecture 24 - Near-Wall Turbulent Flows - 1
Lecture 25 - Near-Wall Turbulent Flows - 2
Lecture 26 - Turbulence Models - 1
Lecture 27 - Turbulence Models - 2
Lecture 28 - Turbulence Models - 3

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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Cryogenic Engineering

Subject Co-ordinator - Prof. M.D. Atrey

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to Cryogenic Engineering
Lecture 2 - Properties of Cryogenic Fluids - I
Lecture 3 - Properties of Cryogenic Fluids - II
Lecture 4 - Properties of Cryogenic
Lecture 5 - Material Properties at Low Temperature - I
Lecture 6 - Material Properties at Low Temperature - II
Lecture 7 - Material Properties at Low Temperature - III
Lecture 8 - Gas Liquefaction and Refrigeration Systems - I
Lecture 9 - Gas Liquefaction and Refrigeration Systems - II
Lecture 10 - Gas Liquefaction and Refrigeration Systems - III
Lecture 11 - Gas Liquefaction and Refrigeration Systems - IV
Lecture 12 - Gas Liquefaction and Refrigeration Systems - V
Lecture 13 - Gas Liquefaction and Refrigeration Systems - VI
Lecture 14 - Gas Liquefaction and Refrigeration Systems - VII
Lecture 15 - Gas Liquefaction and Refrigeration Systems - VIII
Lecture 16 - Gas Liquefaction and Refrigeration Systems - IX
Lecture 17 - Gas Liquefaction and Refrigeration Systems - X
Lecture 18 - Gas Separation - I
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Lecture 23 - Gas Separation - VI
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Lecture 25 - Gas Separation - VIII
Lecture 26 - Cryocoolers
Lecture 27 - Cryocoolers Ideal Stirling Cycle - I
Lecture 28 - Cryocoolers Ideal Stirling Cycle - II
Lecture 29 - Cryocoolers Ideal Stirling Cycle - III

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NPTEL Video Course - Mechanical Engineering - Advanced Strength of Materials

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

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Stress and Strain Tensor
Lecture 2 - Stress and Strain Tensor (Continued) and Cauchy Formula for Traction
Lecture 3 - Examples on Calculation of Strains and Tractions, Principal Stresses and Directions
Lecture 4 - Example on Calculation of Principal Stresses and Directions, Orthogonality of Principal Directions
Lecture 5 - Maximum Shear Stress and Octahedral Shear Stress, Deviatoric and Hydrostatic Stresses
Lecture 6 - Transformation of Stresses and Mohr Circle in 3-D
Lecture 7 - Mohr Circle (Continued)
Lecture 8 - Deformation, Rotation and Strain Tensors, Principal Strains, Deviatoric and Hydrostatic Strains
Lecture 9 - Strain Transformations, Strains in Polar Coordinates, Equilibrium Equations in 2-D
Lecture 10 - Equilibrium Equations in 2-D Polar Coordinates Plane Stress and Plane Strain Conditions
Lecture 11 - Stress-Strain Relations for Isotropic, Orthotropic and Anisotropic Materials Stress-Strain-Temperature Relations
Lecture 12 - Relation between Elastic Constants and Strain Energy Densities Recap of Lectures 1 to 11
Lecture 13 - Stress Distribution in Thick Cylinder
Lecture 14 - Stresses due to Shrink Fitting
Lecture 15 - Stresses in Rotating Disc
Lecture 16 - Examples on Shrink Fitting and Rotating Disc
Lecture 17 - Torsion of Non-Circular Shaft
Lecture 18 - Torsion of Non-Circular Shaft (Continued)
Lecture 19 - Membrane Analogy for Torsion
Lecture 20 - Torsion of Thin Box Sections
Lecture 21 - Torsion of Box and Open Sections
Lecture 22 - Bending of Curved Bars
Lecture 23 - Bending of Curved Bars (Continued)
Lecture 24 - Theories of Failure
Lecture 25 - Theories of Failure (Continued)
Lecture 26 - Theories of Failure (Continued) and Their Applications, Griffith Theory of Brittle Fracture
Lecture 28 - Theorems of Elasticity
Lecture 29 - Theorems of Elasticity (Continued)

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Lecture 30 - Thermal Stress Distribution in Rectangular Sheet due to Symmetric and Asymmetric Temperature Fields
Lecture 31 - Thermal Stress Distribution in Cylinders
Lecture 32 - Unsymmetrical Bending
Lecture 33 - Shear Centre
Lecture 34 - Plate Bending
Lecture 35 - Plate Bending (Continued)
Lecture 36 - Examples on Plate Bending
Lecture 37 - Approximate Solutions for Bending of Rectangular and Circular Plates
Lecture 38 - Thin Shells of Revolution
Lecture 39 - Beam on Elastic Foundation
Lecture 40 - Application of Beam on Elastic Foundation Analysis to Pressure Vessels for Calculation of Discontinuity Stresses
NPTEL Video Course - Mechanical Engineering - Heat and Mass Transfer

Subject Co-ordinator - Prof. S.P. Sukhatme, Prof. U.N. Gaitonde

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to Heat and Mass Transfer
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Heat Conduction - 1
Lecture 5 - Heat Conduction - 2
Lecture 6 - Heat Conduction - 3
Lecture 7 - Heat Conduction - 4
Lecture 8 - Heat Conduction - 5
Lecture 9 - Heat Conduction - 6
Lecture 10 - Thermal Radiation - 1
Lecture 11 - Thermal Radiation - 2
Lecture 12 - Thermal Radiation - 3
Lecture 13 - Thermal Radiation - 4
Lecture 14 - Thermal Radiation - 5
Lecture 15 - Thermal Radiation - 6
Lecture 16 - Review Of Fluid Mechanics - 1
Lecture 17 - Review Of Fluid Mechanics - 2
Lecture 18 - Forced Convection - 1
Lecture 19 - Forced Convection - 2
Lecture 20 - Forced Convection - 3
Lecture 21 - Forced Convection - 4
Lecture 22 - Natural Convection - 1
Lecture 23 - Natural Convection - 2
Lecture 24 - Natural Convection - 3
Lecture 25 - Heat Exchangers - 1
Lecture 26 - Heat Exchangers - 2
Lecture 27 - Heat Exchangers - 3
Lecture 28 - Heat Exchangers - 4
Lecture 29 - Boiling and Condensation - 1
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Lecture 33 - Introduction to Mass Transfer - 1
Lecture 34 - Introduction to Mass Transfer - 2
Lecture 35 - Introduction to Mass Transfer - 3
NPTEL Video Course - Mechanical Engineering - Robotics

Subject Co-ordinator - Prof. P. Seshu, Prof. P.S. Gandhi, Prof. K. Kurien Issac, Prof. B. Seth, Prof. C. Amarnath

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to Robotics
Lecture 2 - Technologies in Robots
Lecture 3 - Industrial Robots
Lecture 4 - Industrial Manipulators and its Kinematics
Lecture 5 - Parallel Manipulators
Lecture 6 - Grippers manipulators
Lecture 7 - Electric Actuators
Lecture 8 - Actuators - Electric, Hydraulic, Pneumatic
Lecture 9 - Internal State Sensors
Lecture 10 - Internal State Sensors
Lecture 11 - External State Sensors
Lecture 12 - Trajectory planning
Lecture 13 - Trajectory planning
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Lecture 19 - Trajectory planning
Lecture 20 - Forward Position Control
Lecture 21 - Inverse Problem
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Dynamic Analysis
Lecture 25 - Image Processing
Lecture 26 - Image Processing
Lecture 27 - Image Processing
Lecture 28 - Image Processing
Lecture 29 - Image Processing

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Lecture 30 - Image Processing
Lecture 31 - Robot Dynamics and Control
Lecture 32 - Robot Dynamics and Control
Lecture 33 - Robot Dynamics and Control
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Lecture 36 - Robot Dynamics and Control
Lecture 37 - Futuristic Topics in Robotics
Lecture 38 - Robot Dynamic and Control-Case Studies
Lecture 39 - Robot Dynamic and Control-Case Studies
Lecture 40 - Futuristic Topics in Robotics

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NPTEL Video Course - Mechanical Engineering - Tribology

Subject Co-ordinator - Dr. Harish Hirani
Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Introduction
Lecture 2 - Interdisciplinary Approach and Economic Benefits
Lecture 3 - Friction
Lecture 4 - Friction Estimation
Lecture 5 - Friction Instability
Lecture 6 - Wear
Lecture 7 - Adhesive Wear
Lecture 8 - Wear Mechanisms
Lecture 9 - Wear Mechanisms - 2
Lecture 10 - Wear Analysis
Lecture 11 - Lubrication and Lubricants
Lecture 12 - Boundary Lubrication
Lecture 13 - Lubrication Mechanisms
Lecture 14 - Hydrodynamic Lubrication
Lecture 15 - Lubricant Classifications
Lecture 16 - Solid and Semi Solid Lubricants
Lecture 17 - Liquid Lubricants
Lecture 18 - Lubricant Additives
Lecture 19 - Fluid Film Lubrication
Lecture 20 - Reynolds Equation
Lecture 21 - Solution of Reynolds Equation
Lecture 22 - Hybrid Solution Approach (to solve Reynolds Equation)
Lecture 23 - Finite Difference Method to Solve Reynolds Equation
Lecture 24 - Viscosity Variation
Lecture 25 - Estimating Elastic Deformation
Lecture 26 - Thermo Hydrodynamic Lubrication
Lecture 27 - Application of Tribology
Lecture 28 - Rolling Element Bearings
Lecture 29 - Rolling Element Bearings (Continued...)

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Lecture 30 - Rolling Element Bearings (Continued...)
Lecture 31 - Selection of Rolling Element Bearings
Lecture 32 - Friction of Rolling Element Bearing
Lecture 33 - Bearing Clearance
Lecture 34 - Bearing Lubrication
Lecture 35 - Tribology of Gears
Lecture 36 - Friction and Lubrication of Gears
Lecture 37 - Friction and Lubrication of Gears (Continued...)
Lecture 38 - Surface Fatigue of Spur Gears
Lecture 39 - Journal Bearings
Lecture 40 - Hydrostatic Bearings
Lecture 41 - Hydrodynamic Journal Bearings
Lecture 42 - Design of Hydrodynamic Journal Bearings
Lecture 1 - An Introduction to CAD
Lecture 2 - Input Output Devices, Raster Graphics
Lecture 3 - Raster Graphics - I
Lecture 4 - Raster Graphics - II
Lecture 5 - Polygon Filling
Lecture 6 - Windowing and Clipping
Lecture 7 - Clipping of Polygons
Lecture 8 - 2D Transformations
Lecture 9 - 3D Transformations and Projection
Lecture 10 - Perspective Projections
Lecture 11 - Projections and Hidden Surface Removal
Lecture 12 - Hidden Surface Removal
Lecture 13 - Hidden Surface Removal
Lecture 14 - Hidden Surface Removal
Lecture 15 - Finite Element Method
Lecture 16 - Galerkin's Approach
Lecture 17 - Galerkin's Method
Lecture 18 - 1D Finite Element Problems
Lecture 19 - 1D Finite Element Problems
Lecture 20 - FE Problems
Lecture 21 - 1D - FE Problems
Lecture 22 - Penalty Approach and Multi Point Boundary
Lecture 23 - Quadratic Shape Functions
Lecture 24 - 2D - FE Problems
Lecture 25 - 2D - FE Problems (Continued.)
Lecture 26 - 3D - FE Problems
Lecture 27 - 3D - Tetrahedral and 2D - Quadrilateral Element
Lecture 28 - Mesh Preparation
Lecture 29 - Modeling of Curves
Lecture 30 - Modeling of Curves
Lecture 31 - Modeling of Curves
Lecture 32 - Modeling of B-Spline Curves
Lecture 33 - Modeling of B-spline Curves
Lecture 34 - Surface Modeling
Lecture 35 - Surface Modeling
Lecture 36 - Display of Curves and Surfaces
Lecture 37 - Solid Modeling
Lecture 38 - Solid Modeling
Lecture 39 - Solid Modeling Using Octrees
Lecture 40 - (Lecture Missing)
Lecture 41 - Computer Aided Design
Lecture 42 - Computer Aided Manufacturing
Lecture 43 - What is CAD/CAM
Lecture 44 - An Overview of Geometric Modeling
Lecture 45 - Parametric Cubic Curve
Lecture 46 - Parametric Bezier Curve
Lecture 47 - B-Spline Curve
Lecture 48 - Parametric Surfaces - Part-1
Lecture 49 - Parametric Surfaces - Part-2
Lecture 50 - Solid Modeling
Lecture 51 - Geometric & Product Data Exchange
Lecture 52 - Reverse Engineering
Lecture 1 - Project and Production Management - An Overview
Lecture 2 - Project Management
Lecture 3 - Project Identification and Screening
Lecture 4 - Project Appraisal - Part I
Lecture 5 - Project Appraisal - Part II
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Lecture 7 - Project Representation
Lecture 8 - Consistency and Redundancy in Project Networks
Lecture 9 - Basic scheduling with A-O-A Networks
Lecture 10 - Basic Scheduling with A-O-N Networks
Lecture 11 - Project Scheduling with Probabilistic Activity
Lecture 12 - Linear Time-Cost Tradeoffs in Projects
Lecture 13 - Project Crashing with Multiple Objectives
Lecture 14 - Resource Profiles and Leveling
Lecture 15 - Limited Resource Allocation
Lecture 16 - Project Monitoring and Control with PERT/Cost
Lecture 17 - Team Building and Leadership in Projects
Lecture 18 - Organizational and Behavioral Issues
Lecture 19 - Computers in Project Management
Lecture 20 - Project Completion and Review
Lecture 21 - Life Cycle of a Production System
Lecture 22 - Role of Models in Production Management
Lecture 23 - Financial Evaluation of capital Decisions
Lecture 24 - Decision Trees and Risk Evaluation
Lecture 25 - Introducing New Products & Services
Lecture 26 - Economic Evaluation of New Products & Services
Lecture 27 - Product Mix Decisions
Lecture 28 - Product & Process Design
Lecture 29 - Issues in Location of Facilities
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NPTEL Video Course - Mechanical Engineering - NOC:RAC Product Design

Subject Co-ordinator - Prof. Sanjeev Jain

Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Introduction to Design
Lecture 2 - Design Considerations
Lecture 3 - Basic Concepts Psychrometry and Air-Conditioning
Lecture 4 - Refrigerants
Lecture 5 - Refrigerant Properties and Applications
Lecture 6 - Refrigeration Cycle and Components
Lecture 7 - Compressor Selection
Lecture 8 - Expansion Devices
Lecture 9 - Condensers and Evaporators
Lecture 10 - Types of Heat Exchangers and Air Conditioning Systems
Lecture 11 - Selection of Air Conditioning Systems for Hostels
Lecture 12 - Case Study on a Railway Air Conditioning System
Lecture 13 - Vibration and noise issues in railway AC systems
Lecture 14 - New product launch process
Lecture 15 - Case study on a telecom cooling system and Emerging technologies

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NPTEL Video Course - Mechanical Engineering - NOC: Thermodynamics

Subject Co-ordinator - Prof. S.R kale

Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Thermodynamic Concepts
Lecture 2 - Thermodynamic Concepts
Lecture 3 - Thermodynamic Concepts
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Lecture 9 - Thermodynamic Concepts
Lecture 10 - Thermodynamic Concepts
Lecture 11 - Laws Of Thermodynamics
Lecture 12 - Laws Of Thermodynamics
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Lecture 30 - Properties of a Pure Substance
Lecture 31 - Laws of Thermodynamics
Lecture 32 - Applications, Problem Solving
Lecture 33 - Applications, Problem Solving
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Lecture 44 - Applications, Problem Solving
Lecture 45 - Properties of Ideal Gas Mixtures
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Lecture 47 - Gas-Vapour Mixtures
Lecture 48 - Gas-Vapour Mixtures
Lecture 49 - Gas-Vapour Mixtures
Lecture 50 - Thermodynamics of Reacting Systems
Lecture 51 - Thermodynamics of Reacting Systems
Lecture 52 - Thermodynamics of Reacting Systems
Lecture 53 - Phase and Chemical Equilibrium
Lecture 54 - Phase and Chemical Equilibrium
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Lecture 3 - Stress Tensor and its Matrix Representation
Lecture 4 - Transformation of Stress Matrix
Lecture 5 - Stress Equilibrium Equations
Lecture 6 - Balance of Angular Momentum (Continued...)
Lecture 7 - Principal Planes and Principal stress components
Lecture 8 - Maximizing the Shear Component of Traction
Lecture 9 - Mohr's Circle
Lecture 10 - Mohr's Circle (Continued...), Stress Invariants, Decomposition of the Stress Tensor
Lecture 11 - Concept of Strain Tensor
Lecture 12 - Longitudinal and Shear Strains
Lecture 13 - Local Volumetric Strain and Local Infinitesimal Rotation
Lecture 14 - Similarity in Properties of Stress and Strain Tensors
Lecture 15 - Stress-Strain Relation
Lecture 16 - Stress-Strain Relation for Isotropic Materials
Lecture 17 - Linear Momentum Balance in Cylindrical Coordinate System
Lecture 18 - Linear Momentum Balance in Cylindrical Coordinate System (Continued...)
Lecture 19 - Strain Matrix Cylindrical Coordinate System
Lecture 20 - Extension-Torsion-Inflation in a Hollow Cylinder
Lecture 21 - Extension-Torsion-Inflation in a Hollow Cylinder (Continued...)
Lecture 22 - Solving Problems Involving Torsion of Shafts
Lecture 23 - Pure Bending of Rectangular Beams
Lecture 24 - Bending of Beams (Continued...)
Lecture 25 - Bending of Unsymmetrical Beams
Lecture 26 - Concept of Shear Center
Lecture 27 - Theoy of Beams
Lecture 28 - Theoy of Beams (Continued...) and Beam Buckling
Lecture 29 - Energy Methods
Lecture 30 - Energy Methods (Continued...)
Lecture 31 - Theories of Failure
Lecture 32 - Theories of Failure (Continued...)
Lecture 1 - Introduction of Nonlinear systems
Lecture 2 - Review of Linear vibrating systems
Lecture 3 - Phenomena associated with Nonlinear systems
Lecture 4 - Commonly observed Phenomena in Nonlinear systems
Lecture 5 - Force and Moment based Approach
Lecture 6 - Energy based approach Extended Hamilton’s principle and Lagrange Principle
Lecture 7 - Derivation of Equation of motion of nonlinear discrete system (More examples)
Lecture 8 - Derivation of Equation of motion of nonlinear continuous system - 1
Lecture 9 - Derivation of Equation of motion of nonlinear continuous system - 2
Lecture 10 - Ordering of nonlinear Equation of motion
Lecture 11 - Qualitative Analysis Straight forward expansion
Lecture 12 - Numerical method Straight forward expansion
Lecture 13 - Lindstedt Poincare technique
Lecture 14 - Method of multiple scales
Lecture 15 - Method of Harmonic balance
Lecture 16 - Method of averaging
Lecture 17 - Generalized Method of averaging
Lecture 18 - Krylov-Bogoliubov-Mitropolski technique
Lecture 19 - Incremental harmonic balance method and Intrinsic multiple scale harmonic balance method
Lecture 20 - Modified Lindstedt Poincare technique
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Lecture 26 - Bifurcation of Periodic response And Introduction to quasi-periodic and Chaotic response
Lecture 27 - Quasi-Periodic and Chaotic response
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Lecture 29 - Numerical methods to obtain time response
Lecture 30 - Numerical methods to obtain frequency response
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Lecture 32 - Free Vibration of Single degree of freedom Nonlinear systems with Cubic and quadratic nonlinearities
Lecture 33 - Free Vibration of multi-degree of freedom Nonlinear systems with Cubic and quadratic nonlinearities
Lecture 34 - Forced nonlinear Vibration Single degree of freedom Nonlinear systems with Cubic nonlinearities
Lecture 35 - Forced nonlinear Vibration Single and multi-degree of freedom Nonlinear systems
Lecture 36 - Nonlinear Forced-Vibration of Single and Multi Degree-of-Freedom System
Lecture 37 - Analysis of Multi-degree of freedom system
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Lecture 40 - Nonlinear Vibration of Parametrically excited system with internal resonance

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NPTEL Video Course - Mechanical Engineering - Theory and Practice of Rotor Dynamics

Subject Co-ordinator - Prof. Rajiv Tiwari
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction
Lecture 2 - A Brief History of Rotor Dynamics
Lecture 3 - The State of the Art of Rotor Dynamics
Lecture 4 - Simple Rotor Models with Rigid Bearings
Lecture 5 - Jeffcott Rotor Model
Lecture 6 - Variant of Jeffcott Rotor Model
Lecture 7 - Rigid Rotor Mounted on Simple Anistropic Springs as Bearings
Lecture 8 - Rigid Rotor Mounted on Complex Anisotropic Bearings
Lecture 9 - Flexible Shaft with a Rigid Disc Mounted on Anistropic Supports
Lecture 10 - Gyroscopic Effects
Lecture 11 - Gyroscopic Effects
Lecture 12 - Gyroscopic Effects
Lecture 13 - Gyroscopic Effects
Lecture 14 - Torsional Vibrations
Lecture 15 - Three Disc Rotor System
Lecture 16 - Transfer Matrix Approach - Part I
Lecture 17 - Transfer Matrix Approach - Part II
Lecture 18 - Transfer Matrix Approach - Part III
Lecture 19 - Geared and Branched Systems
Lecture 20 - Continuous System and Finite Element Method
Lecture 21 - Finite Element Method
Lecture 22 - Finite Element Analysis
Lecture 23 - Finite Element Analysis - Part III
Lecture 24 - Influence Coefficient Method
Lecture 25 - Transfer Matrix Method - Part I
Lecture 26 - Transfer Matrix Method - Part II
Lecture 27 - Transfer Matrix Method - Part III
Lecture 28 - Continuous System Approach
Lecture 29 - Finite Element Method - Part I

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Lecture 30 - Finite Element Method - Part II
Lecture 31 - Finite Element Method - Part III
Lecture 32 - Instability in Rotor Systems
Lecture 33 - Fluid-Film Bearings
Lecture 34 - Internal Damping & Asymmetrical Shaft
Lecture 35 - Steam Whirl and Seals
Lecture 36 - Subcritical Speed Whirl
Lecture 37 - Introduction to Rigid Rotor Balancing
Lecture 38 - Dynamic Balancing of Rotors
Lecture 39 - Dynamic Balancing of Rotors
Lecture 40 - Dynamic Balancing of Rotors
Lecture 41 - Common Faults & Vibration signatures
Lecture 42 - Condition Based Monitoring
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Engineering Mechanics

Subject Co-ordinator - Prof. U.S. Dixit, Dr. G. Saravana Kumar

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Fundamentals Of Engineering Mechanics
Lecture 2 - Equations of Equilibrium
Lecture 3 - Truss Analysis - Part 1
Lecture 4 - Truss Analysis - Part 2
Lecture 5 - Analysis of Frames Machines
Lecture 6 - Internal Forces
Lecture 7 - Internal Forces in Beams
Lecture 8 - Cables
Lecture 9 - Friction
Lecture 10 - Application of Friction - Part 1
Lecture 11 - Application of Friction - Part 2
Lecture 12 - Application of Friction - Part 3
Lecture 13 - Centroids Center of Mass
Lecture 14 - Centroids Area of Moments
Lecture 15 - Product of Inertia, Rotation of Axis and Principle Moments of Inertia
Lecture 16 - Principle Mass Moments of Inertia
Lecture 17 - Second Moment of Mass
Lecture 18 - Virtual Work of Ideal System
Lecture 19 - Principle of Virtual Work
Lecture 20 - Systems with Friction
Lecture 21 - Potential Energy
Lecture 22 - Stability of Equilibrium
Lecture 23 - Kinematics of a Particles
Lecture 24 - Kinematics of a Particle Moving on a Curve
Lecture 25 - Relative Motion
Lecture 26 - Plane Kinematics of Rigid Bodies
Lecture 27 - Kinematics of a Particle
Lecture 28 - Work and Energy
Lecture 29 - Impulse and Momentum

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Lecture 30 - Direct and Oblique Impulse
Lecture 31 - Plane Kinetics of Rigid Bodies
Lecture 32 - Kinetics of a Body
Lecture 33 - Method of Momentum and Analysis of Robot Manipulator
Lecture 34 - Kinematics in 3D
Lecture 35 - Kinetics in 3D
Lecture 36 - Free Vibration
Lecture 37 - Forced Vibration Damped Undamped
Lecture 38 - Vibration of Rigid Bodies - Part 1
Lecture 39 - Vibration of Rigid Bodies - Part 2
Lecture 40 - Some Problems of Vibration
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Mechanical Vibrations

Subject Co-ordinator - Prof. S.K. Dwivedy, Prof. Rajiv Tiwari

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Overview of the Course, Practical and Research Trends
Lecture 2 - Harmonic and Periodic Motions, Vibration Terminology
Lecture 3 - Vibration Model, Equation of Motion-Natural Frequency
Lecture 4 - Energy Method, Principle of Virtual Work
Lecture 5 - Viscously Damped Free Vibration Special Cases
Lecture 6 - Logarithmic Decrement Experimental Determination of Damping Coefficient Hysteresis Loop
Lecture 7 - Coulomb Damping other Damping Models
Lecture 8 - Forced Harmonic Vibration, Magnification Factor
Lecture 9 - Laplace Transform, Superposition Theorem
Lecture 10 - Rotor Unbalance and Whirling of Shaft, Transmissibility
Lecture 11 - Support Motion, Vibration Isolation
Lecture 12 - Sharpness of Resonance, Vibration Measuring Instruments
Lecture 13 - Generalized and Principle Coordinates, Derivation of Equation of Motion
Lecture 14 - Lagranges's Equation
Lecture 15 - Coordinate Coupling
Lecture 16 - Forced Harmonic Vibration
Lecture 17 - Tuned Absorber, Determination of Mass Ratio
Lecture 18 - Tuned and Damped Absorber, Untuned Viscous Damper
Lecture 19 - Derivation of Equations of Motion, Influence Coefficient Method
Lecture 20 - Properties of Vibrating Systems
Lecture 21 - Modal Analysis
Lecture 22 - Modal Analysis
Lecture 23 - Simple Systems With One Two or Three Discs Geared System
Lecture 24 - Multi-Degree of Freedom Systems-Transfer Matrix Method Branched Systems
Lecture 25 - Derivation of Equations of Motion Part 1 - Newton
Lecture 26 - Derivation of Equations of Motion Part 2 - Newton
Lecture 27 - Vibration of Strings
Lecture 28 - Longitudinal and Torsional Vibration of Rods
Lecture 29 - Transverse Vibration of Beams, Equations of Motion and Boundary Conditions

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Lecture 30 - Transverse Vibration of Beams
Lecture 31 - Rayleigh's Energy Method
Lecture 32 - Matrix Iteration Method
Lecture 33 - Durkerley, Rayleigh-Ritz and Galerkin Method
Lecture 34 - Finite Element Formulation for Rods, Gear Train and Branched System
Lecture 35 - Finite Element Formulation for Beams
Lecture 36 - Global Finite Element Assembly and Imposition of Boundary Conditions
Lecture 37 - Vibration Testing Equipments
Lecture 38 - Vibration Testing Equipments
Lecture 39 - Field Balancing of Rotors
Lecture 40 - Condition Monitoring
NPTEL Video Course - Mechanical Engineering - NOC: Advanced Machining Processes

Subject Co-ordinator - Prof. Manas Das

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to advanced machining processes
Lecture 2 - Ultrasonic machining - Part I
Lecture 3 - Ultrasonic machining - Part II
Lecture 4 - Abrasive jet machining
Lecture 5 - Water jet cutting and Abrasive water jet machining
Lecture 6 - Magnetic abrasive finishing
Lecture 7 - Abrasive Flow Finishing
Lecture 8 - Magneto rheological Finishing
Lecture 9 - Magneto rheological Abrasive Flow Finishing - Part I
Lecture 10 - Magneto rheological Abrasive Flow Finishing - Part II
Lecture 11 - Magneto rheological Abrasive Flow Finishing - Part III
Lecture 12 - Electric discharge machining (EDM)
Lecture 13 - Electric Discharge Grinding, Electric Discharge Diamond Grinding and Wire Electric Discharge Machining
Lecture 14 - Electrochemical Machining (ECM)
Lecture 15 - Electrochemical Grinding, Electrostream Drilling, Shaped Tube Electrolytic Machining
Lecture 16 - Plasma Arc Machining (PAM)
Lecture 17 - Electron Beam Machining (EBM) Edit Lesson
Lecture 18 - Laser Beam Machining (LBM)
Lecture 19 - Chemical Machining (ChM)
NPTEL Video Course - Mechanical Engineering - NOC: Fundamentals of Nuclear Power Generation

Subject Co-ordinator - Prof. Dipankar N. Basu
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction of nuclear energy
Lecture 2 - Binding energy and mass defect
Lecture 3 - Radioactivity and radioactive decay
Lecture 4 - Different types of nuclear transmutation
Lecture 5 - Artificial radioactivity and neutron-nucleus interactions
Lecture 6 - Energy and momentum conservation
Lecture 7 - Fission and role of neutron energy
Lecture 8 - Theory of elastic scattering
Lecture 9 - Neutron multiplication factor
Lecture 10 - Neutron diffusion theory
Lecture 11 - Solution of one-group diffusion equation
Lecture 12 - Simple reactor theory
Lecture 13 - Nuclear fuel and simple energy consideration
Lecture 14 - Axial temperature distribution and heat transfer coefficient
Lecture 15 - Prompt and delayed neutrons
Lecture 16 - Delayed neutron kinetics
Lecture 17 - Different control mechanisms and various effects
Lecture 18 - Classical reactor designs
Lecture 19 - Evolution of reactors from Gen-I to Gen-IV
Lecture 20 - The concept of breeding
Lecture 21 - Fuel cycles and FBR
Lecture 22 - Gen-IV FBR designs
Lecture 23 - Hydrogen fusion reactions
Lecture 24 - Coulomb barrier and other critical factors
Lecture 25 - Radiation dose and gross biological effects
Lecture 26 - Stochastic and deterministic effects of human cells
Lecture 27 - Lessons from TMI and Chernobyl
Lecture 28 - Defence-in-depth Philosophy
Lecture 29 - Waste classification and Disposal of Mill Tailings

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Lecture 30 - Disposal methodologies for HLW and IMW
NPTEL Video Course - Mechanical Engineering - NOC: Advances in Welding and Joining Technologies

Subject Co-ordinator - Prof. Swarup Bag

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Fundamentals of Welding and Joining - Part I
Lecture 2 - Fundamentals of Welding and Joining - Part II
Lecture 3 - Fundamentals of Welding and Joining - Part III
Lecture 4 - Fundamentals of Welding and Joining - Part IV
Lecture 5 - Fundamentals of Welding and Joining - Part V
Lecture 6 - Laser and Electron Beam Welding - Part I
Lecture 7 - Laser and Electron Beam Welding - Part II
Lecture 8 - Solid State Welding Processes - Part I
Lecture 9 - Solid State Welding Processes - Part II
Lecture 10 - Solid State Welding Processes - Part III
Lecture 11 - Computational Welding Mechanics - Part I
Lecture 12 - Computational Welding Mechanics - Part II
Lecture 13 - Computational Welding Mechanics - Part III
Lecture 14 - Micro and Nano Joining Processes - Part I
Lecture 15 - Micro and Nano Joining Processes - Part II
Lecture 16 - Micro and Nano Joining Processes - Part III
Lecture 17 - Welding Metallurgy - Part I
Lecture 18 - Welding Metallurgy - Part II
Lecture 19 - Welding Metallurgy - Part III
Lecture 20 - Welding Metallurgy - Part IV
Lecture 21 - Welding and Joining of Non-Metals - Part I
Lecture 22 - Welding and Joining of Non-Metals - Part II
Lecture 23 - Metal Transfer in Welding and Metal Printing

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NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Machining and Machining Fluids

Subject Co-ordinator - Prof. Mamilla Ravi Sankar

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction
Lecture 2 - Introduction and Importance of Machining
Lecture 3 - Principles of Machining or Metal Cutting
Lecture 4 - Cutting Tools
Lecture 5 - Forces in Machining
Lecture 6 - Tribology in Machining
Lecture 7 - Lubrication surface roughness in Machining
Lecture 8 - Machinability and Thermal Aspects
Lecture 9 - Tool Wear and Tool life - Part 1
Lecture 10 - Tool Wear and Tool life - Part 2
Lecture 11 - Tool Wear and Tool life - Part 3
Lecture 12 - Tool Materials and Coatings
Lecture 13 - Machining Fluids / Cutting Fluids and its Additives - Part 1
Lecture 14 - Machining Fluids / Cutting Fluids and its Additives - Part 2
Lecture 15 - Machining Fluids / Cutting Fluids and its Emissions
Lecture 16 - Eco Friendly Cutting Fluids - Part 1
Lecture 17 - Eco Friendly Cutting Fluids - Part 2
Lecture 18 - Rheology and Thermal Characterization of Machining / Cutting Fluids
Lecture 19 - Bio-degradation Studies of Machining / Cutting Fluids
Lecture 20 - Cutting Fluid Application in Machining Region
Lecture 21 - Practical Machining Processes - 1
Lecture 22 - Practical Machining Processes - 2
Lecture 23 - Introduction to Abrasive Processes - Grinding
Lecture 24 - Cutting fluids in Grinding Process
Lecture 25 - Unbonded Conventional Abrasive Processes
Lecture 26 - Advances in Metal Cutting_Machining Processes
Lecture 27 - Advances in Metal Cutting_Machining Processes - 2

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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Mechanics of Machining

Subject Co-ordinator - Dr. Uday S. Dixit
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Deformation of Metals
Lecture 2 - Mechanism of Plastic Deformation
Lecture 3 - Machining Processes
Lecture 4 - Tool Geometry
Lecture 5 - Tool Specifications, Conversion Of Tool Angles, Multi-Point Cutting Tools
Lecture 6 - Mechanics of Orthogonal Cutting, Force Relationships
Lecture 7 - Determination of Stress, Strain, and Strain Rate
Lecture 8 - Measurement of Shear Angle
Lecture 9 - Other Analysis for Force Relationships
Lecture 10 - Mechanics of Oblique Cutting
Lecture 11 - Measurement of Cutting Forces
Lecture 12 - Thermal Aspects Of Machining
Lecture 13 - Tool Wear and Tool Life and Tool Life Equations
Lecture 14 - Economics in Machining
Lecture 15 - Practical Machining Operations
Lecture 16 - Practical Machining Operations
Lecture 17 - Grinding of Metals and Mechanics of Grinding Process
Lecture 18 - Abrasive Machining and Finishing Operations
Lecture 19 - CNC Machines and CNC Programming
Lecture 20 - Introduction to Advanced Machining Processes

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Lecture 1 - Introduction to hydraulic machines
Lecture 2 - Euler equation for turbomachines
Lecture 3 - Velocity triangles of pumps, effect of inlet swirl on velocity triangles
Lecture 4 - Pump casing, efficiencies, problems
Lecture 5 - H-Q Curve, System resistance Curve
Lecture 6 - Stodola slip model, problems - I
Lecture 7 - Stodola slip model, problems - II
Lecture 8 - Stodola slip model, problems - III
Lecture 9 - NPSH
Lecture 10 - Radial flow pump testing
Lecture 11 - Degrees of reaction
Lecture 12 - Radial equilibrium of axial flow machines - I
Lecture 13 - Radial equilibrium of axial flow machines - II
Lecture 14 - Pumps operation
Lecture 15 - Pumps operation
Lecture 16 - Affinity laws, specific speed - Part I
Lecture 17 - Affinity laws, specific speed - Part II
Lecture 18 - Pumping system design - I
Lecture 19 - Pumping system design - II
Lecture 20 - Pumping system design - III
Lecture 21 - Positive displacement pump, indicator diagram - I
Lecture 22 - Positive displacement pump, indicator diagram - II
Lecture 23 - Characteristic H-Q curve of positive displacement pump, problems
Lecture 24 - Hydraulic Turbine
Lecture 25 - Impulse Turbine
Lecture 26 - Impulse Turbine
Lecture 27 - Reaction Turbine
Lecture 28 - Reaction Turbine
Lecture 29 - Degrees of reaction and Efficiency of Hydraulic Turbine
Lecture 30 - Hydraulic Turbine
Lecture 31 - Cavitation in Hydraulic Turbine
NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Abrasive Machining and Finishing Processes

Subject Co-ordinator - Prof. Mamilla Ravi Sankar
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to Abrasive Machining and Finishing Processes
Lecture 2 - Grinding Process
Lecture 3 - Grinding Fluids and Its Additives
Lecture 4 - Grinding Fluids and its Emissions
Lecture 5 - Sustainable Grinding Process
Lecture 6 - Sustainable Grinding Process
Lecture 7 - Honing Process
Lecture 8 - Lapping Process
Lecture 9 - Super Finishing and Sand Blasting
Lecture 10 - Vibratory Bowl Finishing, Rotary Barrel Finishing or Tumbling
Lecture 11 - Drag Finishing, Ice-bonded Abrasive Finishing, Pitch Polishing, Pad Polishing
Lecture 12 - Introduction to Surface Texture in abrasive Process
Lecture 13 - Representation of Surface Roughness
Lecture 14 - Abrasive Jet Machining (AJM)
Lecture 15 - Abrasive Water Jet Machining (AWJM)
Lecture 16 - Ultrasonic Machining (USM)
Lecture 17 - EDM, Wire-EDM, EDG, EDDG, AW-EDG
Lecture 18 - Elastic Emission Machining
Lecture 19 - PMEDM and ECD and ELID, ECH
Lecture 20 - Abrasive Flow Finishing
Lecture 21 - Abrasive Flow Finishing
Lecture 22 - Magnetic Field Assisted Abrasive Finishing
Lecture 23 - Magneto Rheological Finishing and BE-MRF
Lecture 24 - Magnetic Field Assisted Abrasive Finishing
Lecture 25 - Summary of the Course

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NPTEL Video Course - Mechanical Engineering - NOC: Theory of Rectangular Plates - Part 1

Subject Co-ordinator - Prof. Poonam Kumari
Co-ordinating Institute - IIT - Guwahati
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic of Solid Mechanics
Lecture 2 - Energy Principles
Lecture 3 - Classification of Plate Theories and Some Basics
Lecture 4 - Tutorial
Lecture 5 - Governing Equation for Plate - 1
Lecture 6 - Governing Equation for Plate - 2
Lecture 7 - Tutorial
Lecture 8 - Navier Solution + Levy solution
Lecture 9 - Levy Solution
Lecture 10 - Tutorial
Lecture 11 - EKM and buckling of plates
Lecture 12 - 3D Solutions
Lecture 13 - Matlab Coding + ABAQUS
Lecture 14 - Tutorial
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Principles of Mechanical Measurement

Subject Co-ordinator - Prof. Dipankar N. Basu
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to measurement
Lecture 2 - Generalized measurement system and static characteristics
Lecture 3 - Uncertainties in measurement
Lecture 4 - Statistical treatment of random errors
Lecture 5 - System response to periodic inputs
Lecture 6 - Zeroth and first order systems
Lecture 7 - First and second order systems
Lecture 8 - Basics of digitization and number systems
Lecture 9 - Binary logic gates and binary codes
Lecture 10 - Analog-to-digital conversion
Lecture 11 - Digital-to-analog conversion
Lecture 12 - Electromagnetic indicators
Lecture 13 - Electronic amplifiers and filters
Lecture 14 - Resistive devices
Lecture 15 - Inductive, capacitive and optical devices
Lecture 16 - Piezoelectric and nozzle-flapper transducers
Lecture 17 - Resistive strain gages and associated circuitry
Lecture 18 - Strain gage rosettes and gage orientation
Lecture 19 - Elastic and strain gage load cells
Lecture 20 - Various load cells and dynamometers
Lecture 21 - Principles of manometry
Lecture 22 - Piezometer and elastic pressure transducer
Lecture 23 - Electric pressure transducer and high and low pressure measurement
Lecture 24 - Bernoulli's equation in obstruction meters
Lecture 25 - Obstruction meters and volume flowmeters
Lecture 26 - Mass flowmeters and velocity probes
Lecture 27 - Expansion-based devices
Lecture 28 - RTD, Thermistor and Thermocouple
Lecture 29 - Introduction to pyrometers

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Lecture 30 - Basic seismic transducer
Lecture 31 - Vibro-, velo- and accelerometer
Lecture 32 - Introduction to acoustic measurement
Lecture 33 - Radioactivity and its biological effects
NPTEL Video Course - Mechanical Engineering - NOC:IC Engines and Gas Turbines

Subject Co-ordinator - Dr. Vinayak Kulkarni, Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - External and Internal combustion engines, Engine components, SI and CI engines
Lecture 2 - Four-stroke and Two-stroke engines, Comparison between SI and CI engines, and Four-stroke and Two-stroke engines
Lecture 3 - Classification of IC engines
Lecture 4 - Engine operating characteristics
Lecture 5 - Otto, Diesel and Dual cycles
Lecture 6 - Otto, Diesel and Dual cycles (Continued...)
Lecture 7 - Otto, Diesel and Dual cycles (Continued...)
Lecture 8 - Otto, Diesel and Dual cycles (Continued...)
Lecture 9 - Comparison between the cycles, Actual cycles and their analysis
Lecture 10 - Carburetor, Mixture requirements
Lecture 11 - Carburetor, Mixture requirements (Continued...)
Lecture 12 - Idling, cruising and power ranges
Lecture 13 - Idling, cruising and power ranges (Continued...)
Lecture 14 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems
Lecture 15 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems (Continued...)
Lecture 16 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems (Continued...)
Lecture 17 - Engine friction, Lubrication systems, forces on piston
Lecture 18 - Lubricating oils, Thermochemistry and Fuels, Self-ignition
Lecture 19 - Octane and Cetane Numbers, Alternative Fuels - Methanol, Ethanol, hydrogen, Natural Gas
Lecture 20 - Octane and Cetane Numbers, Alternative Fuels - Methanol, Ethanol, hydrogen, Natural Gas (Continued...)
Lecture 21 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram
Lecture 22 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram (Continued...)
Lecture 23 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram (Continued...)
Lecture 24 - SI engine injection system, Energy distribution, Engine temperatures, Heat transfer in combustion chambers
Lecture 25 - SI engine injection system, Energy distribution, Engine temperatures, Heat transfer in combustion chambers
Lecture 26 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends
Lecture 27 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends (Continued...)
Lecture 28 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends (Continued...)
Lecture 29 - Problems on IC engine

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Lecture 30 - Turbomachines, Gas Turbine theory
Lecture 31 - Open Cycle Gas Turbine Power Plant, Twin Shaft Arrangement
Lecture 32 - Closed Cycle, Multi-Spool Arrangement, Steam Power Plant
Lecture 33 - Basic Thermodynamics
Lecture 34 - Brayton Cycle
Lecture 35 - Brayton Cycle
Lecture 36 - Brayton Cycle with Heat Exchanger/Reheater
Lecture 37 - Brayton Cycle with Intercooler
Lecture 38 - Real Brayton Cycle, Solved Example for Ideal Cycle
Lecture 39 - Solved Examples for Real Brayton Cycle
Lecture 40 - Introduction and Performance Parameters of Propulsion System
Lecture 41 - Basics of Various Aircraft Engine
Lecture 42 - Euler Turbomachinery Equation
Lecture 43 - Introduction and Flow Analysis of Centrifugal Compressors
Lecture 44 - Thermodynamics Analysis of Centrifugal Compressors
Lecture 45 - Axial Compressor
Lecture 46 - Axial Compressor
Lecture 47 - Complete Analysis of Axial Flow Gas Turbine
Lecture 48 - Solved Examples for Axial Compressors, Centrifugal Compressors and Turbine
Lecture 49 - Radial Flow Turbine, Solved Example of Free vortex Condition
Lecture 50 - Nozzles and Diffusers
NPTEL Video Course - Mechanical Engineering - NOC: Fundamental of Welding Science and Technology

Subject Co-ordinator - Prof. Pankaj Biswas
Co-ordinating Institute - IIT - Guwahati

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

| Lecture 1 | Introduction of welding |
| Lecture 2 | Classification of welding and joints |
| Lecture 3 | Parts of weld joint |
| Lecture 4 | Welding Symbol |
| Lecture 5 | Welding power source - 1 |
| Lecture 6 | Welding power source - 2 |
| Lecture 7 | Welding Power sources characteristics - 1 |
| Lecture 8 | Welding Power sources characteristics - 2 |
| Lecture 9 | Physics of welding - 1 |
| Lecture 10 | Physics of welding - 2 |
| Lecture 11 | Physics of welding - 4 (Arc Stability and Arc Blow) |
| Lecture 12 | Physics of welding - 3 |
| Lecture 13 | Physics of welding - 5 (Metal Transfer-1) |
| Lecture 14 | Physics of welding - 6 (Metal Transfer-2) |
| Lecture 15 | Physics of welding - 7 (Metal Transfer-3) |
| Lecture 16 | Physics of welding - 8 (Metal Transfer-4) |
| Lecture 17 | Physics of welding - 9 (Metal Transfer-5) |
| Lecture 18 | Physics of welding - 10 (Metalting Efficiency) |
| Lecture 19 | Oxy-Fuel Gas Welding |
| Lecture 20 | Shielded Metal Arc Welding |
| Lecture 21 | Gas Tungsten Arc Welding |
| Lecture 22 | Gas Metal Arc Welding |
| Lecture 23 | Submerged Arc Welding |
| Lecture 24 | Welding Defects and Inspection |

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NPTEL Video Course - Mechanical Engineering - NOC: Polymer Assisted Abrasive Finishing Processes

Subject Co-ordinator - Prof. Mamilla Ravi Sankar

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to Polymer Assisted Abrasive Finishing Processes
Lecture 2 - Surface Integrity and Surface roughness representation - Part I
Lecture 3 - Surface Integrity and Surface roughness representation - Part II
Lecture 4 - Introduction to Grinding and Polymer assisted Grinding Wheels
Lecture 5 - Polymer medium for vibratory bowl finishing, Tumbling, Drag finishing
Lecture 6 - Polymer Pad and Chemo-mechanical Polishing
Lecture 7 - Elastic Emission Machining
Lecture 8 - Hydrodynamic Polishing, Elasto Abrasive Finishing
Lecture 9 - Abrasive Flow Machining and Finishing - Part I
Lecture 10 - Abrasive Flow Machining and Finishing - Part II
Lecture 11 - Advances in Abrasive Flow Finishing
Lecture 12 - Advances in Abrasive Flow Finishing
Lecture 13 - AFF Processes
Lecture 14 - Finishing of Biomedical implants (Micro AFF
Lecture 15 - Summary of the Course

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NPTEL Video Course - Mechanical Engineering - NOC: Mathematical Modeling of Manufacturing Processes

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Materials and manufacturing Processes - 1
Lecture 2 - Materials and manufacturing Processes - 2
Lecture 3 - Physics based modeling approach at different scale
Lecture 4 - Evaluation of properties and process modelling
Lecture 5 - Thermofluid and electromagnetic analysis
Lecture 6 - Solid-state deformation and residual stress - 1
Lecture 7 - Solid-state deformation and residual stress - 2
Lecture 8 - Melting, solidification and additive manufacturing
Lecture 9 - Force and velocity diagram - 1
Lecture 10 - Force and velocity diagram - 2
Lecture 11 - Heat transfer analysis
Lecture 12 - Principal and mechanism at different processes - 1
Lecture 13 - Principal and mechanism at different processes - 2
Lecture 14 - Mechanics of bulk metal forming
Lecture 15 - Mechanics of sheet metal forming - 1
Lecture 16 - Mechanics of sheet metal forming - 2
Lecture 17 - Heat transfer and thermomechanical processing
Lecture 18 - Fusion welding processes - 1
Lecture 19 - Fusion welding processes - 2
Lecture 20 - Physics of welding and metal transfer
Lecture 21 - Heat source model in fusion welding
Lecture 22 - Heat transfer and material flow
Lecture 23 - Solidification in welding - 1
Lecture 24 - Solidification in welding - 2
Lecture 25 - Solid state welding - 1
Lecture 26 - Solid state welding - 2
Lecture 27 - Hybrid welding, residual stress and distortion
Lecture 28 - Cooling and solidification at different casting processes
Lecture 29 - Powder metallurgy

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Lecture 30 - Principle of surface and coating technologies
Lecture 31 - Principle and development of additive manufacturing technologies - 1
Lecture 32 - Principle and development of additive manufacturing technologies - 2
Lecture 33 - Fundamentals of heat treatment
Lecture 34 - Evaluation of microstructural properties and residual stress
Lecture 35 - Down-scaling of conventional manufacturing processes and Micro-to-nano manufacturing
Lecture 36 - Packaging, micro-finishing and micro-manufacturing processes
Lecture 37 - Processing and shaping of non-metals and bio-materials
Lecture 38 - Principle of glass and ceramics processing and their shaping
Lecture 1 - Introduction and Notation
Lecture 2 - Flow Regimes and Flow Regime Maps
Lecture 3 - The Homogeneous Model
Lecture 4 - The Separated Flow Model
Lecture 5 - The Separated Flow Model (Continued...)
Lecture 6 - The Drift Flux Model
Lecture 7 - Estimation of pressure drop in two phase flow
Lecture 8 - Two phase flow and pressure drop in miniature channels
Lecture 1 - Overview of thermodynamic system and state
Lecture 2 - First and second laws of thermodynamics
Lecture 3 - Concept of entropy and entropy generation
Lecture 4 - Concept of exergy and exergy destruction
Lecture 5 - Thermodynamic potentials and Maxwell relations
Lecture 6 - Generalized relations for entropy and specific heats
Lecture 7 - Joule-Thomson coefficient and Clapeyron equation
Lecture 8 - Liquid-vapor phase-change process
Lecture 9 - Use of property tables
Lecture 10 - Equations-of-state and Compressibility factor
Lecture 11 - Ideal cycles for reciprocating engines
Lecture 12 - Otto, Diesel and Dual combustion cycles
Lecture 13 - Stirling and Ericsson cycles
Lecture 14 - Fuel-air cycle
Lecture 15 - Numerical exercise on Fuel-air cycles
Lecture 16 - Losses in actual cycle and valve-timing diagram
Lecture 17 - Ideal Brayton cycle
Lecture 18 - Intercooling and reheating in Brayton cycle
Lecture 19 - Regeneration in Brayton cycle
Lecture 20 - Ideal Rankine cycle
Lecture 21 - Improvements and modifications in Rankine cycle
Lecture 22 - Regenerative Rankine cycle
Lecture 23 - Binary vapor power cycle
Lecture 24 - Combined gas-steam power plant
Lecture 25 - Different arrangements in combined cycles
Lecture 26 - Vapor compression refrigeration cycle
Lecture 27 - SSS cycles and refrigerants
Lecture 28 - Modifications in VCR systems
Lecture 29 - Vapor absorption refrigeration cycle
Lecture 30 - P-v-T behavior of gas mixtures
Lecture 31 - Numerical examples
Lecture 32 - Properties of moist air
Lecture 33 - Psychrometric chart and various psychrometric processes
Lecture 34 - Sensible heat factor and bypass factor
Lecture 35 - Theoretical and actual combustion process
Lecture 36 - Thermodynamic analyses of reacting systems
NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Conduction and Radiation

Subject Co-ordinator - Prof. Dipankar N. Basu
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Relationship of Thermodynamics with Heat transfer
Lecture 2 - Modes of heat transfer
Lecture 3 - Fourier's law and thermal conductivity
Lecture 4 - Generalized heat diffusion equation
Lecture 5 - Heat diffusion equation in curvilinear coordinates
Lecture 6 - Concept of thermal resistance
Lecture 7 - Use of network of resistances in wall and cylinder
Lecture 8 - Critical thickness of insulation
Lecture 9 - Conduction with energy generation - I
Lecture 10 - Conduction with energy generation - II
Lecture 11 - General Heat Transfer Analysis
Lecture 12 - Fins with uniform cross-section area - I
Lecture 13 - Fins with uniform cross-section area - II
Lecture 14 - Fins with non-uniform cross-section area
Lecture 15 - Method of Separation of Variables
Lecture 16 - Graphical approach
Lecture 17 - Method of Superposition
Lecture 18 - Lumped capacitance approach - I
Lecture 19 - Lumped capacitance approach - II
Lecture 20 - Semi-infinite Solid
Lecture 21 - Steady Heat Conduction
Lecture 22 - Unsteady Heat Conduction
Lecture 23 - Problem solving using Energy Balance Method
Lecture 24 - Introduction to radiative heat fluxes
Lecture 25 - Spectral and directional definitions
Lecture 26 - Blackbody radiation
Lecture 27 - Emissivity
Lecture 28 - Irradiation of real surfaces
Lecture 29 - View factor

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Lecture 30 - Blackbody radiation exchange
Lecture 31 - Radiation networks
Lecture 32 - Gas radiation
Lecture 33 - Radiative Transfer Equation
Lecture 30 - Gas Mixture
Lecture 31 - Psychrometry - 1
Lecture 32 - Psychrometry - 2
Lecture 33 - Condensers
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Lecture 34 - Plastic Deformation at High Strain Rates - 1
Lecture 35 - Plastic Deformation at High Strain Rates - 2
Lecture 36 - Plastic Deformation at High Strain Rates - 3
Lecture 37 - Plastic Deformation at High Strain Rates - 4
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Lecture 39 - Plastic Deformation Under Shock Waves - 1
Lecture 40 - Plastic Deformation Under Shock Waves - 2
Lecture 41 - Plastic Deformation Under Shock Waves - 3
Lecture 42 - Shear Band - 1
Lecture 43 - Shear Band - 2
Lecture 44 - Dynamic Fracture - 1
Lecture 45 - Dynamic Fracture - 2
NPTEL Video Course - Mechanical Engineering - NOC: Plastic Working of Metallic Materials

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

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to Plastic Working of Metals
Lecture 2 - Uniaxial Tension Test Analysis
Lecture 3 - Temperature effects in metal forming
Lecture 4 - Friction and Lubrication
Lecture 5 - Friction and Lubrication (Continued...)
Lecture 6 - Deformation zone + worked examples
Lecture 7 - Stresses at point and Theory of Plasticity
Lecture 8 - Slab Analysis
Lecture 9 - Slip Line Field Theory - Part 1
Lecture 10 - Slip Line Field Theory - Part 2
Lecture 11 - Upper Bound Theorem
Lecture 12 - Plasticity equations
Lecture 13 - Forging
Lecture 14 - Analysis of Forging
Lecture 15 - Analysis of Forging (Continued...)
Lecture 16 - Forging Die Design consideration
Lecture 17 - Forging Load
Lecture 18 - Rolling of Metals
Lecture 19 - Analysis of Rolling
Lecture 20 - Analysis of Rolling (Continued...)
Lecture 21 - Strain rate in the deformation zone
Lecture 22 - Rolling mills
Lecture 23 - Problem on rolling
Lecture 24 - Drawing of Rods, Wires and Tubes
Lecture 25 - Drawing of Rods, Wires and Tubes (Continued...)
Lecture 26 - Analysis of Wire Drawing
Lecture 27 - Wire Drawing
Lecture 28 - Extrusion Process
Lecture 29 - Analysis of Extrusion

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Artificial Intelligence

Subject Co-ordinator - Prof. Shyamanta M. Hazarika
Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Introduction to Artificial Intelligence
Lecture 2 - Problem Solving as State Space Search
Lecture 3 - Uninformed Search
Lecture 4 - Heuristic Search
Lecture 5 - Informed Search
Lecture 6 - Constraint Satisfaction Problems
Lecture 7 - Searching AND/OR Graphs
Lecture 8 - Game Playing
Lecture 9 - Minimax + Alpha-Beta
Lecture 10 - Introduction to Knowledge Representation
Lecture 11 - Propositional Logic
Lecture 12 - First Order Logic - I
Lecture 13 - First Order Logic - II
Lecture 14 - Inference in First Order Logic - I
Lecture 15 - Inference in First Order Logic - II
Lecture 16 - Answer Extraction
Lecture 17 - Procedural Control of Reasoning
Lecture 18 - Reasoning under Uncertainty
Lecture 19 - Bayesian Network
Lecture 20 - Decision Network
Lecture 21 - Introduction to Planning
Lecture 22 - Plan Space Planning
Lecture 23 - Planning Graph and GraphPlan
Lecture 24 - Practical Planning and Acting
Lecture 25 - Sequential Decision Problems
Lecture 26 - Making Complex Decisions
Lecture 27 - Introduction to Machine Learning
Lecture 28 - Learning Decision Trees
Lecture 29 - Linear Regression

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Lecture 30 - Support Vector Machines
Lecture 31 - Unsupervised Learning
Lecture 32 - Reinforcement Learning
Lecture 33 - Learning in Neural Networks
Lecture 34 - Deep Learning
NPTEL Video Course - Mechanical Engineering - NOC: Aircraft Propulsion

Subject Co-ordinator - Dr. Vinayak Kulkarni

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Overview of Basic Thermodynamics
Lecture 2 - Solved Examples for Flow process
Lecture 3 - Turbomachines
Lecture 4 - Components of Gas Turbine Power Plant, Gas Turbine Attachments
Lecture 5 - Introduction to Various Aircraft engines, Engine Performance parameters
Lecture 6 - Air Standard Ideal Brayton Cycle
Lecture 7 - Examples for Ideal Brayton Cycle
Lecture 8 - Non-Ideal Brayton Cycle
Lecture 9 - Examples for Non-Ideal Brayton Cycle
Lecture 10 - Brayton Cycle with Heat Exchanger / Re-heater
Lecture 11 - Brayton Cycle with Intercooler / All Attachments
Lecture 12 - Examples of Gas Turbine Attachment
Lecture 13 - Examples of Gas Turbine Attachment
Lecture 14 - Stagnation Conditions, Real Brayton Cycle with Stagnation Conditions
Lecture 15 - Polytropic Efficiency of Compressor and Turbine
Lecture 16 - Examples of Real Cycle
Lecture 17 - Nozzle Flow
Lecture 18 - Aircraft Engine Intake, Intake Efficiency
Lecture 19 - Propelling Nozzle, Nozzle Efficiency
Lecture 20 - Turbojet engine
Lecture 21 - Turbofan engine
Lecture 22 - Ramjet engine
Lecture 23 - Examples of Ramjet Engine
Lecture 24 - Thrust Augmentation and Engine performance parameters for Aircrafts
Lecture 25 - Introduction to Turbomachinery
Lecture 26 - Centrifugal Compressor
Lecture 27 - Centrifugal Compressor
Lecture 28 - Examples of Centrifugal compressor
Lecture 29 - Axial Flow Compressor

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Lecture 30 - Axial Flow Compressor
Lecture 31 - Examples of Axial Flow Compressor
Lecture 32 - Examples of Axial Flow Compressor
Lecture 33 - Examples of Axial Flow Compressor
Lecture 34 - Axial Turbine
Lecture 35 - Radial Turbine
Lecture 36 - Examples of Axial Turbine
Lecture 37 - Practice examples of Axial Turbine and centrifugal compressor
Lecture 38 - Cascade theory and Blade design
Lecture 39 - Cascade variables and Turbine Cascade
Lecture 40 - Velocity diagrams of Turbine Cascade, Compressor cascade
Lecture 41 - Turbine cooling methods
Lecture 42 - Practice examples of aircraft engine
Lecture 1 - Applications of CFD
Lecture 2 - Basic equations of fluid dynamics and heat transfer
Lecture 3 - Initial and boundary conditions
Lecture 4 - Physical Classification, System of first-order PDEs
Lecture 5 - System of second-order PDEs
Lecture 6 - Finite difference by Taylor series expansion
Lecture 7 - Finite difference by general approximation and polynomials
Lecture 8 - Finite difference in non-uniform grid
Lecture 9 - Types of error and accuracy of FD solutions
Lecture 10 - Finite difference formulations of Elliptic Equations with boundary condition treatment
Lecture 11 - Iterative Methods
Lecture 12 - Applications
Lecture 13 - Linear Solvers
Lecture 14 - Finite difference formulations of Parabolic Equations
Lecture 15 - Finite difference formulations of Parabolic Equations
Lecture 16 - Finite difference formulations of Parabolic Equations
Lecture 17 - Finite difference formulations of Parabolic Equations
Lecture 18 - Finite difference formulations of the first order wave equation
Lecture 19 - Finite difference formulations of the first order wave equation
Lecture 20 - Von Neumann stability analysis of different schemes for Parabolic equations
Lecture 21 - Von Neumann stability analysis of different schemes for Parabolic equations
Lecture 22 - Von Neumann stability analysis of different schemes for Hyperbolic equations
Lecture 23 - Modified equation, Artificial viscosity, Numerical diffusion
Lecture 24 - Discretization vorticity-stream function equations using FDM
Lecture 25 - Boundary conditions for flow problems
Lecture 26 - Solutions of vorticity-stream function equations
Lecture 27 - Solution of Navier-Stokes Equation using FDM
Lecture 28 - Solution of Navier-Stokes Equation using FDM (Continued...)
Lecture 29 - Introduction to finite volume method
NPTEL Video Course - Mechanical Engineering - NOC: Experimental Methods in Fluid Mechanics

Subject Co-ordinator - Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Basic concepts, Calibration
Lecture 2 - Dimensions, Units, Standards, Systems of dimensions, System of units, Unit conversion table
Lecture 3 - Basic concept of dynamic measurements
Lecture 4 - Basic concept of dynamic measurements (Continued...)
Lecture 5 - Basic concept of dynamic measurements (Continued...)
Lecture 6 - System response and distortion, Impedance matching
Lecture 7 - Dimensional measurement Gauge blocks, The pneumatic displacement gauge
Lecture 8 - Dimensional measurement Gauge blocks, The pneumatic displacement gauge
Lecture 9 - Pressure Measurements
Lecture 10 - Mechanical pressure measurement devices, U-tube manometer, The inclined well type manometer
Lecture 11 - The aneroid barometer, Diaphragm and Bellows Gauges
Lecture 12 - The Mcleod gauge, The Pirani gauge, The Ionization gauge
Lecture 13 - The Mcleod gauge, The Pirani gauge, The Ionization gauge (Continued...)
Lecture 14 - The Mcleod gauge, The Pirani gauge, The Ionization gauge (Continued...)
Lecture 15 - Pressure measurement using 3 holes/probes
Lecture 16 - Pressure measurement using 3 holes/probes (Continued...)
Lecture 17 - Flow obstruction flow rate measurement (venturimeter/orificemeter), the Rotameter
Lecture 18 - Flow obstruction flow rate measurement (venturimeter/orificemeter), the Rotameter (Continued...)
Lecture 19 - Thermal Anemometry (hot wire/hot film), Hot wire anemometer
Lecture 20 - Thermal Anemometry (hot wire/hot film), Hot wire anemometer (Continued...)
Lecture 21 - Laser Doppler anemometry
Lecture 22 - Measurement of velocity components by 3 holes and 4 holes probes
Lecture 23 - Ideal gas thermometer, Temperature measurement by mechanical and electrical effects
Lecture 24 - Ideal gas thermometer, Temperature measurement by mechanical and electrical effects (Continued...)
Lecture 25 - Thermostatic temperature, Resistance Temperature Detectors (RTD), Thermistors, Thermocouples
Lecture 26 - Temperature measurement by Radiation, The optical pyrometer
Lecture 27 - Transient response of thermal system, Thermocouple compensation, high speed flow
Lecture 28 - Transient response of thermal system, Thermocouple compensation, high speed flow (Continued...)
Lecture 29 - Transient response of thermal system, Thermocouple compensation, high speed flow (Continued...)
Lecture 30 - Constant temperature hot-wire anemometer, LDA
Lecture 31 - Use of PIV
Lecture 32 - Use of PIV (Continued...)
Lecture 33 - Use of PIV (Continued...)
Lecture 34 - Measurement of pitch angle
Lecture 35 - Measurement of torque by dynamometers, straingauge, transducers
Lecture 36 - Measurement of microscale flow features - I
Lecture 37 - Measurement of microscale flow features - II
Lecture 38 - Transient and Frequency response consideration
Lecture 39 - Examples
Lecture 40 - Analysis of experimental data, causes and types of experimental errors
Lecture 41 - Rejection of data
Lecture 42 - Error propagation
Lecture 43 - The Method of Least square with example
NPTEL Video Course - Mechanical Engineering - Acoustics

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Intro, sound wave versus vibration, different types of waves, octave, music scales, sense of SPL
Lecture 2 - Review
Lecture 3 - Review
Lecture 4 - Review
Lecture 5 - 1-D wave equation, and its solution
Lecture 6 - Solution for 1-D wave equation
Lecture 7 - Waveguides, transmission line equations, and standing waves
Lecture 8 - Waveguides, transmission line equations, and standing waves
Lecture 9 - Examples of 1-D waves in tubes, short tubes, Kundt's tube
Lecture 10 - Thermodynamic processes during sound transmission
Lecture 11 - Numerical examples
Lecture 12 - Sound transmission through walls
Lecture 13 - Sound transmission through walls
Lecture 14 - Leakage in walls, STC Ratings, Octave bands
Lecture 15 - Instantaneous power flow
Lecture 16 - Radial propagation of sound, monopoles, and dipoles
Lecture 17 - Radial propagation of sound, monopoles, and dipoles
Lecture 18 - Radial propagation of sound, monopoles, and dipoles
Lecture 19 - Numerical examples
Lecture 20 - Numerical examples
Lecture 21 - Directivity
Lecture 22 - Directivity
Lecture 23 - Directivity
Lecture 24 - Directivity
Lecture 25 - Generalized elements
Lecture 26 - Examples of electromechanical systems
Lecture 27 - Transformers, radiation impedance, and Helmholtz resonator
Lecture 28 - Radiation impedance
Lecture 29 - Radiation impedance

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Lecture 30 - Advanced Machining Processes
Lecture 31 - Advanced Machining Processes
Lecture 32 - Advanced Machining Processes
Lecture 33 - Advanced Machining Processes
Lecture 34 - Advanced Machining Processes
NPTEL Video Course - Mechanical Engineering - Biomicroelectromechanical systems

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10 (same as 9)
Lecture 11
Lecture 12 (Lecture Missing)
Lecture 13
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NPTEL Video Course - Mechanical Engineering - Computer Aided Engineering Design

Subject Co-ordinator - Dr. Anupam Saxena

Co-ordinating Institute - IIT - Kanpur

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

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NPTEL Video Course - Mechanical Engineering - Mathematical Methods in Engineering and Science

Subject Co-ordinator - Dr. Bhaskar Dasgupta

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction
Lecture 2 - Basic Ideas of Applied Linear Algebra
Lecture 3 - Systems of Linear Equations
Lecture 4 - Square Non-Singular Systems
Lecture 5 - Ill-Conditioned and Ill-Posed Systems
Lecture 6 - The Algebraic Eigenvalue Problem
Lecture 7 - Canonical Forms, Symmetric Matrices
Lecture 8 - Methods of Plane Rotations
Lecture 9 - Householder Method, Tridiagonal Matrices
Lecture 10 - QR Decomposition, General Matrices
Lecture 11 - Singular Value Decomposition
Lecture 12 - Vector Space
Lecture 13 - Multivariate Calculus
Lecture 14 - Vector Calculus in Geometry
Lecture 15 - Vector Calculus in Physics
Lecture 16 - Solution of Equations
Lecture 17 - Introduction to Optimization
Lecture 18 - Multivariate Optimization
Lecture 19 - Constrained Optimization
Lecture 20 - Constrained Optimization
Lecture 21 - Interpolation
Lecture 22 - Numerical Integration
Lecture 23 - Numerical Solution of ODE's as IVP
Lecture 24 - Boundary Value Problems, Question of Stability in IVP Solution
Lecture 25 - Stiff Differential Equations, Existence and Uniqueness Theory
Lecture 26 - Theory of First Order ODE's
Lecture 27 - Linear Second Order ODE's
Lecture 28 - Methods of Linear ODE's
Lecture 29 - ODE Systems

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Lecture 30 - Stability of Dynamic Systems
Lecture 31 - Series Solutions and Special Functions
Lecture 32 - Sturm-Liouville Theory
Lecture 33 - Approximation Theory and Fourier Series
Lecture 34 - Fourier Integral to Fourier Transform, Minimax Approximation
Lecture 35 - Separation of Variables in PDE's, Hyperbolic Equations
Lecture 36 - Parabolic and Elliptic Equations, Membrane Equation
Lecture 37 - Analytic Functions
Lecture 38 - Integration of Complex Functions
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NPTEL Video Course - Mechanical Engineering - Dynamics of Machines
Subject Co-ordinator - Prof. Amitabha Ghosh
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 6 - Euler's Equation of Motion
Lecture 7 - Gyroscopic Action in Machines
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NPTEL Video Course - Mechanical Engineering - Kinematics of Machines

Subject Co-ordinator - Prof. Ashok K Mallik

Co-ordinating Institute - IIT - Kanpur

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

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NPTEL Video Course - Mechanical Engineering - Advanced manufacturing process for micro system fabrication

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

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Lab session 4 - Laser Machening Process
Lab session 5 - Vaccume Assisted Forming
Lab session 6 - Vaccume Forming
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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:BioMEMS and Microsystems

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 48 - Explicit and implicit method, diagonalization of mass matrix, closure
NPTEL Video Course - Mechanical Engineering - NOC: Basics of Noise and Its Measurements

Subject Co-ordinator - Prof. Nachiketa Tiwari
Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Vibration versus Waves
Lecture 3 - Nature of Sound
Lecture 4 - The Decibel Scale
Lecture 5 - Some Key Terms
Lecture 6 - Adding Decibels
Lecture 7 - Modeling Sound Propagation
Lecture 8 - The Momentum Equation
Lecture 9 - The Continuity Equation and The Gas Law
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Lecture 25 - Fourier Series Expansion
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Lecture 44 - Spectrograms
Lecture 45 - Reverberation time
Lecture 46 - Anechoic rooms
Lecture 47 - STC, NRC and sound attenuation
Lecture 48 - Reverberant rooms
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Process Technology - Part I

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Manufacturing Process Technology
Lecture 2 - Structure of Matter (Bonding of Solids, Crystal Structures)
Lecture 3 - Brief introduction of non-conventional machining processes
Lecture 4 - Structure of matters (bonding of solids, crystal structures)
Lecture 5 - Elastic and Plastic Deformation
Lecture 6 - Crystal imperfection and dislocation
Lecture 7 - Plastic Deformation
Lecture 8 - Material Properties, Stress Strain Diagram for different types of materials
Lecture 9 - Friction and Wear, Solid solutions
Lecture 10 - Equilibrium Phase Diagram
Lecture 11 - Iron-carbon equilibrium phase diagram
Lecture 12 - Control of material properties (Alloying and heat treatment), Mechanical properties and Recrystallization
Lecture 13 - Introduction To Casting Process
Lecture 14 - Pattern and Mold Design
Lecture 15 - Mold Making Procedures
Lecture 16 - Fundamentals of Melting and Furnaces & Pouring and Gating Design
Lecture 17 - Vertical and Bottom Gating Systems Edit Lesson
Lecture 18 - Numerical Estimation To Find Mold Filling Time and Mold Design
Lecture 19 - Effects of friction and velocity distribution in time of filling
Lecture 20 - Numerical design of gating systems using frictional and bending losses
Lecture 21 - Principle of cooling and solidification in single and multiphase systems
Lecture 22 - Estimation of rate of solidification
Lecture 23 - Principles of cooling and solidification of casting
Lecture 24 - Modeling of Solidification Rates of Thin Casting in a Metal Mold
Lecture 25 - Solidification with Predominant Interface Resistance
Lecture 26 - Solidification with Constant Casting Surface Temperature
Lecture 27 - Solidification of Casting with Predominant Resistance in Mold and Solidified Metal
Lecture 28 - Solidification Time for Permanent Mold Casting
Lecture 29 - Solidification with Constant Casting Surface

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Lecture 2 - Classification of Materials
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NPTEL Video Course - Mechanical Engineering - NOC: Manufacturing Process Technology - Part II

Subject Co-ordinator - Dr. Shantanu Bhattacharya
Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Classification of Machining Processes
Lecture 3 - Silicon growth and Crystallography
Lecture 4 - Micro Fabrication Technology
Lecture 5 - Photolithography
Lecture 6 - Soft Lithography
Lecture 7 - Introduction to Wet Etching Techniques
Lecture 8 - Introduction to Dry Etching Techniques
Lecture 9 - Introduction of Additive Techniques
Lecture 10 - Introduction to Abrasive Jet Machining Process
Lecture 11 - Ultrasonic Machining Process
Lecture 12 - Determination of MRR of Ultrasonic Machining Process
Lecture 13 - Mechanics of Ultrasonic Machining (USM)
Lecture 14 - Effect of Process parameters of USM
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Lecture 16 - Electrochemical Machining Processes (ECM)
Lecture 17 - Material Removal Rate of ECM
Lecture 18 - Electrode Double Layer
Lecture 19 - Material removal rate of an alloy in ECM
Lecture 20 - Kinematics and Dynamics of ECM
Lecture 21 - Temperature and Pressure rise during ECM
Lecture 22 - Determination of Electrolyte flow velocity in ECM
Lecture 23 - Effect of heat and Hydrogen bubble generation during ECM Process
Lecture 24 - Theoretical determination of Tool shape
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Lecture 26 - Introductions of Electro-chemical Drilling Process
Lecture 27 - Introduction to Finishing Process
Lecture 28 - Electric Discharge Machining Process
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Lecture 31 - Analysis of RC circuit for EDM
Lecture 32 - Electrodischarge machining system
Lecture 33 - Effect of various parameters on EDM Process
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Lecture 36 - Functional Characteristics of EBM Process Edit Lesson
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Lecture 38 - Material removal rate of LBM
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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Finite Element Analysis - II

Subject Co-ordinator - Prof. Nachiketa Tiwari
Co-ordinating Institute - IIT - Kanpur

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Lecture 2 - Fundamental principles
Lecture 3 - Steps followed in FEA
Lecture 4 - Weak Formulation
Lecture 5 - Weak Formulation
Lecture 6 - Assembling element level equations
Lecture 7 - Errors in FEA Solution
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Lecture 34 - Stiffness and Force matrices for Rectangular element
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NPTEL Video Course - Mechanical Engineering - NOC: Principles of Vibration Control

Subject Co-ordinator - Prof. Bishakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Vibration control
Lecture 2 - Strategies and Steps in Vibration Control
Lecture 3 - Strategies, Active control, Detuning and Decoupling
Lecture 4 - Viscous damping model
Lecture 5 - Coulomb and Hysteretic damping model
Lecture 6 - Energy Dissipation in Structural Materials
Lecture 7 - Material Selection Criterion against Damping
Lecture 8 - Design for Enhanced Material Damping
Lecture 9 - Linear Viscoelastic Materials and Models
Lecture 10 - Maxwell and 3-Parameter Models
Lecture 11 - Complex modulus and Applications of VEM
Lecture 12 - Basics of Dynamic Vibration Absorber
Lecture 13 - Modelling of Dynamic Vibration Absorber
Lecture 14 - Proof mass Actuator
Lecture 15 - Springs for Vibration Isolation
Lecture 16 - Introduction to Active Vibration Control
Lecture 17 - Basics of Classical Control System
Lecture 18 - Basics of State Space Control
Lecture 19 - Controllability and Observability of System
Lecture 20 - Full State Feedback Control
Lecture 21 - SMSS Laboratory Demonstration
NPTEL Video Course - Mechanical Engineering - NOC: Fundamentals of Acoustics

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 4 - Lesson 4 - The Decibel scale
Lecture 5 - Lesson 5 - Key Terms In Acoustics
Lecture 6 - Lesson 6 - Adding Decibels
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Lecture 8 - Lesson 2 - Important Mathematical Concepts-Complex Time Signals
Lecture 9 - Lesson 3 - Important Mathematical Concepts-Transfer Function
Lecture 10 - Lesson 4 - Important Mathematical Concepts-Pole Zero Plot
Lecture 11 - Lesson 5 - Important Mathematical Concepts - Bode Plot For Simple Pole
Lecture 12 - Lesson 6 - Important Mathematical Concepts - Bode Plot For Simple Zero
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Lecture 28 - Lesson 4 - Power Flow into an Infinitely Long Tube
Lecture 29 - Lesson 5 - Point Sources of Sound

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Lecture 72 - Lesson 6 - Noise Reduction Coefficient (NRC)
Lecture 30 - Implication of Avrami's equation with example on excel spreadsheet
Lecture 31 - Experimental verification of Avrami Equation
Lecture 32 - Linear regression (least squares) method to find the value of n and k in Avrami equation
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Lecture 34 - Stereology and quantitative metallography - I
Lecture 35 - Stereology and quantitative metallography - II
Lecture 36 - Grain size measurements methods
Lecture 37 - Statistical tools for analysis and reporting of obtained data with examples
Lecture 38 - Evolution of TTT and CCT diagram from f vs. t plots
Lecture 39 - TTT, CCT continue and hardenability of steel
Lecture 40 - Importance of heat treatment practices in real life (with examples)
NPTEL Video Course - Mechanical Engineering - NOC: Phase Transformation in Materials

Subject Co-ordinator - Dr. Krishanu Biswas
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Introduction
Lecture 2 - Define Phase, Equilibrium
Lecture 3 - Free Energy, Stability of Phases
Lecture 4 - Gibbs Free Energy of Binary Solution
Lecture 5 - Ideal Solution and Chemical Potential
Lecture 6 - Thermodynamics of solid solutions
Lecture 7 - G vs X curves
Lecture 8 - Solid solutions
Lecture 9 - Heterogeneous phase equilibria
Lecture 10 - G vs X curves for eutectic system
Lecture 11 - G-X plot for peritectic system
Lecture 12 - Effect of temperature of solid solubility, Influence of interfaces on Equilibrium
Lecture 13 - Introduction of Diffusion
Lecture 14 - Mechanism of Diffusion, Fick's I law
Lecture 15 - Fick's II law
Lecture 16 - Fick's II law (Continued...), Diffusion and Temperature
Lecture 17 - Interfacial Free Energy, Solid/Vapor Interface
Lecture 18 - Boundaries in single phase solids
Lecture 19 - High angle grain boundaries, Equilibrium in poly-crystalline materials, Interphase interfaces in solids
Lecture 20 - Interphase interfaces in solids (Continued...)
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Lecture 29 - Dendritic Solidification

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Lecture 30 - Growth rate for dendrite formation
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Lecture 32 - Alloy solidification (Continued...)
Lecture 33 - Eutectic
Lecture 34 - Eutectic
Lecture 35 - Solidification of casting / ingot
Lecture 36 - Precipitation hardenable alloy
Lecture 37 - Precipitation age- hardening alloy (Continued...)
Lecture 38 - Age hardening alloy
Lecture 39 - Eutectoid transformation
Lecture 40 - Eutectoid transformation (Continued....)
Lecture 41 - Eutectoid transformation in steel (Continued...)
Lecture 42 - Martensite
Lecture 43 - Martensite (Continued...)
Lecture 44 - Martensite (Continued...) and TTT curves
Lecture 45 - TTT diagram
Lecture 46 - Recovery, Recrystallization and Grain growth
Lecture 47 - Recovery
Lecture 48 - Recrystallization
Lecture 49 - Recrystallization (Continued...)
Lecture 50 - Introduction to spinodal decomposition
NPTEL Video Course - Mechanical Engineering - NOC: Manufacturing of Composites

Subject Co-ordinator - Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Composites
Lecture 2 - Matrices
Lecture 3 - Fiber reinforcements
Lecture 4 - Fiber reinforcements (Continued...)
Lecture 5 - Composites properties
Lecture 6 - Composites testing
Lecture 7 - Selection of material
Lecture 8 - Selection of material (Continued...)
Lecture 9 - Design for Manufacturing
Lecture 10 - Design for Manufacturing (Continued...)
Lecture 11 - Composite Manufacturing Processes
Lecture 12 - Filament winding Processes
Lecture 13 - Resin transfer moulding
Lecture 14 - Pultrusion
Lecture 15 - Compression Moulding Process
Lecture 16 - Vacuum Impregnation Methods
Lecture 17 - Stacking of Composites
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Lecture 19 - Thermoplastic Composites Manufacturing Processes - Part 2 (Continued...)
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Lecture 21 - Metal Matrix Composites
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Lecture 26 - Fabrication of Ceramic Matrix Composites (CMCs)
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Lecture 28 - Polymer Matrix and Nano Composites
Lecture 29 - Machining of Composites

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Lecture 30 - Repair of Composites
Lecture 31 - Manufacturing Processes
NPTEL Video Course - Mechanical Engineering - NOC: Applied Ergonomics

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 34 - Motion and time study
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Lecture 45 - Job Satisfaction
Lecture 46 - Worker behavior
NPTEL Video Course - Mechanical Engineering - NOC: Noise Management and Control

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Introduction
Lecture 3 - Nature Of Sound
Lecture 4 - Beats
Lecture 5 - The Decibel Scale
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Lecture 8 - Decibel Scale - Part 2
Lecture 9 - Decibel Scale - Part 3
Lecture 10 - Complex Numbers
Lecture 11 - Complex Time Function
Lecture 12 - Linear Systems
Lecture 13 - Transfer Functions
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Lecture 15 - The Momentum Equation
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Lecture 23 - Standing Wave Formation in a Closed Tube With Rigid Termination
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Lecture 25 - 1-D sound wave propagation
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Lecture 28 - Radially propagating sound waves in spherical coordinate system - II
Lecture 29 - Complex impedance for radially propagating sound waves in spherical coordinate system

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NPTEL Video Course - Mechanical Engineering - NOC:Design Practice

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Product Development
Lecture 3 - Basic protocols of industrial design
Lecture 4 - Design thinking and innovation
Lecture 5 - Brain Storming
Lecture 6 - Design prototyping
Lecture 7 - Generic Phases of the Design
Lecture 8 - Configurational Design Aspects
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Lecture 10 - Concurrent Engineering - 2
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Lecture 13 - Benefits of concurrent engineering
Lecture 14 - Concurrent engineering environment influencing dimensions
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Lecture 16 - Program and product Interface dimensions in Concurrent engineering
Lecture 17 - Product Development Methodology
Lecture 18 - Elements of concurrent engineering
Lecture 19 - Business relationships in concurrent engineering
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Lecture 21 - Techniques for the Implementation of concurrent engineering environment
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Lecture 27 - Basic steps in Material Selection Process
Lecture 28 - Design of Work Systems
Lecture 29 - Motion Study

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Lecture 30 - Axiomatic Design
Lecture 31 - Introduction to group technology
Lecture 32 - Failure Mode Effect Analysis
NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Composites

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

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

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Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

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Lecture 69 - Introduction to Short-Fiber Composites
Lecture 70 - Theories of Stress Transfer
Lecture 71 - Theories of Stress Transfer
Lecture 72 - Modulus of Short-Fiber Composites and Closure
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Engineering Metrology

Subject Co-ordinator - Dr. Amandeep Singh, Prof. J. Ramkumar
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to measurements and metrology
Lecture 2 - Instruments in measurement systems
Lecture 3 - Instruments in measurement systems
Lecture 4 - General concepts and definitions in metrology
Lecture 5 - Standards of measurement
Lecture 6 - Limits, Fits, and Tolerances - Part 1
Lecture 7 - Limits, Fits, and Tolerances - Part 2
Lecture 8 - Limits, Fits, and Tolerances - Part 3
Lecture 9 - Limits, Fits, and Tolerances - Part 4
Lecture 10 - Linear Measurements - Part 1
Lecture 11 - Linear Measurements - Part 2
Lecture 12 - Laboratory demonstration, Vernier Caliper
Lecture 13 - Laboratory demonstration, Dial gauge and vernier, micrometer, surface plate, feeler gauge
Lecture 14 - Angular Measurements - Part 1
Lecture 15 - Angular Measurements - Part 2
Lecture 16 - Laboratory demonstration, Vernier height gauge
Lecture 17 - Laboratory demonstration, Thread gauge, spirit level
Lecture 18 - Laboratory demonstration, Combination set, slip gauges, sine bar
Lecture 19 - Comparators - Part 1
Lecture 20 - Comparators - Part 2
Lecture 21 - Transducers - Part 1
Lecture 22 - Transducers - Part 2
Lecture 23 - Screw thread metrology
Lecture 24 - Gears metrology - Part 1
Lecture 25 - Gears metrology - Part 2
Lecture 26 - Laboratory demonstration, Gear Vernier
Lecture 27 - Surface metrology
Lecture 28 - Temperature measurements
Lecture 29 - Pressure measurements - Part 1

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Lecture 30 - Pressure measurements - Part 2
Lecture 31 - Strain measurements - Part 1
Lecture 32 - Strain measurements - Part 2
Lecture 33 - Optical measurements and Nanometrology - Part 1
Lecture 34 - Optical measurements and Nanometrology - Part 2
Lecture 35 - Optical measurements and Nanometrology - Part 3
Lecture 36 - Statistics in Metrology, an introduction - Part 1
Lecture 37 - Statistics in Metrology, an introduction - Part 2
Lecture 38 - Data and scales in measurements
Lecture 39 - Discrete and continuous data
Lecture 40 - Statistics for metrology, fundamental concepts - Part 1
Lecture 41 - Statistics for metrology, fundamental concepts - Part 2
Lecture 42 - Statistics for metrology, fundamental concepts - Part 3
Lecture 43 - Probability distributions for estimating measurement
Lecture 44 - Normal distribution
Lecture 45 - Statistics for proportions
Lecture 46 - Chi square distribution, and Data outlier detection
Lecture 47 - Quality Control, introduction
Lecture 48 - Quality Control, control charts for variables
Lecture 49 - Quality Control, control charts for attributes
Lecture 50 - Quality Control, critical aspects
Lecture 51 - 3D measurements, Coordinate Measuring Machine (CMM)
Lecture 52 - Laboratory demonstration, Coordinate Measuring Machine (CMM)
NPTEL Video Course - Mechanical Engineering - NOC: Smart Materials and Intelligent System Design

Subject Co-ordinator - Prof. Bisakh Bhattacharya
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Smart Materials
Lecture 2 - Piezoelectric Material
Lecture 3 - Magnetostrictive Material
Lecture 4 - Active Smart Polymer
Lecture 5 - Shape Memory Alloys
Lecture 6 - Introduction to composites
Lecture 7 - Classification of Composites
Lecture 8 - Micromechanics and Macromechanics of Composites
Lecture 9 - Classical Laminated Plate Theory
Lecture 10 - ABD Matrices
Lecture 11 - Modelling of piezoelectric material 1
Lecture 12 - Modelling of piezoelectric material 2
Lecture 13 - Modelling of Magnetostrictive material
Lecture 14 - Modelling of Shape memory Alloys
Lecture 15 - Smart Actuators
Lecture 16 - Smart Materials based MEMS
Lecture 17 - Smart MEMS Applications
Lecture 18 - Energy Harvesting
Lecture 19 - Concept of Self Healing
NPTEL Video Course - Mechanical Engineering - NOC:Design Practice-II

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Design concepts
Lecture 2 - Computer Aided Design (CAD)
Lecture 3 - Geometrical transformation
Lecture 4 - Composition of geometrical transformation
Lecture 5 - Geometric modeling
Lecture 6 - Representation of curves
Lecture 7 - Parametric representation of synthetic curves
Lecture 8 - Curve fitting problem (Hermite case)
Lecture 9 - Problem solving (based on Bezier curve)
Lecture 10 - Representation of Surfaces
Lecture 11 - Introduction to Micro-Electro mechanical Systems (MEMS)
Lecture 12 - Lab-on-Chip
Lecture 13 - Introduction to Sensors
Lecture 14 - Introduction to Transducers
Lecture 15 - Introduction to device fabrications
Lecture 16 - Introduction to Silicon as a MEMS material
Lecture 17 - Etching processes
Lecture 18 - Types of Photolithography
Lecture 19 - Introduction to actuators
Lecture 20 - Designing of the Micro-Valve
Lecture 21 - Electrochemical valves
Lecture 22 - Micropumps
Lecture 23 - Designing of peristaltic pumps
Lecture 24 - Different types of pumps and sensors
Lecture 25 - Computer Numerical Control
Lecture 26 - Numerical control programming
Lecture 27 - NC part programming
Lecture 28 - Introduction to rapid prototyping
Lecture 29 - Different types of rapid prototyping technologies

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Lecture 30 - Fused Deposition Modeling
Lecture 31 - LAB demonstration of Fused Deposition Modelling Techniques
Lecture 32 - LAB demonstration of Fused Deposition Modelling Process
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
NPTEL Video Course - Mechanical Engineering - NOC: Rapid Manufacturing

Subject Co-ordinator - Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Rapid Manufacturing - Part 1
Lecture 2 - Introduction to Rapid Manufacturing - Part 2
Lecture 3 - Introduction to Rapid Manufacturing - Part 3
Lecture 4 - Product Development Process - Part 1
Lecture 5 - Product Development Process - Part 2
Lecture 6 - Product Development Process - Part 3
Lecture 7 - Design for Modularity (Manufacturing)
Lecture 8 - Design for Modularity (Assembly; Part 1)
Lecture 9 - Design for Modularity (Assembly; Part 2)
Lecture 10 - Design for Modularity
Lecture 11 - Subtractive versus Rapid Manufacturing
Lecture 12 - Reverse Engineering - Part 1
Lecture 13 - Reverse Engineering - Part 2
Lecture 14 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 1
Lecture 15 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 2
Lecture 16 - Laboratory Demonstration, 3D scanners - Part 1
Lecture 17 - Laboratory Demonstration, 3D scanners - Part 2
Lecture 18 - Polymerization Processes - Part 1
Lecture 19 - Polymerization Processes - Part 2
Lecture 20 - Powder based processes - Part 1
Lecture 21 - Powder based processes - Part 2
Lecture 22 - Powder based processes - Part 3
Lecture 23 - Extrusion based processes - Part 1
Lecture 24 - Extrusion based processes - Part 2
Lecture 25 - Sheet Stacking processes
Lecture 26 - 3D printing processes
Lecture 27 - Laboratory Demonstration, 3D printing - Part 1
Lecture 28 - Laboratory Demonstration, 3D printing - Part 2
Lecture 29 - Laboratory Demonstration, 3D printing - Part 3

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| Lecture 30 | Beam Deposition processes |
| Lecture 31 | Materials in Rapid Manufacturing - Part 1 |
| Lecture 32 | Materials in Rapid Manufacturing - Part 2 |
| Lecture 33 | Post-processing concerns - Part 1 |
| Lecture 34 | Post-processing concerns - Part 2 |
| Lecture 35 | Product costing for Rapid Manufacturing - Part 1 |
| Lecture 36 | Product costing for Rapid Manufacturing - Part 2 |
| Lecture 37 | Rapid Product Development, CAD/CAM - Part 1 |
| Lecture 38 | Rapid Product Development, CAD/CAM - Part 2 |
| Lecture 39 | Rapid Product Development, CAD/CAM - Part 3 |
| Lecture 40 | Rapid Product Development, CAE and CIM |
| Lecture 41 | Rapid Product Development, Technomatix, Plant Simulation 10 - Part 1 |
| Lecture 42 | Rapid Product Development, Technomatix, Plant Simulation 10 - Part 2 |
| Lecture 43 | Rapid Product Development, Technomatix, Plant Simulation 10 - Part 3 |
| Lecture 44 | Rapid Manufacturing, case studies |
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Turbulent Combustion: Theory and Modelling

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Combustion
Lecture 2 - Introduction to Combustion (Continued...)
Lecture 3 - Introduction to Combustion (Continued...)
Lecture 4 - Introduction to Combustion (Continued...) + Combustion and Thermochemistry
Lecture 5 - Combustion and Thermochemistry
Lecture 6 - Combustion and Thermochemistry (Continued...)
Lecture 7 - Combustion and Thermochemistry (Continued...) + Chemical Kinetics
Lecture 8 - Chemical Kinetics (Continued...)
Lecture 9 - Chemical Kinetics (Continued...)
Lecture 10 - Chemical Kinetics (Continued...) + Combustion Chemistry
Lecture 11 - Combustion Chemistry (Continued...)
Lecture 12 - Heat and Mass Transfer
Lecture 13 - Heat and Mass Transfer + Coupling of Chemical Kinetics and Thermodynamics
Lecture 14 - Coupling of Chemical Kinetics and Thermodynamics (Continued...)
Lecture 15 - Coupling of Chemical Kinetics and Thermodynamics + Laminar Premixed Flames
Lecture 16 - Laminar Premixed Flames (Continued...)
Lecture 17 - Laminar Premixed Flames (Continued...)
Lecture 18 - Laminar Premixed Flames (Continued...) + Laminar Non-Premixed Flames
Lecture 19 - Laminar Non-Premixed Flames (Continued...)
Lecture 20 - Laminar Non-Premixed Flames (Continued...)
Lecture 21 - Laminar Non-Premixed Flames
Lecture 22 - Laminar Non-Premixed Flames (Continued...)
Lecture 23 - Laminar Non-Premixed Flames (Continued...)
Lecture 24 - Laminar Non-Premixed Flames (Continued...)
Lecture 25 - Laminar Non-Premixed Flames (Continued...)
Lecture 26 - Laminar Non-Premixed Flames + Turbulence
Lecture 27 - Turbulence
Lecture 28 - Turbulence
Lecture 29 - Turbulence

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NPTEL Video Course - Mechanical Engineering - NOC: Manufacturing Automation

Subject Co-ordinator - Prof. Sounak Kumar Choudhury
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Automation
Lecture 2 - Various Aspects of Manufacturing Automation
Lecture 3 - Part Transfer Mechanisms
Lecture 4 - Automated Flow Lines
Lecture 5 - Analysis of Automated Flow Lines
Lecture 6 - Vibratory Bowl Feeder
Lecture 7 - Analysis of Vibratory Bowl Feeder
Lecture 8 - Reciprocating Tube Hopper Feeder
Lecture 9 - Centreboard Hopper Feeder and its analysis
Lecture 10 - Reciprocating fork and External Gate Hopper Feeders
Lecture 11 - Rotary Disc Feeder and Centrifugal Hopper Feeder
Lecture 12 - Bladed Wheel and Tumbling Barrel Hopper Feeders
Lecture 13 - Rotary Centreboard and Magnetic Feeders
Lecture 14 - Part Orienting Devices
Lecture 15 - Feed Tracks and their analysis
Lecture 16 - Powered Feed Track and Escapements
Lecture 17 - Various Escapements and Part Placing Mechanisms
Lecture 18 - Design for Automatic Assembly
Lecture 19 - Performance and Economics of Assembly Systems
Lecture 20 - Performance of Indexing and Free Transfer Machines
Lecture 1 - Introduction to CIM - Part 1
Lecture 2 - Introduction to CIM - Part 2
Lecture 3 - Computers and Manufacturing Systems - Part 1
Lecture 4 - Computers and Manufacturing Systems - Part 2
Lecture 5 - Computers and Manufacturing Systems - Part 3
Lecture 6 - Computer Graphics - Part 1
Lecture 7 - Computer Graphics - Part 2
Lecture 8 - Computer Graphics - Part 3
Lecture 9 - Computer Graphics - Part 4
Lecture 10 - Geometric Modelling - Part 1
Lecture 11 - Geometric Modelling - Part 2
Lecture 12 - Computer Numerical Control - Part 1
Lecture 13 - Computer Numerical Control - Part 2
Lecture 14 - Computer Numerical Control - Part 3
Lecture 15 - Computer Numerical Control - Part 4
Lecture 16 - CNC Machining - Part 1
Lecture 17 - CNC Machining - Part 2
Lecture 18 - CNC Tooling
Lecture 19 - CNC Part Programming - Part 1
Lecture 20 - CNC Part Programming - Part 2
Lecture 21 - CNC Part Programming - Part 3
Lecture 22 - CNC Part Programming - Part 4
Lecture 23 - Laboratory Demonstration, Computer Aided Design - Part 1
Lecture 24 - Laboratory Demonstration, Computer Aided Design - Part 2
Lecture 25 - CAM softwares
Lecture 26 - Laboratory Demonstration, Computer Aided Manufacturing - Part 1
Lecture 27 - Laboratory Demonstration, Computer Aided Manufacturing - Part 2
Lecture 28 - Group Technology
Lecture 29 - Computer Aided Process Planning - Part 1
Lecture 30 - Computer Aided Process Planning - Part 2
Lecture 31 - Flexible Manufacturing System
Lecture 32 - Robotics
Lecture 33 - Programmable Logic Controller
Lecture 34 - Automatic Identification and Data Capture
Lecture 35 - Computer Aided Quality Control - Part 1
Lecture 36 - Computer Aided Quality Control - Part 2
Lecture 37 - Laboratory Demonstration, Coordinate Measuring Machine
Lecture 38 - Rapid Manufacturing - Part 1
Lecture 39 - Rapid Manufacturing - Part 2
Lecture 40 - Laboratory demonstration, Rapid Manufacturing - Part 1
Lecture 41 - Laboratory demonstration, Rapid Manufacturing - Part 2
Lecture 42 - Laboratory Demonstration, CAD using Fusion 360, an introduction
Lecture 43 - Laboratory Demonstration, CAD using Fusion 360, Rendering and 3D printing
Lecture 44 - Material Handling
Lecture 45 - Laboratory Demonstration, Plant Simulation software - Part 1
Lecture 46 - Laboratory Demonstration, Plant Simulation software - Part 2
Lecture 47 - Laboratory Demonstration, Plant Simulation software - Part 3
Lecture 48 - Computers in Manufacturing Industry, current scenario - Part 1
Lecture 49 - Computers in Manufacturing Industry, current scenario - Part 2
Lecture 50 - Computers in Manufacturing Industry, current scenario - Part 3
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Machining Science

Subject Co-ordinator - Prof. Sounak Kumar Choudhury

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to Machining
Lecture 2 - Mechanism of plastic deformation
Lecture 3 - Basic machining parameters, Cutting Tools and Types of Machining
Lecture 4 - Types of Chips, Tool nomenclature and tool angles
Lecture 5 - Tool Nomenclature in Normal Rake System and conversion of angles
Lecture 6 - Selection of Tool angles
Lecture 7 - Forces in machining, Merchant’s Circle Diagram
Lecture 8 - Stress, Strain and Strain Rate and Shear Plane Angle
Lecture 9 - Numerical Examples; Lee and Shaffer’s model
Lecture 10 - Friction in metal cutting
Lecture 11 - Practical Machining Operations
Lecture 12 - Slab Milling; Measurement of Cutting Forces
Lecture 13 - Dynamometers; Tool Wear and Tool Life
Lecture 14 - Factors affecting tool life; Abrasive Machining Processes
Lecture 15 - Mechanics of Grinding Process
Lecture 16 - Chip length and specific energy in Grinding
Lecture 17 - Grinding wheel wear; Oblique Cutting
Lecture 18 - Rake angles in oblique cutting; Economics of Machining
Lecture 19 - Economics of Machining (Continued...); Thermal aspects of machining
Lecture 20 - Surface finish

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Lecture 30 - Discretization of Convection-Diffusion Equations
Lecture 31 - Discretization of Convection-Diffusion Equations
Lecture 32 - Discretization of Convection-Diffusion Equations
Lecture 33 - Discretization of Convection-Diffusion Equations
Lecture 34 - Discretization of Convection-Diffusion Equations
Lecture 35 - Discretization of Navier Stokes Equations
Lecture 36 - Discretization of Navier Stokes Equations (Continued.)
Lecture 37 - Discretization of Navier Stokes Equations (Continued.)
Lecture 38 - PART 1
Lecture 39 - Unstructured Grid Formulation (Continued.)
Lecture 40 - What is there in implementing a CFD Code
Lecture 41 - Introduction to Turbulence Modeling
Lecture 42 - Introduction to Turbulence Modeling (Continued.)
Lecture 43 - End Semester Questions Review
NPTEL Video Course - Mechanical Engineering - Fundamentals of Industrial Oil Hydraulics and Pneumatics

Subject Co-ordinator - Prof. R.N. Maiti

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - What is Hydraulic and Pneumatic System
Lecture 2 - Basic Components, Symbols and Circuits
Lecture 3 - Incompressible Fluids - Some Fundamental Properties
Lecture 4 - Incompressible Fluid Flow related to Fluid Drive
Lecture 5 - Capillary Fluid (incompressible) Flow and Hydrodynamic Lubrication
Lecture 6 - Basis for Calculating Hydraulic Systems
Lecture 7 - Different types of Valves - Features and Operations - I
Lecture 8 - Hydraulic Valves (General) Different types of Valves - Features and Operations - II
Lecture 9 - Hydraulic Circuits and Valves
Lecture 10 - Hydraulic Servomechanism and Servo and Proportional Control Valves
Lecture 11 - Basic Spool Valve Design Analysis
Lecture 12 - General Control Valve Analysis
Lecture 13 - Critical Centre Spool Valve Analysis
Lecture 14 - Critical Centre Spool Valve Analysis - Stroking Forces
Lecture 15 - Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve
Lecture 16 - Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve (Continued...)
Lecture 17 - Introduction to Positive Displacement Hydrostatic Units (Hydraulic Pumps and Motors)
Lecture 18 - Basic features of some Hydraulic Pumps and Motors
Lecture 19 - Analysis of an axial - Piston Swash Plate type Hydrostatic Pump (Discharge Flow Characteristics)
Lecture 20 - Analysis of an axial - Piston Swash Plate type Hydrostatic Pump (Estimation of Torque on Drive Shaft and Swash Plate)
Lecture 21 - Analysis of an Axial - Piston Swash Plate type Hydrostatic unit (Pressure Ripple and Swash Plate Torque)
Lecture 22 - Design Analysis of Gear Pumps - I
Lecture 23 - Design Analysis of Gear Pumps - II
Lecture 24 - Basic Concept of Hydrostatic Transmission (HST) System
Lecture 25 - Selection of HST units and components
Lecture 26 - Regenerative Circuits
Lecture 27 - Introduction to Fluid Logic
Lecture 28 - Basic Devices, Symbols and Circuits
Lecture 29 - Logic Circuits

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Lecture 30 - Design Analysis of ORBIT Motor - I
Lecture 31 - Design Analysis of ORBIT Motor - II
Lecture 32 - Design Analysis of ORBIT Motor - III
Lecture 33 - Application and Selection of Accumulators - Part I
Lecture 34 - Application and Selection of Accumulators - Part II
Lecture 35 - Hydraulic Circuits in Industrial Applications
Lecture 36 - Air preparation - Compressor and Accessories
Lecture 37 - Pneumatic Circuits
Lecture 38 - Analysis of Three - Way (Spool and Flapper Nozzle Valve)
Lecture 39 - Analysis of Flapper Nozzle Valves
Lecture 40 - Flow Force Compensation and Spool Design (Electro - hydraulic valves)
Lecture 41 - Premier and Guide to Oil - hydraulic fluids ; and Introduction to Fluid Power Symbols
Lecture 42 - Symbols in Oil Hydraulics
Lecture 43 - AppendicesTutorial on Basic Calculation on HST System and Hydraulic Fluids
NPTEL Video Course - Mechanical Engineering - Machinery fault diagnosis and signal processing

Subject Co-ordinator - Prof. A.R. Mohanty
Co-ordinating Institute - IIT - Kharagpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Principles of Maintenance
Lecture 3 - Failure Modes Effects and Criticality Analysis
Lecture 4 - Fault Diagnostics and Prognostics
Lecture 5 - Basics of Machinery Vibration
Lecture 6 - Engineering Applications of Vibration
Lecture 7 - Rotordynamics
Lecture 8 - Time Domain Signal Analysis
Lecture 9 - Frequency Domain Signal Analysis
Lecture 10 - Computer Aided Data Acquisition
Lecture 11 - FFT Analysis
Lecture 12 - Modulation and Sidebands
Lecture 13 - Envelope Analysis
Lecture 14 - Cepstrum Analysis
Lecture 15 - Order Analysis
Lecture 16 - Basics of Instrumentation
Lecture 17 - Sensors and Transducers
Lecture 18 - Data Recording and Transmission
Lecture 19 - Vibration Transducers
Lecture 20 - Vibration Monitoring
Lecture 21 - Basics of Noise and Noise Monitoring
Lecture 22 - Numericals in Noise Vibration and Data Acquisition
Lecture 23 - Unbalance Detection
Lecture 24 - Field Balancing
Lecture 25 - Misalignment Detection
Lecture 26 - Cracked Shaft Detection
Lecture 27 - Looseness and Rub Detection
Lecture 28 - Ball and Journal Bearings
Lecture 29 - Gear Fault Detection

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Lecture 30 - Fans, Blowers and Compressors
Lecture 31 - Pumps and Turbines
Lecture 32 - Contaminant Analysis
Lecture 33 - Oil Analysis
Lecture 34 - Fault Detection in Motors and Transformers
Lecture 35 - Motor Current Signature Analysis
Lecture 36 - Thermography
Lecture 37 - Ultrasonics
Lecture 38 - Acoustic Emission and Eddy Current Testing
Lecture 39 - Radiography, Dye Penetrant Test and Visual Inspection
Lecture 40 - Case Studies
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Lecture 30 - Monthly Average Daily Utilizability
Lecture 31 - The phi(bar) - f chart method (Continued.)
Lecture 32 - The phi(bar) - f chart method Tank Losses and Finite Heat Exchanger
Lecture 33 - Exercise - 2
Lecture 34 - Exercise - 2 (Continued.)
Lecture 35 - Exercise - 2 (Continued.)
Lecture 36 - Economic Analysis
Lecture 37 - Life Cycle Savings
Lecture 38 - Passive Devices
Lecture 39 - Passive Architecture, Overhangs and Wing Walls
Lecture 40 - Passive Architecture, Overhangs and Wing Walls (Continued.)
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Lecture 42 - Summary (Continued.)
Lecture 43 - Summary (Continued.)
NPTEL Video Course - Mechanical Engineering - Technology of Surface Coating

Subject Co-ordinator - Prof. A.K. Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Lecture 1 - Introduction
Lecture 2 - CVD Reaction
Lecture 3 - Adhesion of Surface Coating
Lecture 4 - CVD System
Lecture 5 - CDV of Tic
Lecture 6 - Chemical Vapour Deposition of Nitride Coating
Lecture 7 - Chemical Vapour Deposition of Carbo-Nitride Coating
Lecture 8 - Chemical Vapour Deposition of Cromium
Lecture 9 - Chemical Vapour Deposition of Aluminium Oxide
Lecture 10 - Chemical Vapour Deposition of Diamond
Lecture 11 - Vacuum Evaporation Deposition
Lecture 12 - Reactive Evaporation Deposition
Lecture 13 - Cathodic Arc Evaporation Deposition
Lecture 14 - Sputtering
Lecture 15 - Magnetron Sputtering
Lecture 16 - Unbalanced Magnetron Sputtering
Lecture 17 - Radio frequency and pulsed DC sputtering
Lecture 18 - Sputter Deposition of Nitride Coating
Lecture 19 - Sputter Deposition of Molybdenum Di Sulphide Coating
Lecture 20 - Influence of Architecture of Sputter Deposited Molybdenum Di Sulphide Coating
Lecture 21 - Electro Plating, Anodizing and Electro-Less Plating
Lecture 22 - Coating of Monolayer Abrasive Grain by Electro Plating
Lecture 23 - Mechanism of Wetting
Lecture 24 - Coating on Ceramics by Wetting
Lecture 25 - Coating of Monolayer Abrasive Grain by Wetting
Lecture 26 - Coating on Abrasive Grain
Lecture 27 - Combustion Spray Process
Lecture 28 - Plasma Spray Process
Lecture 29 - Mechanical, Chemical and Ion-Assisted Method

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Lecture 30 - Combustion Spray Process
Lecture 31 - Production of Low Vacuum
Lecture 32 - Production of High Vacuum
Lecture 33 - Measurement of Low Pressure and Gas Flow in Coating Deposition System
Lecture 34 - Physical Characterization
Lecture 35 - Assessment of Coating Hardness
Lecture 36 - Assessment of Friction and Wear of Coating
Lecture 37 - Assessment of Surface Roughness and Thickness of Coating
Lecture 38 - Assessment of Adhesion of Coating
Lecture 39 - Performance Evaluation of TiN Coated Tool
Lecture 40 - Performance Evaluation of HFCVD Diamond Coated Tool
NPTEL Video Course - Mechanical Engineering - Vibration of Structures

Subject Co-ordinator - Prof. A. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Transverse Vibrations of Strings - I
Lecture 2 - Transverse Vibrations of Strings - II
Lecture 3 - Axial and Torsional Vibrations of Bars
Lecture 4 - Variational Formulation - I
Lecture 5 - Variational Formulation - II
Lecture 6 - Modal Analysis - I
Lecture 7 - Modal Analysis - II
Lecture 8 - Properties of the Eigenvalue Problem
Lecture 9 - Modal Analysis
Lecture 10 - Modal Analysis
Lecture 11 - The Initial Value Problem
Lecture 12 - Forced Vibration Analysis - I
Lecture 13 - Forced Vibration Analysis - II
Lecture 14 - Forced Vibration Analysis - III
Lecture 15 - Damping in Structures
Lecture 16 - Axially Translating Strings
Lecture 17 - d' Alembert's Solution - I
Lecture 18 - d' Alembert's Solution - II
Lecture 19 - Harmonic Waves and Energetics of Wave Motion
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Lecture 21 - Applications of Wave Solution - I
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Lecture 26 - Applications of Modal Solution
Lecture 27 - Approximate Methods
Lecture 28 - Topic in Beam Vibration - I
Lecture 29 - Topic in Beam Vibration - II

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Lecture 30 - Wave Propagation in Beams
Lecture 31 - Dynamics of Curved Beams
Lecture 32 - Vibrations of Rings and Arches
Lecture 33 - Dynamics of Membranes
Lecture 34 - Vibrations of Rectangular Membrane
Lecture 35 - Vibrations of Circular Membrane
Lecture 36 - Special Problems in Membrane Vibrations
Lecture 37 - Dynamics of Plates
Lecture 38 - Vibrations of Rectangular Plates
Lecture 39 - Vibrations of Circular Plates
Lecture 40 - Special Problems in Plate Vibrations
Lecture 30 - Thermodynamics of Multi Component System - I
Lecture 31 - Thermodynamics of Multi Component System - II
Lecture 32 - Thermodynamics of Multi Component System - III
NPTEL Video Course - Mechanical Engineering - Design of Machine Elements I

Subject Co-ordinator - Prof. G. Chakraborty, Prof. B. Maiti, Prof. S.K. Roychowdhury

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Design Philosophy
Lecture 2 - Design And Manufacturing
Lecture 3 - Engineering Materials
Lecture 4 - Engineering Materials
Lecture 5 - Simple Stresses In Machine Elements
Lecture 6 - Simple Stresses In Machine Elements
Lecture 7 - Compound Stresses In Machine Elements
Lecture 8 - Design For Strength
Lecture 9 - Design for Strength
Lecture 10 - Design for Strength
Lecture 11 - Design for Strength
Lecture 12 - Design for Strength
Lecture 13 - Design of Fasteners - I
Lecture 14 - Design of Fasteners - II
Lecture 15 - Design Of Keys and Splines
Lecture 16 - Threaded Fasteners
Lecture 17 - Design Of Threaded Fasteners
Lecture 18 - Power Screws
Lecture 19 - Design Of Power Screws
Lecture 20 - Shaft Coupling - I
Lecture 21 - Shaft Coupling - II
Lecture 22 - Rivet Joints
Lecture 23 - Design of Welded Joints - I
Lecture 24 - Design of Welded Joints - II
Lecture 25 - Design of Joints With Eccentric Loading
Lecture 26 - Design of Joints With Variable Loading
Lecture 27 - Design of Springs
Lecture 28 - Design Of Springs
Lecture 29 - Design Of Springs

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Lecture 30 - Belt Drives
Lecture 31 - Belt Drives
Lecture 32 - Belt Drives
Lecture 33 - Design for Strength
Lecture 34 - Design of Shafts
Lecture 35 - Design of Machine Elements - I (V & W)
Lecture 36 - Design of Machine Elements - II (V & W)
Lecture 37 - Design of Cylinders & Pressure Vessels - II
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Lecture 39 - Design of Brakes - I
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NPTEL Video Course - Mechanical Engineering - Manufacturing Processes II

Subject Co-ordinator - Prof. S. Paul, Prof. A.B. Chattopadhyay, Prof. A.K. Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Instructional Objectives - I (Manufacturing Process II)
Lecture 2 - Instructional Objectives - II
Lecture 3 - On Tool Geometry
Lecture 4 - Interrelations Among The Tool Angles
Lecture 5 - Mechanism of Chip Formation
Lecture 6 - Orthogonal and Oblique Cutting
Lecture 7 - Use of Chip Breaker in Machining
Lecture 8 - Machining Forces
Lecture 9 - Analytical and Experimental
Lecture 10 - Dynamometers for Measuring Cutting Forces
Lecture 11 - CTCEAC
Lecture 12 - CCTCFA
Lecture 13 - Concept of Machinability and its Improvement
Lecture 14 - Tool Life
Lecture 15 - Conventional Cutting Tool Maths
Lecture 16 - Advanced Tool Materials
Lecture 17 - Kinematics System of Centre Lathe
Lecture 18 - General Purpose Machine Tool Drills
Lecture 19 - Kinematic Systems and Operations
Lecture 20 - Configuration and Kinematic System
Lecture 21 - Mounting of jobs and Cutting Tools in Machine
Lecture 22 - Mounting of jobs and Cutting Tools in Machine
Lecture 23 - Construction, Operation and Tool Layout
Lecture 24 - Use of Attachments In Machine Tools
Lecture 25 - Forces Developing and Acting In Machine Tools
Lecture 26 - Estimation of Machining Time
Lecture 27 - Broaching - Principle Systems and Applications
Lecture 28 - Grinding Principle and Application
Lecture 29 - Abrasive Processes

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Lecture 30 - Abrasive Processes (Grinding)
Lecture 31 - Super finishing Processes
Lecture 32 - Production of Screw Threads
Lecture 33 - Gear Manufacturing
Lecture 34 - Jigs and Fixtures For Machine Shops
Lecture 35 - Design and Applications of Jigs and Fixtures
Lecture 36 - Non Traditional Manufacturing
Lecture 37 - Ultrasonic Machining
Lecture 38 - Water Jet Machining and Abrasive Water Jet
Lecture 39 - Electro - Chemical Machining
Lecture 40 - Electro - Discharge Machining
Lecture 41 - EBM and LBM

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Lecture 30 - Refrigeration System Components
Lecture 31 - Refrigeration System Components
Lecture 32 - Analysis of Complete Vapour Compression System
Lecture 33 - Refrigerants
Lecture 34 - Psychrometry
Lecture 35 - Psychrometric Processes
Lecture 36 - Inside Design Condition Thermal Comfort
Lecture 37 - Psychrometry of Air Conditioning Systems
Lecture 38 - Air Conditioning Systems
Lecture 39 - Cooling and Heating Load Calculation
Lecture 40 - Cooling and Heating Load Calculations
Lecture 41 - Cooling and Heating Load Calculations (Continued...)
Lecture 42 - Cooling and Heating Load Calculations (Continued...)
Lecture 43 - Selection of Air Conditioning Systems
Lecture 44 - Transmission and Distribution of Air
Lecture 45 - Transmission and Distribution of Air (Continued..)
Lecture 46 - Space Air Distribution
NPTEL Video Course - Mechanical Engineering - Fluid Mechanics

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

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction and Fundamental Concepts - Part I
Lecture 2 - Introduction and Fundamental Concepts - Part II
Lecture 3 - Introduction and Fundamental Concepts - Part III
Lecture 4 - Fluid Statics - Part I
Lecture 5 - Fluid Statics - Part II
Lecture 6 - Fluid Statics - Part III
Lecture 7 - Fluid Statics - Part IV
Lecture 8 - Fluid Statics - Part V
Lecture 9 - Fluid Statics - Part VI
Lecture 10 - Kinematics of Fluid - Part I
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Lecture 12 - Kinematics of Fluid - Part III
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Lecture 28 - Fluid Flow Applications - Part VII
Lecture 29 - Incompressible Viscous Flows - Part I
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NPTEL Video Course – Mechanical Engineering – Introduction to Fluid Machines and Compressible Flow

Subject Co-ordinator – Prof. S.K. Som

Co-ordinating Institute – IIT – Kharagpur

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

Lecture 1 – Introduction to Fluid Machines 1
Lecture 2 – Energy Transfer in Fluid Machines Part – I
Lecture 3 – Energy Transfer in Fluid Machines Part – II
Lecture 4 – Energy Transfer – impulse and Reaction Machines, efficiencies of Fluid Machines
Lecture 5 – Principles of Similarity in Fluid Machines
Lecture 6 – Concept of specific speed and introduction to Impulse Hydraulic Turbine
Lecture 7 – Analysis of force on the Bucket of Pelton wheel and Power Generation
Lecture 8 – Specific speed, Governing and Limitation of a Pelton Turbine
Lecture 9 – Introduction to reaction Type of Hydraulic Turbine – A Francis Turbine
Lecture 10 – Analysis of Force on Francis Runner and Power Generation
Lecture 11 – Axial Flow Machine and Draft Tube
Lecture 12 – Governing of Reaction Turbine
Lecture 13 – Introduction to Rotodynamic Pumps
Lecture 14 – Flow and Energy Transfer in a Centrifugal Pump
Lecture 15 – Characteristics of a Centrifugal Pump
Lecture 16 – Matching of Pump and System Characteristics
Lecture 17 – Diffuser and Cavitation
Lecture 18 – Axial Flow Pump
Lecture 19 – Reciprocating Pump – Part I
Lecture 20 – Reciprocating Pump – Part II
Lecture 21 – Centrifugal Compressor – Part I
Lecture 22 – Centrifugal Compressor – Part II
Lecture 23 – Centrifugal Compressor – Part III
Lecture 24 – Axial Flow Compressor – Part I
Lecture 25 – Axial Flow Compressor – Part II
Lecture 26 – Introduction to Compressible Flow – Part I
Lecture 27 – Introduction to Compressible Flow – Part II
Lecture 28 – Thermodynamic Relations and Speed of Sound
Lecture 29 – Disturbance propagation, Stagnation and Sonic Properties

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Lecture 30 - Effects of Area Variation on Properties in an Isentropic Flow
Lecture 31 - Choking in a Converging Nozzle
Lecture 32 - Isentropic Flow through Convergent - Divergent Duct
Lecture 33 - Normal Shock - Part I
Lecture 34 - Normal Shock - Part II
Lecture 35 - Normal Shock - Part III
Lecture 36 - Normal Shock - Part IV
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Lecture 39 - Oblique Shock - Part II
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Lecture 42 - Potential Flow Past Immersed Bodies
Lecture 43 - Potential Flow (Continued...) and Flow Past Immersed Bodies of Special Shapes
Lecture 44 - Flow Past Immersed Bodies (Continued...) and Sports Ball Aerodynamics
Lecture 45 - Pipe Flow
Lecture 46 - Pipe Flow (Continued...)
Lecture 47 - Pipe Flow (Continued...)
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Lecture 50 - Introduction to Fluid Machines (Continued...)
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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Microfluidics

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to Microfluidics
Lecture 2 - Microfluidics
Lecture 3 - Microfluidics
Lecture 4 - Equations of Conservation
Lecture 5 - Navier Stokes Equation
Lecture 6 - Navier Stokes Equation (Continued...)
Lecture 7 - Energy Equation
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Lecture 5 - 1D Steady State Heat Conduction In Plane Wall Without Generation of Thermal Energy
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Lecture 10 - 1D Steady State Heat Conduction in Spherical Geometry
Lecture 11 - Heat Transfer from Extended Surfaces (Fins)
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NPTEL Video Course - Mechanical Engineering - NOC: Fluid Machines

Subject Co-ordinator - Prof. S.K. Som
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Definition of Fluid Machines and Energy Transfer in Fluid Machines - Part I
Lecture 2 - Energy Transfer in Fluid Machines - Part II
Lecture 3 - Impulse and Reaction Machines
Lecture 4 - Principles of Similarity in Fluid Machines
Lecture 5 - Concept of Specific Speed
Lecture 6 - Basic Principles, Analysis of Force and Power Generation - Part I
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Lecture 8 - Specific Speed Governing and Limitations of Impulse Turbine
Lecture 9 - Tutorial - I
Lecture 10 - Tutorial - II
Lecture 11 - Introduction and Analysis of Force on Francis Turbine (Radial Flow) - Part I
Lecture 12 - Analysis of Force (Part-II) and Power Generation
Lecture 13 - Draft Tube
Lecture 14 - Tutorial - III
Lecture 15 - Tutorial - IV
Lecture 16 - Axial Flow Turbine
Lecture 17 - Governing of Reaction Turbine
Lecture 18 - Introduction to Rotodynamic Pumps
Lecture 19 - Flow and Energy Transfer to Centrifugal Pumps
Lecture 20 - Tutorial - V
Lecture 21 - Characteristics of a Centrifugal Pump
Lecture 22 - Matching of Pump and System Characteristics
Lecture 23 - Diffuser and Cavitation
Lecture 24 - Tutorial - VI
Lecture 25 - Tutorial - VIII
Lecture 26 - Axial Flow Pump
Lecture 27 - Reciprocating Pump - Part I
Lecture 28 - Reciprocating Pump - Part II
Lecture 29 - Tutorial - VIII

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Lecture 30 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part I
Lecture 31 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part II
Lecture 32 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part III
Lecture 33 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part IV and Losses in Centrifugal Compressors
Lecture 34 - Performance Characteristics of Centrifugal Compressors - Part I
Lecture 35 - Performance Characteristics of Centrifugal Compressors - Part II
Lecture 36 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part I
Lecture 37 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part II
Lecture 38 - Fans and Blowers - Part I
Lecture 39 - Fans and Blowers - Part II
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Computer numerical control (CNC) of machine tools and processes

Subject Co-ordinator - Prof. Asimava Roy Choudhury
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to computer control Â□ role of computers in automation
Lecture 2 - Introduction (Continued...) - binary logic and logic gates
Lecture 3 - Classification of Computer numerical control (CNC) Â Point to point and continuous control
Lecture 4 - Classification (Continued...) - Closed loop and open loop control
Lecture 5 - Tutorial involving simple calculations on different aspects of CNC controls
Lecture 6 - Questions, MCQ Discussions on Motors, Encoders, Decoders and Programming Practice
Lecture 7 - Stepper motors, Permanent magnet DC motors
Lecture 8 - Binary circuits and decoders
Lecture 9 - Tachogenerator, printed circuit motors, Encoders
Lecture 10 - Programming Practice - I
Lecture 11 - Programming Practice - II
Lecture 12 - Computer Aided Offline Programming
Lecture 13 - Interpolators - Linear
Lecture 14 - Interpolators - Curvilinear
Lecture 15 - Questions on Programming and Interpolation
Lecture 16 - 3-D Machining - Basic Concepts
Lecture 17 - Curved Surface Geometry
Lecture 18 - Cutter Path Generation for Curved Surfaces
Lecture 19 - Cutter Path Generation (Concluding Part) and Current Status - CNC Machining and Related Processes
Lecture 20 - Questions and Discussions on Curved Surface Machining

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NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Fluid Mechanics

Subject Co-ordinator - Dr. Suman Chakraborty
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Lagrangian and Eulerian Approach, Types of fluid flow
Lecture 2 - Streamlines, Streakline and Pathline
Lecture 3 - Acceleration of fluid flow
Lecture 4 - Deformation and Conservation of mass of fluid a element
Lecture 5 - Angular deformation of a fluid element, vorticity and streamfunction and velocity potential
Lecture 6 - Eulerâ□□s equation
Lecture 7 - Bernoulliâ□□s equation - Part I
Lecture 8 - Kinematic viscosity, Reynolds number
Lecture 9 - Non-Newtonian fluids
Lecture 10 - Problems and Solutions
Lecture 11 - Problems and Solutions
Lecture 12 - Surface Tension - Part I
Lecture 13 - Surface Tension - Part II
Lecture 14 - Governing equation of fluid statics
Lecture 15 - Manometers
Lecture 16 - Force on a surface immersed in fluid - Part I
Lecture 17 - Force on a surface immersed in fluid - Part II
Lecture 18 - Force on a surface immersed in fluid - Part III, Stability of solid bodies in fluid - Part I
Lecture 19 - Stability of solid bodies in fluid - Part II
Lecture 20 - Fluid under rigid body motion
Lecture 21 - Lagrangian and Eulerian approaches
Lecture 22 - Concept of different flow lines
Lecture 23 - Acceleration of fluid flow
Lecture 24 - Deformation of fluid elements - Part I
Lecture 25 - Derivation of continuity equation
Lecture 26 - Problems and Solutions
Lecture 27 - Deformation of fluid elements - Part II
Lecture 28 - Deformation of fluid elements - Part III
Lecture 29 - Stream Function

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NPTEL Video Course - Mechanical Engineering - NOC: Spur and Helical Gear Cutting

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction
Lecture 2 - Simple Gear Calculations
Lecture 3 - Gear Geometry
Lecture 4 - Helical Gear Problems
Lecture 5 - Numerical Problem MCQ
Lecture 6 - Numerical Problem Milling of Helical Gears
Lecture 7 - Simple and Compound Indexing
Lecture 8 - Differential Indexing
Lecture 9 - Helical Gear Cutting on Milling Machine
Lecture 10 - Numerical Problems on Gear Milling
Lecture 11 - Gear Shaping - I
Lecture 12 - Gear Shaping - II
Lecture 13 - Gear Shaping - III
Lecture 14 - Gear Shaping - IV
Lecture 15 - Gear Hobbing - I
Lecture 16 - Gear Hobbing - II
Lecture 17 - Gear Hobbing - III
Lecture 18 - Gear Hobbing - IV
Lecture 19 - Gear Hobbing - V
Lecture 20 - Gear Hobbing - VI

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Lecture 1 - Introduction, Definition of System, Properties and State of a System
Lecture 2 - Properties of pure substances
Lecture 3 - Properties of pure substances (Continued...)
Lecture 4 - Heat and Work
Lecture 5 - Tutorial 1
Lecture 6 - Zeroth Law of Thermodynamics
Lecture 7 - First law of thermodynamics for closed systems - Part I
Lecture 8 - First law of thermodynamics for closed systems - Part II, some examples
Lecture 9 - Tutorial 2
Lecture 10 - First law of thermodynamics for open systems
Lecture 11 - Tutorial 3
Lecture 12 - Second law and its corollaries - Part I
Lecture 13 - Second law and its corollaries - Part II
Lecture 14 - Second law and its corollaries - Part III
Lecture 15 - Definition of entropy and entropy change in closed systems
Lecture 16 - Entropy change in closed systems (Continued...)
Lecture 17 - Tutorial 4
Lecture 18 - Entropy and its transport
Lecture 19 - Tutorial 5
Lecture 20 - Introduction to Third Law
Lecture 21 - Review of learning concepts
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Subject Co-ordinator - Prof. PK Das
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to waste heat recovery
Lecture 2 - Introduction to waste heat recovery (Continued...)
Lecture 3 - Introduction to waste heat recovery (Continued...)
Lecture 4 - Introduction to waste heat recovery (Continued...)
Lecture 5 - Thermodynamic principles of waste heat recovery
Lecture 6 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 7 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 8 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 9 - Reversible Cycles
Lecture 10 - Reversible Cycles (Continued...)
Lecture 11 - Entropy
Lecture 12 - Entropy (Continued...)
Lecture 13 - Entropy (Continued...), Exergy
Lecture 14 - Exergy, Second Law efficiency
Lecture 15 - Second Law efficiency (Continued...)
Lecture 16 - Recapitulation of common power cycles
Lecture 17 - Recapitulation of common power cycles (Continued...)
Lecture 18 - Recapitulation of common power cycles (Continued...)
Lecture 19 - Recapitulation of common power cycles (Continued...)
Lecture 20 - Recapitulation of common power cycles (Continued...)
Lecture 21 - Recapitulation of common power cycles (Continued...)
Lecture 22 - Gas Turbine cycle
Lecture 23 - Combined cycle
Lecture 24 - Combined cycle (Continued...)
Lecture 25 - Combined Cycle (Continued...)
Lecture 26 - Heat recovery steam generator
Lecture 27 - Thermodynamic cycles for low temperature application
Lecture 28 - Thermodynamic cycles for low temperature application (Continued...), Cogeneration
Lecture 29 - Heat Exchanger

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Lecture 30 - Heat Exchanger (Continued...)
Lecture 31 - Heat Exchanger (Continued...)
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37 - Heat Pipe - Part I
Lecture 38 - Heat Pipe - Part II
Lecture 39 - Heat Pipe - Part III
Lecture 40 - Direct Conversion - Introduction to TEG
Lecture 41 - Thermoelectric Generators - Functioning and Applications
Lecture 42 - TEG - Performance analysis
Lecture 43 - TEG - Performance optimization
Lecture 44 - Direct Conversion - Magneto Hydro Dynamics (MHD)
Lecture 45 - Direct Conversion - Thermo-Ionic generation
Lecture 46 - Direct Conversion - Thermo Photo Voltaic generation (TPV)
Lecture 47 - Heat Pumps - I
Lecture 48 - Heat Pumps - II
Lecture 49 - Heat Pumps - III
Lecture 50 - Waste Heat Recovery from Incinerator Plants
Lecture 51 - Energy Storage Systems - I
Lecture 52 - Energy Storage Systems - II
Lecture 53 - Energy Storage Systems - III
Lecture 54 - Energy Storage Systems - IV
Lecture 55 - Energy Storage Systems - V
Lecture 56 - Energy Storage Systems - VI
Lecture 57
Lecture 58
Lecture 59
Lecture 60
Lecture 61
Lecture 62
Lecture 63
Lecture 64
Lecture 65
Lecture 66
Lecture 67
Lecture 68 - Corrigendum
NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Mechanical Micro Machining

Subject Co-ordinator - Prof. Ajay M Sidpara
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Scaling Laws
Lecture 8 - Scaling laws (Continued...)
Lecture 9 - Scaling laws (Continued...)
Lecture 10 - Difference between macro and micro machining
Lecture 11 - Difference between macro and micro machining (Continued...)
Lecture 12 - Difference between micro and macro machining (Continued...)
Lecture 13 - Difference between micro and macro machining (Continued...)
Lecture 14 - Difference between macro and micro machining (Continued...)
Lecture 15 - Difference between macro and micro machining (Continued...)
Lecture 16 - Difference between macro and micro machining (Continued...)
Lecture 17 - Difference between macro and micro machining (Continued...)
Lecture 18 - Difference between macro and micro machining (Continued...)
Lecture 19 - Difference between macro and micro machining (Continued...)
Lecture 20 - Difference between macro and micro machining (Continued...)
Lecture 21 - Difference between macro and micro machining (Continued...)
Lecture 22 - Component of the machine tool
Lecture 23 - Components of the machine tool (Continued...)
Lecture 24 - Components of the machine tool (Continued...)
Lecture 25 - Components of the machine tool (Continued...)
Lecture 26 - Components of the machine tool (Continued...)
Lecture 27 - Errors in machine tool (Continued...)
Lecture 28 - Errors in machine tool (Continued...)
Lecture 29 - Errors in machine tool (Continued...)

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Lecture 30 - Errors in machine tool (Continued...)
Lecture 31 - Components of machine tool
Lecture 32 - Components of machine tool (Continued...)
Lecture 33 - Components of machine tool (Continued...)
Lecture 34 - Components of machine tool (Continued...)
Lecture 35 - Components of machine tool (Continued...)
Lecture 36 - Components of machine tool (Continued...)
Lecture 37 - Components of machine tool (Continued...)
Lecture 38 - Components of machine tool (Continued...)
Lecture 39 - Components of machine tool (Continued...)
Lecture 40 - Components of machine tool (Continued...)
Lecture 41 - Components of machine tool (Continued...)
Lecture 42 - Components of machine tool (Continued...)
Lecture 43 - Components of machine tool (Continued...)
Lecture 44 - Components of machine tool (Continued...)
Lecture 45 - Components of machine tool (Continued...)
Lecture 46 - Components of machine tool (Continued...)
Lecture 47 - Components of machine tool (Continued...)
Lecture 48 - Components of machine tool (Continued...)
Lecture 49 - Micro tools
Lecture 50 - Micro tools (Continued...)
Lecture 51 - Micro tools (Continued...)
Lecture 52 - Fabrication of micro tool by EDM process
Lecture 53 - Micro tools (Continued...)
Lecture 54 - Micro machines
Lecture 55 - Micro machines (Continued...)
Lecture 56 - Diamond turning
Lecture 57 - Diamond turning (Continued...)
Lecture 58 - Diamond turning (Continued...)
Lecture 59 - Diamond turning (Continued...)
Lecture 60 - Sensors and metrology for micro machining
Lecture 61 - Sensors and metrology for micro machining (Continued...)
Lecture 62 - Sensors and metrology for micro machining (Continued...)
Lecture 63 - 3D surface measurement using interferometer
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NPTEL Video Course - Mechanical Engineering - NOC: Machinery Fault Diagnosis and Signal Processing

Subject Co-ordinator - Prof. Amiya Ranjan Mohanty
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction
Lecture 2 - Maintenance Principles
Lecture 3 - FMECA
Lecture 4 - Fault Diagnostics and Prognostics
Lecture 5 - Machine Learning in CBM
Lecture 6 - Basics of Vibration
Lecture 7 - Free and Forced Response
Lecture 8 - Vibration and Shock Isolation
Lecture 9 - Rotordynamics
Lecture 10 - Practical Examples of Vibration
Lecture 11 - Time Domain Analysis
Lecture 12 - Frequency Domain Analysis
Lecture 13 - Non Stationary Signal Analysis
Lecture 14 - Modulation and Beats
Lecture 15 - Orbit and Order Analysis
Lecture 16 - Computer aided data acquisition
Lecture 17 - Orbit and Order Analysis
Lecture 18 - Data Recording
Lecture 19 - Cepstrum Analysis
Lecture 20 - Hilbert Transform in Condition Monitoring
Lecture 21 - Introduction to MATLAB
Lecture 22 - Signal Processing using MATLAB
Lecture 23 - Numericals in Signal Processing and Data Acquisition
Lecture 24 - Signal Hetrodyning
Lecture 25 - Practical Signals
Lecture 26 - Basics Of Instrumentation
Lecture 27 - Signal Conditioning And Filtering
Lecture 28 - Errors In Measurements
Lecture 29 - Dynamic Range And Frequency Response

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NPTEL Video Course - Mechanical Engineering - NOC: Metal Cutting and Machine Tools

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction
Lecture 2 - Geometry of single point turning tools - 1
Lecture 3 - Geometry of turning tools - 2
Lecture 4 - Geometry of single point turning tools - 3
Lecture 5 - Geometry of cutting tools and numerical problems
Lecture 6 - Different types of tools and mcq
Lecture 7 - Mechanism of chip formation
Lecture 8 - Mechanics of material removal
Lecture 9 - Measurement of Cutting Forces
Lecture 10 - Numerical problems and MCQ
Lecture 11 - Tool wear and Tool life
Lecture 12 - Wear and life of cutting tools - 2
Lecture 13 - The lathe
Lecture 14 - Calculations on mechanisms in machine tools
Lecture 15 - Numerical problems on lathe
Lecture 16 - Milling machines
Lecture 17 - Milling machine - indexing
Lecture 18 - Gear cutting CNC and non traditional machining
Lecture 19 - CNC and non-traditional machining methods
Lecture 20 - Numerical problems for week 4
Lecture 21 - Live Session
NPTEL Video Course - Mechanical Engineering - NOC: Gear and Gear Unit Design - Theory and Practice

Subject Co-ordinator - Prof. Rathindranath Maiti
Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction - Motivation and Theme of the Course
Lecture 2 - Laws of Gearing, Kinematics and Geometry - Part I
Lecture 3 - Laws of Gearing, Kinematics and Geometry - Part II
Lecture 4 - Involute Toothed Gear - Properties and Terminology
Lecture 5 - Tutorial
Lecture 6 - Involute Straight Tooth Spur Gear
Lecture 7 - Helical Tooth Spur Gear and Loads on Gear Shaft
Lecture 8 - Design of Bevel Gear
Lecture 9 - Crossed Helical Gear - I
Lecture 10 - Crossed Helical Gear - II and Worm Gear
Lecture 11 - Gear Unit Design - Selection of Stage Ratios, Pinion and Gear Teeth Numbers
Lecture 12 - Gear Unit Design - First Stage Pinion and Gear Design - I (Module on Beam Strength Basis)
Lecture 13 - Gear Unit Design - Failure of Gear Tooth (Probable Dynamic Load and Wear Load Capacity)
Lecture 14 - Gear Unit Design - 1st. Stage Pinion and Gear Design - II (Probable Dynamic Load and Wear Load Capacity)
Lecture 15 - Gear Unit Design - 1st. Layout (After Gear Design)
Lecture 16 - Bearing Arrangement - Gear Box Shafts
Lecture 17 - Bearing Load Calculation - Intermediate Shaft
Lecture 18 - Bearing Selection and Introduction to Shaft Design Verification
Lecture 19 - Design Verification of Gear Box Shafts
Lecture 20 - Development (Layout) of Intermediate Shaft
Lecture 21 - Development (Layout) of Input Shaft and Integral Pinion
Lecture 22 - Development (Layout) of Output Shaft and 2nd. Stage (Output) Gear
Lecture 23 - Development (Layout) of Output Shaft (Continued...), Loads on Shaft and Bearings
Lecture 24 - Output Shaft-Bearing Lives
Lecture 25 - Design Verification of Output Shaft
Lecture 26 - Design Verification of Input Shaft (including Bearing Life Estimation)
Lecture 27 - Finalizing Design including the Sizes of the Keys
Lecture 28 - Development of Plan and Elevation of Gear Reduction Unit - I
Lecture 29 - Development of Plan and Elevation of Gear Reduction Unit - II

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NPTEL Video Course - Mechanical Engineering - NOC:Traditional and Non-Traditional Optimization Tools

Subject Co-ordinator - Prof. Dilip Kumar Pratihar

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Principle of Optimization
Lecture 2 - Traditional Methods of Optimization
Lecture 3 - Traditional Methods of Optimization (Continued...)
Lecture 4 - Binary-Coded Genetic Algorithm (BCGA)
Lecture 5 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 6 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 7 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 8 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 9 - Schema Theorem of BCGA
Lecture 10 - Schema Theorem of BCGA (Continued...)
Lecture 11 - Constraint Handling
Lecture 12 - Real-Coded GA
Lecture 13 - Faster Genetic Algorithms
Lecture 14 - Faster Genetic Algorithms (Continued...)
Lecture 15 - Faster Genetic Algorithms (Continued...)
Lecture 16 - Faster Genetic Algorithms (Continued...)
Lecture 17 - Scheduling GA
Lecture 18 - Scheduling GA (Continued...)
Lecture 19 - Scheduling GA (Continued...)
Lecture 20 - Simulated Annealing
Lecture 21 - Particle Swarm Optimization
Lecture 22 - Multi-Objective Optimization
Lecture 23 - Multi-Objective Optimization (Continued...)
Lecture 24 - Multi-Objective Optimization (Continued...)
Lecture 25 - Multi-Objective Optimization (Continued...)
Lecture 26 - Multi-Objective Optimization (Continued...)
Lecture 27 - Intelligent Optimization Toolture
Lecture 28 - A Practical Optimization Problem
Lecture 29 - A Practical Optimization Problem (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC: Mechanism and Robot Kinematics

Subject Co-ordinator - Dr. Anirvan Das Gupta
Co-ordinating Institute - IIT - Kharagpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Nomenclature
Lecture 3 - Kinematic Diagram
Lecture 4 - Degree of Freedom - I
Lecture 5 - Degree of Freedom - II
Lecture 6 - Degree of Freedom - Failure
Lecture 7 - Grashof Criteria - I
Lecture 8 - Grashof Criteria - II
Lecture 9 - Geometry and Representation of Vectors
Lecture 10 - Displacement Analysis
Lecture 11 - Displacement Analysis
Lecture 12 - Displacement Analysis
Lecture 13 - Displacement Analysis
Lecture 14 - Displacement Analysis
Lecture 15 - Displacement Analysis
Lecture 16 - Displacement Analysis
Lecture 17 - Displacement Analysis
Lecture 18 - Displacement Analysis
Lecture 19 - Displacement Analysis
Lecture 20 - Velocity Analysis
Lecture 21 - Velocity Analysis
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Velocity Analysis
Lecture 25 - Velocity Analysis
Lecture 26 - Velocity Analysis
Lecture 27 - Velocity Analysis
Lecture 28 - Velocity Analysis
Lecture 29 - Serial Manipulator Velocity Analysis - I

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Lecture 30 - Serial Manipulator Velocity Analysis - II
Lecture 31 - Serial Manipulator Velocity Analysis - III
Lecture 32 - Parallel Manipulator Velocity Analysis
Lecture 33 - Path Generation Problem
Lecture 34 - Acceleration Analysis - I
Lecture 35 - Acceleration Analysis - II
Lecture 36 - Force Analysis - I
Lecture 37 - Force Analysis - II
Lecture 38 - Coordinate transformation - I
Lecture 39 - Coordinate transformation - II
Lecture 40 - Coordinate transformation - III
Lecture 30 - Plate fin heat exchanger
Lecture 31 - Plate fin heat exchanger
Lecture 32 - Plate fin heat exchanger
Lecture 33 - Plate fin heat exchanger
Lecture 34 - Plate fin heat exchanger
Lecture 35 - Plate fin heat exchanger
Lecture 36 - Phase change heat exchangers
Lecture 37 - Phase change heat exchangers (Continued...)
Lecture 38 - Surface Condenser
Lecture 39 - Surface Condenser (Continued...)
Lecture 40 - Surface Condenser (Continued...)
Lecture 41 - Surface Condenser (Continued...)
Lecture 42 - In tube condensation
Lecture 43 - Heat pipes and Heat pipe heat exchangers
Lecture 44 - Heat pipes and Heat pipe heat exchangers (Continued...)
Lecture 45 - Heat pipes and Heat exchangers
Lecture 46 - Heat pipes and Heat exchangers (Continued...)
Lecture 47 - Micro Heat Exchanger Introduction
Lecture 48 - Micro scale Heat Transfer
Lecture 49 - Micro scale Heat Transfer (Continued...)
Lecture 50 - Micro Channel
Lecture 51 - Micro Heat Exchanger
Lecture 52 - Regenerators
Lecture 53 - Fixed Bed Regenerator Analysis
Lecture 54 - Design and Simulation of Regenerator (Fixed Bed)
Lecture 55 - Fixed Bed Regenerator (Numerical)
Lecture 56 - Fixed Bed Regenerator (Numerical) (Continued...)
Lecture 57 - Fouling in Heat Exchangers
Lecture 58 - Fouling in Heat Exchangers (Continued...)
Lecture 59 - Fouling in Heat Exchangers (Continued...)
Lecture 60 - Direct Contact heat exchanger
Lecture 61 - Direct Contact heat exchanger (Continued...)
Lecture 62 - Heat exchanger network synthesis
Lecture 63 - Heat exchanger network
Lecture 64 - Heat exchanger network (Continued...)
Lecture 65 - Heat Exchanger Testing
Lecture 66 - Heat Exchanger Testing (Continued...)
Lecture 30 - Control Scheme
Lecture 31 - Sensors
Lecture 32 - Sensors (Continued...)
Lecture 33 - Sensors (Continued...)
Lecture 34 - Robot Vision
Lecture 35 - Robot Vision (Continued...)
Lecture 36 - Robot Vision (Continued...)
Lecture 37 - Robot Motion Planning
Lecture 38 - Robot Motion Planning (Continued...)
Lecture 39 - Robot Motion Planning (Continued...)
Lecture 40 - Robot Motion Planning (Continued...)
Lecture 41 - Intelligent Robot
Lecture 42 - Biped Walking
Lecture 43 - Biped Walking (Continued...)
Lecture 44 - Summary
Lecture 45 - Summary (Continued...)
Lecture 1 - Introduction to CFD
Lecture 2 - Classification of partial differential equations
Lecture 3 - Examples of partial differential equations
Lecture 4 - Examples of partial differential equations (Continued...)
Lecture 5 - Nature of the characteristics of partial differential equation
Lecture 6 - Euler-Lagrangian equation
Lecture 7 - Approximate Solutions of Differential Equations
Lecture 8 - Variational formulation
Lecture 9 - Example of variational formulation and introduction to weighted residual method
Lecture 10 - Weighted residual method (Continued...)
Lecture 11 - Point Collocation method, the Galerkin's method and the 'M' form
Lecture 12 - Finite element method (FEM) of discretization
Lecture 13 - Finite element method of discretization (Continued...)
Lecture 14 - Finite difference method (FDM) of discretization
Lecture 15 - Well posed boundary value problem
Lecture 16 - Finite volume method (FVM) of discretization
Lecture 17 - Illustrative examples of finite volume method
Lecture 18 - Illustrative examples of finite volume method (Continued...)
Lecture 19 - Basic rules of finite volume discretization
Lecture 20 - Implementation of boundary conditions in FVM
Lecture 21 - Implementation of boundary conditions in FVM (Continued...)
Lecture 22 - 1-D Unsteady state diffusion problem
Lecture 23 - 1-D Unsteady state diffusion problem (Continued...)
Lecture 24 - Consequences of Discretization of Unsteady State Problems
Lecture 25 - FTCS scheme
Lecture 26 - CTCS scheme (Leap frog scheme) and Dufort-Frankel scheme
Lecture 27 - Part 1
Lecture 28 - Solution to linear algebraic equations (Continued...)
Lecture 29 - Elimination methods
Lecture 30 - Gaussian elimination and LU Decomposition methods
Lecture 31 - Illustrative example of elimination method
Lecture 32 - Tri-Diagonal Matrix Algorithm (TDMA)
Lecture 33 - Elimination methods
Lecture 34 - Elimination methods
Lecture 35 - Iteration methods
Lecture 36 - Generalized analysis of Iteration method
Lecture 37 - Further discussion on Iterative methods
Lecture 38 - Illustrative examples of Iterative methods
Lecture 39 - Gradient Search based methods
Lecture 40 - Steepest descent method (Continued...)
Lecture 41 - Conjugate gradient method
Lecture 42 - Convection diffusion equation
Lecture 43 - Central difference scheme applied to convection-diffusion equation
Lecture 44 - Upwind scheme
Lecture 45 - Illustrative examples
Lecture 46 - Exact solution of 1-D steady state convection diffusion equation (Continued...)
Lecture 47 - Exponential scheme
Lecture 48 - Generalized convection diffusion formulation
Lecture 49 - 2-D convection diffusion problem
Lecture 50 - False (numerical) diffusion scheme and the QUICK scheme
Lecture 51 - Discretization of Navier Stokes equation
Lecture 52 - Discretization of Navier Stokes equation (Continued...)
Lecture 53 - Concept of staggered grid
Lecture 54 - SIMPLE algorithm
Lecture 55 - Salient features of SIMPLE algorithm
Lecture 56 - Illustrative examples on the use of SIMPLE algorithm
Lecture 57 - SIMPLER algorithm
Lecture 58 - Illustrative examples of SIMPLER algorithm
Lecture 59 - What is there in implementing a CFD Code
Lecture 60 - Some representative case studies
NPTEL Video Course - Mechanical Engineering - NOC: Concepts of Thermodynamics

Subject Co-ordinator - Prof. Aditya Bandopadhyay, Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introductory Concepts
Lecture 2 - Properties of Pure Substances
Lecture 3 - Properties of Pure Substances (Continued...)
Lecture 4 - Introduction to Property Tables
Lecture 5 - Properties of Pure Substances
Lecture 6 - Properties of Pure Substances
Lecture 7 - Use of Computer as Means of Learning Thermodynamics
Lecture 8 - Properties of Pure Substances (Continued...)
Lecture 9 - Properties of Pure Substances Spring - Piston Problem
Lecture 10 - Heat and Work
Lecture 11 - Heat and Work
Lecture 12 - Heat and Work
Lecture 13 - Heat and Work
Lecture 14 - First Law of Thermodynamics for a Control Mass System
Lecture 15 - Enthalpy and Specific Heats
Lecture 16 - First Law for a Control Mass System
Lecture 17 - First Law for a Control Mass System
Lecture 18 - First Law for a Control Mass System
Lecture 19 - Control Volume Conservation Reynolds Transport Theorem
Lecture 20 - Control Volume Mass and Energy Balance
Lecture 21 - Supplementary Lecture
Lecture 22 - First Law for Steady State Steady Flow (SSSF) Process
Lecture 23 - First Law for SSSF Process
Lecture 24 - First Law for SSSF Process
Lecture 25 - First Law for SSSF Process
Lecture 26 - First Law for SSSF Process
Lecture 27 - Supplementary Lecture
Lecture 28 - First Law of Thermodynamics for Unsteady Processes in a Control Volume
Lecture 29 - First Law for Unsteady Problems - Examples

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NPTEL Video Course - Mechanical Engineering - NOC:Electronic Packaging and Manufacturing

Subject Co-ordinator - Prof. A Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Introduction - 3
Lecture 4 - Semiconductors and Components - 1
Lecture 5 - Semiconductors and Components - 2
Lecture 6 - 1st Level Packaging - I
Lecture 7 - 1st Level Packaging - II
Lecture 8 - Area Array Packages - I
Lecture 9 - Area Array Packages - II
Lecture 10 - Area Array Packages - III
Lecture 11 - Flip Chip Technology
Lecture 12 - 1st Level Interconnections - I
Lecture 13 - 1st Level Interconnections - II
Lecture 14 - 1st Level Interconnections - III
Lecture 15 - Advanced Packaging
Lecture 16 - 2nd Level Packaging
Lecture 17 - 2nd Level Packaging
Lecture 18 - 2nd Level Packaging
Lecture 19 - 2nd Level Packaging
Lecture 20 - 2nd Level Packaging
Lecture 21 - System Integration
Lecture 22 - Thermal Management 1
Lecture 23 - Thermal Management 2
Lecture 24 - Thermal Management 3
Lecture 25 - Thermal Management 4
Lecture 26 - Thermal Management 5
Lecture 27 - Thermal Management 6
Lecture 28 - Thermal Management 7
Lecture 29 - Thermal Management 8

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Lecture 30 - Thermal Management 9
Lecture 31 - Shock and Vibration - 1
Lecture 32 - Shock and Vibration - 2
Lecture 33 - Shock and Vibration - 3
Lecture 34 - Shock and Vibration - 4
Lecture 35 - Electronic Packaging Reliability - 1
Lecture 36 - Electronic Packaging Reliability - 2
Lecture 37 - Electronic Packaging Reliability - 3
Lecture 38 - Electronic Packaging Reliability - 4
Lecture 39 - Power Electronics Packaging
Lecture 40 - Special Topics
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Kinematics of Mechanisms and Machines
Subject Co-ordinator - Prof. A. Dasgupta
Co-ordinating Institute - IIT - Kharagpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation
Lecture 2 - Nomenclature and Classification
Lecture 3 - Kinematic Diagram
Lecture 4 - Degree of Freedom
Lecture 5 - Constrained and Robotic Mechanisms
Lecture 6 - Failure of DOF Calculation
Lecture 7 - Grashof Criterion - I
Lecture 8 - Grashof Criterion - II
Lecture 9 - Grashof Criterion - Problems
Lecture 10 - Displacement Analysis - I
Lecture 11 - Displacement Analysis - II
Lecture 12 - Displacement Analysis Example - I
Lecture 13 - Displacement Analysis Example - II
Lecture 14 - Steering Mechanisms
Lecture 15 - Displacement Analysis of Robots - I
Lecture 16 - Displacement Analysis of Robots - II
Lecture 17 - Displacement Analysis of Robots - III
Lecture 18 - Geometric Velocity Analysis - I
Lecture 19 - Geometric Velocity Analysis - II
Lecture 20 - Geometric Velocity Analysis - III
Lecture 21 - Velocity Analysis
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Analytical Velocity Analysis - I
Lecture 25 - Analytical Velocity Analysis - II
Lecture 26 - Analytical Velocity Analysis - III
Lecture 27 - Velocity Analysis Examples
Lecture 28 - Robot Velocity Analysis - I
Lecture 29 - Robot Velocity Analysis - II

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Lecture 30 - Robot Velocity Analysis - III
Lecture 31 - Robot Path Generation
Lecture 32 - Acceleration Analysis - I
Lecture 33 - Acceleration Analysis - II
Lecture 34 - Force Analysis - I
Lecture 35 - Force Analysis - II
Lecture 36 - Force Analysis Examples
Lecture 37 - Gear Kinematics
Lecture 38 - Gear trains - I
Lecture 39 - Gear trains - II
Lecture 40 - Gear trains - III

Subject Co-ordinator - Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Motivations of studying fluid mechanics
Lecture 2 - Macroscopic and microscopic point of views
Lecture 3 - Concept of traction vector
Lecture 4 - Cauchy's theorem
Lecture 5 - Concept of pressure in a fluid
Lecture 6 - Density, Bulk Modulus, Viscosity
Lecture 7 - Viscosity, Newtonian fluid
Lecture 8 - Kinematic viscosity, Reynolds number
Lecture 9 - Non-Newtonian fluids
Lecture 10 - Some illustrative examples solved
Lecture 11 - Problems and Solutions
Lecture 12 - Surface Tension - Part I
Lecture 13 - Surface Tension - Part II
Lecture 14 - Governing equation of fluid statics
Lecture 15 - Manometers
Lecture 16 - Force on a surface immersed in fluid - Part I
Lecture 17 - Force on a surface immersed in fluid - Part II
Lecture 18 - Force on a surface immersed in fluid - Part III, Stability of solid bodies in fluid - Part I
Lecture 19 - Stability of solid bodies in fluid - Part II
Lecture 20 - Fluid under rigid body motion
Lecture 21 - Lagrangian and Eulerian approaches
Lecture 22 - Concept of different flow lines
Lecture 23 - Acceleration of fluid flow
Lecture 24 - Deformation of fluid elements - Part I
Lecture 25 - Derivation of continuity equation
Lecture 26 - Problems and Solutions
Lecture 27 - Deformation of fluid elements - Part II
Lecture 28 - Deformation of fluid elements - Part III
Lecture 29 - Stream Function

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Lecture 30 - Circulation, Velocity Potential
Lecture 31 - Euler's equation
Lecture 32 - Bernoulli's equation - Part I
Lecture 33 - Bernoulli's equation - Part II
Lecture 34 - Bernoulli's equation - Part III
Lecture 35 - Euler's equation in streamline coordinates
Lecture 36 - Problems and Solutions
Lecture 37 - Problems and Solutions
Lecture 38 - Application of Bernoulli's equation - Part I
Lecture 39 - Application of Bernoulli's equation - Part II
Lecture 40 - Application of Bernoulli's equation - Part III
Lecture 41 - Reynolds Transport Theorem (RTT)
Lecture 42 - Application of RTT
Lecture 43 - Problems and Solutions
Lecture 44 - Problems and Solutions
Lecture 45 - Application of RTT
Lecture 46 - Problems and Solutions
Lecture 47 - Problems and Solutions
Lecture 48 - Problems and Solutions
Lecture 49 - Application of RTT
Lecture 50 - Problems and Solutions
Lecture 51 - Navier-Stokes equation - Part I
Lecture 52 - Navier-Stokes equation - Part II
Lecture 53 - Navier-Stokes equation - Part III
Lecture 54 - Navier-Stokes equation - Part IV
Lecture 55 - Pipe Flow - Part I
Lecture 56 - Pipe Flow - Part II
Lecture 57 - Pipe Flow - Part III
Lecture 58 - Pipe Flow - Part IV
Lecture 59 - Principle of Similarity and Dynamical Analysis - Part I
Lecture 60 - Principle of Similarity and Dynamical Analysis - Part II

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Lecture 1 - Introduction to Conduction
Lecture 2 - 1-D Steady State Conduction
Lecture 3 - Introduction to Convection
Lecture 4 - Conduction Equation
Lecture 5 - Conduction Equation
Lecture 6 - Conduction Equation
Lecture 7 - 1-D Steady State Conduction - I
Lecture 8 - Concept of Thermal Resistance
Lecture 9 - 1-D Steady State Conduction - II
Lecture 10 - 1-D Steady State Conduction - II (Continued...)
Lecture 11 - Problems on 1-D Steady State Conduction - I
Lecture 12 - Problems on 1-D Steady State Conduction - I (Continued...)
Lecture 13 - Problems on 1-D Steady State Conduction - II
Lecture 14 - Conduction in Cylindrical Geometry
Lecture 15 - Critical Insulation Thickness
Lecture 16 - Critical Insulation Thickness (Continued...)
Lecture 17 - Problems on Conduction in Cylindrical Geometry - 1
Lecture 18 - Problems on Conduction in Cylindrical Geometry - 2 and Conduction in Spherical Geometry
Lecture 19 - Problems on Conduction in Cylindrical Geometry - 2 and Conduction in Spherical Geometry
Lecture 20 - Heat Transfer From Extended Surfaces
Lecture 21 - Boundary Conditions at the Fin Tip
Lecture 22 - Fin Types, Efficiency and Effectiveness
Lecture 23 - Problems on Heat Transfer From Extended Surfaces
Lecture 24 - 2-D Steady State Conduction
Lecture 25 - Separation of Variables Method for 2-D Steady State Conduction
Lecture 26 - Superposition Method for 2-D Steady State Conduction
Lecture 27 - Transient Conduction
Lecture 28 - Problems on Lumped Parameter Approach
Lecture 29 - Transient Conduction

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Lecture 30 - Transient Conduction
Lecture 31 - Transient Conduction
Lecture 32 - Introduction to Convection
Lecture 33 - Review of Fluid Mechanics - 1
Lecture 34 - Review of Fluid Mechanics - 2
Lecture 35 - Review of Fluid Mechanics - 3
Lecture 36 - Review of Fluid Mechanics - 4
Lecture 38 - Energy Conservation Equation - 1
Lecture 39 - Energy Conservation Equation - 2
Lecture 40 - Energy Conservation Equation - 3
Lecture 41 - Thermal Boundary Layer - 1
Lecture 42 - Thermal Boundary Layer - 2
Lecture 43 - Energy Integral Equation - 1
Lecture 44 - Energy Integral Equation - 2
Lecture 45 - Internal Forced Convection - 1
Lecture 46 - Internal Forced Convection - 2
Lecture 47 - Internal Forced Convection - 3
Lecture 48 - Internal Forced Convection - 4
Lecture 49 - Internal Forced Convection - 5
Lecture 50 - Internal Forced Convection - 6
Lecture 51 - Viscous Dissipation - 1
Lecture 52 - Viscous Dissipation - 2
Lecture 53 - Natural Convection - 1
Lecture 54 - Natural Convection - 2
Lecture 55 - Natural Convection - 3
Lecture 56 - Natural Convection - 4
Lecture 57 - Condensation - 1
Lecture 58 - Condensation - 2
Lecture 59 - Boiling
Lecture 60 - Heat Exchangers - 1
Lecture 61 - Heat Exchangers - 2
Lecture 62 - Heat Exchangers - 3
Lecture 63 - Heat Exchangers - 4
Lecture 64 - Heat Exchangers - 5
Lecture 65 - Problems on Heat Exchangers
Lecture 30 - Potential Flow (Continued...)
Lecture 31 - Potential Flow (Continued...)
Lecture 32 - Potential Flow (Continued...)
Lecture 33 - Potential Flow (Continued...)
Lecture 34 - Stokes Flow past a Sphere
Lecture 35 - Stokes Flow past a Sphere (Continued...)
Lecture 36 - Stokes Flow past a Sphere (Continued...)
Lecture 37 - Lubrication Theory
Lecture 38 - Lubrication Theory (Continued...)
Lecture 39 - Lubrication Theory (Continued...)
Lecture 40 - Thin Film Dynamics
Lecture 41 - Thin Film Dynamics (Continued...)
Lecture 42 - Thin Film Dynamics (Continued...)
Lecture 43 - Thin Film Dynamics (Continued...)
Lecture 44 - Thin Film Dynamics (Continued...)
Lecture 45 - Thin Film Dynamics (Continued...)
Lecture 46 - Thin Film Dynamics (Continued...)
Lecture 47 - Thin Film Dynamics (Continued...)
Lecture 48 - Compressible Flows
Lecture 49 - Compressible Flows (Continued...)
Lecture 50 - Compressible Flows (Stagnation Properties)
Lecture 51 - Compressible Flows (Stagnation Properties, Variable Area)
Lecture 52 - Compressible Flows (Variable Area)
Lecture 53 - Compressible Flows (Variable Area)
Lecture 54 - Compressible Flows (Normal Shock)
Lecture 55 - Compressible Flows (Normal Shock) (Continued...)
Lecture 56 - Compressible Flows (Converging Nozzle)
Lecture 57 - Compressible Flows (Converging Diverging Nozzle)
Lecture 58 - Compressible Flows (Converging Diverging Nozzle) (Continued...)
Lecture 59 - Compressible Flows with Friction
NPTEL Video Course - Mechanical Engineering - Advanced Gas Dynamics

Subject Co-ordinator - Dr. Rinku Mukherjee

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to Gas Dynamics & Review of Basic Thermodynamics
Lecture 2 - Review of Basic Thermodynamics Continued
Lecture 3 - An introduction to Normal Shocks
Lecture 4 - The Mach Number and Compressible Flow
Lecture 5 - The relation of physical properties across a normal shock
Lecture 6 - Normal Shock in a duct
Lecture 7 - Example Problems in Normal Shocks
Lecture 8 - An introduction to Oblique Shocks
Lecture 9 - The relation of physical properties across an oblique shock
Lecture 10 - Example Problems in Oblique Shocks
Lecture 11 - Pressure - Deflection relationship of Shocks
Lecture 12 - An introduction to Expansion waves
Lecture 13 - Area - Mach Relationship
Lecture 14 - Unsteady Shock Waves
Lecture 15 - The Shock Tube
Lecture 16 - A review of wave propagation
Lecture 17 - Wave propagation
Lecture 18 - Finite Wave Theory
Lecture 19 - The Shock Tube
Lecture 20 - The Method of Characteristics
Lecture 21 - Application of The Method of Characteristics
Lecture 22 - Application of The Method of Characteristics
Lecture 23 - Flow over a Wavy wall
Lecture 24 - Subsonic Flow over a Wavy wall
Lecture 25 - Supersonic Flow over a Wavy wall
Lecture 26 - Supersonic Flow past a 3D Cone
Lecture 27 - Quasi 2D Flow - I
Lecture 28 - Quasi 2D Flow - II
Lecture 29 - Similarity Rules and Transformed Coordinate System

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Lecture 30 - Critical Mach Number and Thin Airfoil Theory
Lecture 31 - Example Problem using Thin Airfoil Theory
Lecture 32 - Example Problems - 1
Lecture 33 - Example Problems - 2
Lecture 34 - Example Problems - 3
Lecture 35 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 36 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 37 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 38 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 39 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 40 - Supersonic Flow past a 3D Bluff Body at an angle of attack
NPTEL Video Course - Mechanical Engineering - Design and Optimization of Energy systems

Subject Co-ordinator - Prof. C. Balaji
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to Optimization
Lecture 2 - System Design and Analysis
Lecture 3 - Workable system
Lecture 4 - System simulation
Lecture 5 - Information flow diagrams
Lecture 6 - Successive substitution method
Lecture 7 - Successive substitution method (Continued.)
Lecture 8 - Successive substitution method and Newton-Raphson method
Lecture 9 - Newton-Raphson method (Continued.)
Lecture 10 - Convergence characteristics of Newton-Raphson method
Lecture 11 - Newton-Raphson method for multiple variables
Lecture 12 - Solution of system of linear equations
Lecture 13 - Introduction to Curve fitting
Lecture 14 - Example for Lagrange interpolation
Lecture 15 - Lagrange interpolation (Continued.)
Lecture 16 - Best fit
Lecture 17 - Least Square Regression
Lecture 18 - Least Square Regression (Continued.)
Lecture 19 - Least Square Regression (Continued.)
Lecture 20 - Non-linear Regression (Gauss - Newton Algorithm)
Lecture 21 - Optimization - Basic ideas
Lecture 22 - Properties of objective function and cardinal ideas in optimization
Lecture 23 - Unconstrained optimization
Lecture 24 - Constrained optimization problems
Lecture 25 - Mathematical proof of the Lagrange multiplier method
Lecture 26 - Test for Maxima / Minima
Lecture 27 - Handling in-equality constraints
Lecture 28 - Kuhn-Tucker conditions (Continued.)
Lecture 29 - Uni-modal function and search methods
Lecture 30 - Dichotomous search
Lecture 31 - Fibonacci search method
Lecture 32 - Reduction ratio of Fibonacci search method
Lecture 33 - Introduction to multi-variable optimization
Lecture 34 - The Conjugate gradient method
Lecture 35 - The Conjugate gradient method (Continued.)
Lecture 36 - Linear programming
Lecture 37 - Dynamic programming
Lecture 38 - Genetic Algorithms
Lecture 39 - Genetic Algorithms (Continued.)
Lecture 40 - Simulated Annealing and Summary
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Engineering Fracture Mechanics

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - EFM Course Outline
Lecture 2 - Spectacular Failures
Lecture 3 - Lessons from Spectacular Failures
Lecture 4 - LEFM and EPFM
Lecture 5 - Fracture Mechanics is Holistic
Lecture 6 - Fatigue Crack Growth Model
Lecture 7 - Crack Growth and Fracture Mechanisms
Lecture 8 - Elastic Strain Energy
Lecture 9 - Fracture Strength by Griffith
Lecture 10 - Energy Release Rate
Lecture 11 - Utility of Energy Release Rate
Lecture 12 - Pop-in Phenomenon
Lecture 13 - Displacement and Stress Formulations
Lecture 14 - Forms of Stress Functions
Lecture 15 - Airy's Stress Function for Mode-I
Lecture 16 - Westergaard Solution of Stress Field for Mode-I
Lecture 17 - Displacement Field for Mode-I
Lecture 18 - Relation between KI and GI
Lecture 19 - Stress Field in Mode-II
Lecture 20 - Generalised Westergaard Approach
Lecture 21 - William's Eigen Function Approach
Lecture 22 - Multi-parameter Stress Field Equations
Lecture 23 - Validation of Multi-parameter Field Equations
Lecture 24 - Discussion Session - I
Lecture 25 - Evaluation of SIF for Various Geometries
Lecture 26 - SIF for Embedded Cracks
Lecture 27 - SIF for Surface Cracks
Lecture 28 - Modeling of Plastic Deformation
Lecture 29 - Irwin's Model

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Lecture 30 - Dugdale Model
Lecture 31 - Fracture Toughness Testing
Lecture 32 - Plane Strain Fracture Toughness Testing
Lecture 33 - Plane Stress Fracture Toughness Testing
Lecture 34 - Paris Law and Sigmoidal Curve
Lecture 35 - Crack Closure
Lecture 36 - Crack Growth Models
Lecture 37 - J-Integral
Lecture 38 - HRR Field and CTOD
Lecture 39 - FAD and Mixed Mode Fracture
Lecture 40 - Crack Arrest and Repair Methodologies
Lecture 41 - Discussion Session - II
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NPTEL Video Course - Mechanical Engineering - Experimental Stress Analysis

Subject Co-ordinator - Prof. K. Ramesh
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Overview of Experimental Stress Analysis
Lecture 2 - Optical Methods Work as Optical Computers
Lecture 3 - Stress, Strain and Displacement Fields
Lecture 4 - Physical Principle of Strain Gauges, Photoelasticity and Moiré®
Lecture 5 - Introduction to Moiré®, Brittle Coatings and Holography
Lecture 6 - Hologram Interferometry, Speckle Methods
Lecture 7 - Introduction to Shearography, TSA, DIC and Caustics
Lecture 8 - Fringe Patterns & Richness of Qualitative Information
Lecture 9 - Multi-Scale Analysis in Experimental Mechanics
Lecture 10 - Selection of an Experimental Technique
Lecture 11 - Introduction to Transmission Photoelasticity
Lecture 12 - Ordinary and Extraordinary Rays
Lecture 13 - Light Ellipse, Passage of Light Through a Crystal Plate
Lecture 14 - Retardation Plates, Stress-optic Law
Lecture 15 - Plane Polariscpe
Lecture 16 - Jones Calculus
Lecture 17 - Circular Polariscpe
Lecture 18 - Determination of Photoelastic Parameters at an Arbitrary Point
Lecture 19 - Tardy's Method of Compensation
Lecture 20 - Calibration of Photo elastic Materials
Lecture 21 - Fringe Thinning Methodologies
Lecture 22 - Fringe Ordering in Photoelasticity
Lecture 23 - Miscellaneous Topics in Transmission Photoelasticity
Lecture 24 - Three Dimensional Photoelasticity
Lecture 25 - Overview of Digital Photoelasticity
Lecture 26 - Introduction to Photoelastic Coatings
Lecture 27 - Correction Factors for Photoelastic Coatings
Lecture 28 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatings
Lecture 29 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings

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Lecture 30 - Analysis of Brittle Coatings
Lecture 31 - Introduction to Strain Gauges
Lecture 32 - Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes
Lecture 33 - Strain Gauge Alloys, Carriers and Adhesives
Lecture 34 - Performance of Strain Gauge System
Lecture 35 - Temperature Compensation, Two-wire and Three-wire Circuits
Lecture 36 - Strain Gauge Selection
Lecture 37 - Bonding of a Strain Gauge
Lecture 38 - Soldering, Accounting for Transverse Sensitivity Effects
Lecture 39 - Correction Factors for Special Applications
Lecture 40 - Special Gauges
Lecture 41 - Questions and Answers
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NPTEL Video Course - Mechanical Engineering - Rocket Propulsion

Subject Co-ordinator - Prof. K. Ramamurthi

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Introduction
Lecture 2 - Motion in Space
Lecture 3 - Rotational Frame of Reference and Orbital Velocities
Lecture 4 - Velocity Requirements
Lecture 5 - Theory of Rocket Propulsion
Lecture 6 - Rocket Equation and Staging of Rockets
Lecture 7 - Review of Rocket Principles; Propulsion Efficiency
Lecture 8 - Examples Illustrating Theory of Rocket Propulsion and Introduction to Nozzles
Lecture 9 - Theory of Nozzles
Lecture 10 - Nozzle Shape
Lecture 11 - Area Ratio of Nozzles; Under-expansion and Over-expansion
Lecture 12 - Characteristic Velocity and Thrust Coefficient
Lecture 13 - Divergence Loss in Conical Nozzles and the Bell Nozzle
Lecture 14 - Unconventional Nozzles and Problems in Nozzles
Lecture 15 - Criterion for Choice of Chemical Propellants
Lecture 16 - Choice of Fuel-Rich Propellants
Lecture 17 - Performance Prediction Analysis
Lecture 18 - Dissociation of Products of Combustion
Lecture 19 - Shifting Equilibrium and Frozen Flow in Nozzles
Lecture 20 - Factors Influencing Choice of Chemical Propellants
Lecture 21 - Low Energy Liquid Propellants and Hybrid Propellants
Lecture 22 - Introduction to Solid Propellant Rockets
Lecture 23 - Burn Rate of Solid Propellants and Equilibrium Pressure in Solid Propellant Rockets
Lecture 24 - Design Aspects of Solid Propellant Rockets
Lecture 25 - Burning Surface Area of Solid Propellant Grains
Lecture 26 - Ignition of Solid Propellant Rockets
Lecture 27 - Review of Solid Propellant Rockets
Lecture 28 - Feed Systems for Liquid Propellant Rockets
Lecture 29 - Feed System Cycles for Pump Fed Liquid Propellant Rockets

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Lecture 30 - Analysis of Gas Generator and Staged Combustion Cycles and Introduction to Injectors
Lecture 31 - Injectors, Cooling of Chamber and Mixture Ratio Distribution
Lecture 32 - Efficiencies due to Mixture Ratio Distribution and Incomplete Vaporization
Lecture 33 - Pumps and Turbines; Propellant Feed System at Zero Paige Conditions
Lecture 34 - Review of Liquid Bi-propellant Rockets and Introduction to Mono-propellant Rockets
Lecture 35 - Introduction to Hybrid Rockets and a Simple Illustration of Combustion Instability in Liquid Propellant Rockets
Lecture 36 - Combustion Instability in Solid Propellant and Liquid Propellant Rockets - Bulk and Wave Modes
Lecture 37 - Wave modes of Oscillation
Lecture 38 - Mechanisms Causing Instabilities and Strategies for Avoiding Combustion Instability
Lecture 39 - Electric and Magnetic Fields and the Electrostatic Thruster
Lecture 40 - Electrical Thrusters
Lecture 41 - Advances in Rocket Propulsion
NPTEL Video Course - Mechanical Engineering - Advanced Finite Elements Analysis

Subject Co-ordinator - Dr. R. Krishnakumar
Co-ordinating Institute - IIT - Madras
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Lecture 1 - Advanced Finite Elements Analysis
Lecture 2 - Advanced Finite Elements Analysis
Lecture 3 - Advanced Finite Elements Analysis
Lecture 4 - Advanced Finite Elements Analysis
Lecture 5 - Advanced Finite Elements Analysis
Lecture 6 - Advanced Finite Elements Analysis
Lecture 7 - Advanced Finite Elements Analysis
Lecture 8 - Advanced Finite Elements Analysis
Lecture 9 - Advanced Finite Elements Analysis
Lecture 10 - Advanced Finite Elements Analysis
Lecture 11 - Advanced Finite Elements Analysis
Lecture 12 - Advanced Finite Elements Analysis
Lecture 13 - Advanced Finite Elements Analysis
Lecture 14 - Advanced Finite Elements Analysis
Lecture 15 - Advanced Finite Elements Analysis
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Lecture 27 - Advanced Finite Elements Analysis
Lecture 28 - Advanced Finite Elements Analysis
Lecture 29 - Advanced Finite Elements Analysis

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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Advanced Operations Research

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction and Linear Programming
Lecture 2 - Revised Simplex Algorithm
Lecture 3 - Simplex Method for Bounded Variables
Lecture 4 - One Dimensional Cutting Stock Problem
Lecture 5 - One Dimensional Cutting Stock Problem (Continued.)
Lecture 6 - Dantzig-Wolfe Decomposition Algorithm
Lecture 7 - Dantzig-Wolfe Decomposition Algorithm Primal-Dual Algorithm
Lecture 8 - Primal-Dual Algorithm
Lecture 9 - Goal Programming-Formulations
Lecture 10 - Goal Programming Solutions Complexity of Simplex Algorithm
Lecture 11 - Complexity of Simplex Algorithm (Continued.) Integer Programming
Lecture 12 - Integer Programming-Formulations
Lecture 13 - Solving Zero-One Problems
Lecture 14 - Solving Zero-One Problems (Continued.)
Lecture 15 - Branch And Bond Algorithm For Integer Programming
Lecture 16 - Cutting Plane Algorithm
Lecture 17 - All Integer Primal Algorithm
Lecture 18 - All Integer Dual Algorithm
Lecture 19 - Network Models
Lecture 20 - Shortest Path Problem
Lecture 21 - Successive Shortest Path Problem
Lecture 22 - Maximum Flow Problem
Lecture 23 - Minimum Cost Flow Problem
Lecture 24 - Traveling Salesman Problem (TSP)
Lecture 25 - Branch and Bound Algorithms for TSP
Lecture 26 - Heuristics for TSP
Lecture 27 - Heuristics for TSP (Continued.)
Lecture 28 - Chinese Postman Problem
Lecture 29 - Vehicle Routeing Problem

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Lecture 1 - Introduction to Linear Programming Formulations
Lecture 2 - Linear Programming Formulations (Continued...)
Lecture 3 - Linear Programming Solutions - Graphical Methods
Lecture 4 - Linear Programming Solutions - Simplex Algorithm
Lecture 5 - Simplex Algorithm - Minimization Problems
Lecture 6 - Simplex Algorithm - Initialization and Iteration
Lecture 7 - Simplex Algorithm - Termination
Lecture 8 - Introduction to Duality
Lecture 9 - Primal Dual Relationships, Duality Theorems
Lecture 10 - Dual Variables and the Simplex Tables
Lecture 11 - Simplex Algorithm in Matrix Form Introduction to Sensitivity Analysis
Lecture 12 - Sensitivity Analysis Transportation Problem (Introduction)
Lecture 13 - Transportation Problem, Methods for Initial Basic Feasible Solutions
Lecture 14 - Transportation Problem - Optimal Solutions
Lecture 15 - Transportation Problem - Other Issues
Lecture 16 - Assignment Problem - Hungarian Algorithm
Lecture 17 - Assignment Problem - Other Issues Introduction to Dynamic Programming
Lecture 18 - Dynamic Programming - Examples Involving Discrete Variables
Lecture 19 - Dynamic Programming - Continuous Variables
Lecture 20 - Dynamic Programming - Examples to Solve Linear & Integer Programming Problems
Lecture 21 - Inventory Models - Deterministic Models
Lecture 22 - Inventory Models - Discount Models, Constrained Inventory Problems, Lagrangean Multipliers, Conclu...
Lecture 30 - Introduction to Finite Element Method
Lecture 31 - Introduction to Finite Element Method
Lecture 32 - Introduction to Finite Element Method
Lecture 33 - Introduction to Finite Element Method
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NPTEL Video Course - Mechanical Engineering - Mechanical Measurements and Metrology

Subject Co-ordinator - Prof. Shunmugam M. S, Prof. S.P. Venkateshan

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to the Study of Mechanical Measurement
Lecture 2 - Errors in Measurement
Lecture 3 - Errors in Measurement (Continued...)
Lecture 4 - Propagation of Errors
Lecture 5 - Regression Analysis
Lecture 6 - Regression Analysis (Continued...)
Lecture 7 - Design of Experiments
Lecture 8 - Design of Experiments (Continued...)
Lecture 9 - Temperature Measurement
Lecture 10 - Overview of Thermometry
Lecture 11 - Thermoelectric Thermometry
Lecture 12 - Thermoelectric Thermometry (Continued...)
Lecture 13 - Measurement of Temperature Under Various Conditions
Lecture 14 - Errors in Temperature Measurement
Lecture 15 - Measurement of Transient Temperature and Resistance Thermometry
Lecture 16 - Resistance Thermometry (Continued...)
Lecture 17 - Resistance Thermometry (Continued... and pyrometry
Lecture 18 - pyrometry (Continued...)
Lecture 19 - pyrometry (Continued...)
Lecture 20 - Pressure Measurement (Continued...)
Lecture 21 - Pressure Measurement (Continued...)
Lecture 22 - Pressure Measurement (Continued...)
Lecture 23 - Pressure Measurement (Continued...)
Lecture 24 - Transient Response of Pressure Transducers
Lecture 25 - Transient Response of Pressure Transducers
Lecture 26 - Measurement of High Vacuum
Lecture 27 - Measurement of Fluid Velocity
Lecture 28 - Hot Wire Anemometry and Laser Doppler Velocimetry
Lecture 29 - Laser Doppler Velocimetry and Ultrasonic Methods

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Lecture 30 - Measurement of Heat Flux
Lecture 31 - Measurement of Heat Flux (Continued...)
Lecture 32 - Transient Method of Heat Flux Measurement
Lecture 33 - Measurement of Volume and Mass Flow Rate of Fluid
Lecture 34 - Flow Measuring Devices
Lecture 35 - Measurement of Stagnation and Bulk Mean Temperature
Lecture 36 - Measurement of Thermo-Physical Properties
Lecture 37 - Measurement of Thermal Conductivity
Lecture 38 - Measurement of Heat Capacity and Heating Value
Lecture 39 - Measurement of Viscosity
Lecture 40 - Measurement of Viscosity (Continued...)
Lecture 41 - Integrating Sphere and Measurement of Emissivity
Lecture 42 - Measurements of Gas Composition
Lecture 43 - Measurements of Gas Composition (Continued...)
Lecture 44 - Measurements of Gas Composition and Smoke
Lecture 45 - Measurement of Force
Lecture 46 - Force Measurement
Lecture 47 - Vibration and Acceleration Measurement
Lecture 48 - Laser Doppler Accelerometer, Speed, Torque
Lecture 49 - General Issues in Mechanical Measurement
Lecture 50 - Case Studies
NPTEL Video Course - Mechanical Engineering - Spray Theory and Applications

Subject Co-ordinator - Prof. Mahesh Panchagnula, Dr. Paul E. Sojka
Co-ordinating Institute - IIT - Madras | Purdue University
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to sprays and their applications
Lecture 2 - Spatial versus Temporal Sampling
Lecture 3 - Spatial Vs Temporal Sampling example problem
Lecture 4 - Steady vs unsteady spray
Lecture 5 - Statistical measures on spray
Lecture 6 - Discussion on pdf and moments
Lecture 7 - Size velocity correlation
Lecture 8 - Discussion on Interfacial tension
Lecture 9 - Introduction to Atomizers and their design - 1
Lecture 10 - Introduction to Atomizers and their design - 2
Lecture 11 - Simple measurement techniques
Lecture 12 - Selection of atomizers
Lecture 13 - Spray measurement characteristics
Lecture 14 - Spray measurements techniques
Lecture 15 - Non-intrusive spray measurements techniques
Lecture 16 - Non-intrusive spray measurements techniques
Lecture 17 - Linear stability analysis à Introduction
Lecture 18 - Linear stability analysis - Kelvin-Helmhotz instability - 1
Lecture 19 - Linear stability analysis - Kelvin-Helmhotz instability - 2
Lecture 20 - Linear stability analysis - Kelvin-Helmhotz instability - 3
Lecture 21 - Linear stability analysis procedure
Lecture 22 - Linear stability analysis - Cylindrical jet instability - 1
Lecture 23 - Linear stability analysis - Cylindrical jet instability - 2
Lecture 24 - Linear stability analysis - Planar Liquid Sheet instability - 1
Lecture 25 - Linear stability analysis - Planar Liquid Sheet instability - 2
Lecture 26 - Design of pressure swirl atomizer - 1
Lecture 27 - Design of pressure swirl atomizer - 2
Lecture 28 - Design of pressure swirl atomizer - 3
Lecture 29 - Design of pressure swirl atomizer - 4

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Lecture 30 - Secondary atomization-Dimensionless parameters
Lecture 31 - Secondary atomization-Modes of breakup - 1
Lecture 32 - Secondary atomization-Modes of breakup - 2
Lecture 33 - Multiphase modelling
Lecture 34 - Multiphase modelling
Lecture 35 - Multiphase flow modelling basics
Lecture 36 - Multiphase modelling â Selection of model - 1
Lecture 37 - Multiphase modelling â Selection of model - 2
Lecture 38 - Multiphase modelling - Governing equations
Lecture 39 - Droplet evaporation
Lecture 40 - Droplet combustion
Lecture 41 - Spray combustion
NPTEL Video Course - Mechanical Engineering - Conduction And Radiation

Subject Co-ordinator - Prof. C. Balaji

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Importance of Thermal Radiation
Lecture 2 - Blackbody definition
Lecture 3 - Solid angle, spectral radiation intensity
Lecture 4 - Radiation pressure and radiation energy density
Lecture 5 - Relationship between $I$ and $T$ and Candidate blackbody distribution functions
Lecture 6 - Candidate blackbody distribution functions (Continued...)
Lecture 7 - Planck's blackbody radiation distribution function
Lecture 8 - Planck's distribution and Wien's displacement law
Lecture 9 - Universal blackbody function
Lecture 10 - Emissivity
Lecture 11 - Emissivity (Continued...)
Lecture 12 - Emissivity (Continued...)
Lecture 13 - Kirchoff law, Absorptivity
Lecture 14 - Kirchoff law, Absorptivity (Continued...)
Lecture 15 - Problems on emissivity, absorptivity
Lecture 16 - Reflectivity
Lecture 17 - Transmissivity
Lecture 18 - Problems on reflectivity and transmissivity
Lecture 19 - Radiation heat transfer between surfaces
Lecture 20 - View factor
Lecture 21 - View factor (Continued...)
Lecture 22 - View factor (Continued...)
Lecture 23 - Enclosure analysis
Lecture 24 - Enclosure analysis (Continued...)
Lecture 25 - Enclosure analysis - Gray surface
Lecture 26 - Enclosure analysis - Non gray surfaces
Lecture 27 - Radiation in participating media
Lecture 28 - Solution to the RTE
Lecture 29 - Concept of mean beam length

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Lecture 30 - Components of the Gas Turbine Engine
Lecture 31 - Components of the Gas Turbine Engine / Thermodynamic Analysis of the Engine
Lecture 32 - Thermodynamic Analysis of the Engine
Lecture 33 - Thermodynamic Analysis of the Engine
Lecture 34 - Calculations for Thrust and Fuel Consumption
Lecture 35 - Calculations for Thrust and Fuel Consumption
Lecture 36 - Calculations for Thrust and Fuel Consumption / Emerging Trends
Lecture 37 - Emerging Trends / Ramjets
Lecture 38 - Ramjets
Lecture 39 - Ramjets / Scramjets
Lecture 40 - Scramjets
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NPTEL Video Course - Mechanical Engineering - Microfluidics

Subject Co-ordinator - Dr. Ashis Kumar Sen

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction and Scaling
Lecture 2 - Scaling
Lecture 3 - Micro-scale fluid mechanics
Lecture 4 - Micro-scale fluid mechanics (Continued...)
Lecture 5 - Micro-scale fluid mechanics (Continued...)
Lecture 6 - Micro-scale fluid mechanics (Continued...)
Lecture 7 - Micro-scale fluid mechanics (Continued...)
Lecture 8 - Micro-scale fluid mechanics (Continued...)
Lecture 9 - Micro-scale fluid mechanics (Continued...)
Lecture 10 - Micro-scale fluid mechanics (Continued...)
Lecture 11 - Capillary Flows
Lecture 12 - Capillary Flows (Continued...)
Lecture 13 - Capillary Flows and Electrokinetics
Lecture 14 - Electrokinetics
Lecture 15 - Electrokinetics (Continued...)
Lecture 16 - Electrokinetics (Continued...)
Lecture 17 - Electrokinetics (Continued...)
Lecture 18 - Electrokinetics (Continued...)
Lecture 19 - Electrokinetics (Continued...)
Lecture 20 - Electrokinetics and Magnetophoresis
Lecture 21 - Microfabrication Techniques
Lecture 22 - Microfabrication Techniques (Continued...)
Lecture 23 - Microfabrication Techniques (Continued...)
Lecture 24 - Microfabrication Techniques (Continued...)
Lecture 25 - Microfabrication Techniques (Continued...)
Lecture 26 - Microfabrication Techniques (Continued...)
Lecture 27 - Microfabrication Techniques (Continued...)
Lecture 28 - Microfabrication Techniques (Continued...)
Lecture 29 - Micropump
Lecture 30 - Micropump (Continued...)
Lecture 31 - Microvalve
Lecture 32 - Microvalve (Continued...)
Lecture 33 - Microvalve (Continued...)
Lecture 34 - Micro Flow Sensor and Micro mixers
Lecture 35 - Micro mixers
Lecture 36 - Micro mixers (Continued...)
Lecture 37 - Micro droplets
Lecture 38 - Micro reactors (Continued...)
Lecture 39 - Micro needles and Microparticle separation
Lecture 40 - Few applications of microfluidics
Lecture 41 - Lab Demo
Lecture 1 - Introduction to convective heat transfer - Part 1
Lecture 2 - Introduction to convective heat transfer - Part 2
Lecture 3 - Continuity Equation
Lecture 4 - Momentum and Energy Equations
Lecture 5 - Energy Equation
Lecture 6 - Reynolds Transport Theorem
Lecture 7 - Entropy Generation and streamfunction-vorticity formulation
Lecture 8 - Couette flow - Part 1
Lecture 9 - Couette flow - Part 2
Lecture 10 - Couette flow - Part 3
Lecture 11 - Boundary layer approximation
Lecture 12 - Laminar External flow past flat plate (Blasius Similarity Solution)
Lecture 13 - Numerical solution to the Blasius equation and similarity solution to heat transfer
Lecture 14 - Pohlhausen similarity solution and flows including pressure gradient (Falkner-Skan)
Lecture 15 - Falkner skan solutions for heat transfer
Lecture 16 - Similarity solution for flow and heat transfer with transpiration at walls
Lecture 17 - Thermal boundary layer in high speed flows
Lecture 18 - Approximate(Integral) methods for laminar external flow and heat transfer
Lecture 19 - Integral method for laminar external thermal boundary layer over isothermal surface
Lecture 20 - Integral method for flows with pressure gradient (von Karman-Pohlhausen method)
Lecture 21 - Integral method with pressure gradient
Lecture 22 - Heat transfer across a circular cylinder
Lecture 23 - Duhamel's method for varying surface temperature
Lecture 24 - Laminar External heat transfer with non uniform surface temperature
Lecture 25 - Laminar internal forced convection - fundamentals
Lecture 26 - Hydrodynamically and thermally fully developed internal laminar flows
Lecture 27 - Fully developed laminar internal flow and heat transfer
Lecture 28 - Shooting method for fully developed heat transfer and thermal entry length problem
Lecture 29 - Thermal entry length problem with plug velocity profile
Lecture 30 - Extended Graetz problem for parabolic velocity profile
Lecture 31 - Extended Graetz problem
Lecture 32 - Extended Graetz problem with wall flux boundary condition
Lecture 33 - Approximate method for laminar internal flows
Lecture 34 - Integral method for thermal entry length problem
Lecture 35 - Introduction to Natural Convection Heat Transfer
Lecture 36 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 1
Lecture 37 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 2
Lecture 38 - Similarity Solution in Natural Convection for Vertical isoflux Plate
Lecture 39 - Approximate Method in Natural Convection Heat Transfer
Lecture 40 - Natural Convection in Other Configurations
Lecture 41 - Turbulent Convective Heat Transfer
Lecture 42 - Turbulent Convective Heat Transfer
Lecture 43 - Analogies in Turbulent Convective Heat Transfer - Part 1
Lecture 44 - Analogies in Turbulent Convective Heat Transfer - Part 2
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NPTEL Video Course - Mechanical Engineering - Introduction to Explosions and Explosion Safety

Subject Co-ordinator - Prof. K. Ramamurthi

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Loud Bang and Disruption
Lecture 2 - Blast Wave in an Explosion
Lecture 3 - Typical Examples of Explosions and Classification
Lecture 4 - Shock Hugoniot and Rayleigh Line
Lecture 5 - Properties behind a Constant Velocity Shock
Lecture 6 - Blast waves
Lecture 7 - Blast waves
Lecture 8 - Blast Waves
Lecture 9 - Blast Waves
Lecture 10 - Blast Waves
Lecture 11 - Blast Waves
Lecture 12 - Blast Waves
Lecture 13 - Energy Release in a Chemical Reaction
Lecture 14 - Energy Release
Lecture 15 - Energy Release
Lecture 16 - Rate of Energy Release
Lecture 17 - Thermal Theory of Explosion
Lecture 18 - Thermal Theory
Lecture 19 - Role of Chain Carriers in an Explosion
Lecture 20 - Combustion - I
Lecture 21 - Combustion - II
Lecture 22 - Case Histories of Explosions involving Volatile Liquids
Lecture 23 - Detonation
Lecture 24 - Structure of Detonations
Lecture 25 - Realizable States in a Detonation
Lecture 26 - One Dimensional Model of Detonation
Lecture 27 - Case Histories of Explosions involving Detonation or Quasi-Detonation
Lecture 28 - Explosions in Confined and Unconfined Geometries
Lecture 29 - Dust Explosions - I

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Lecture 30 - Dust Explosions - II
Lecture 31 - Physical Explosions
Lecture 32 - Rupture of Cryogenic Storage Vessels and Pressure Vessels
Lecture 33 - Condensed Phased Explosives Based on Hydrocarbons
Lecture 34 - Condensed Phase Explosives and their Properties
Lecture 35 - TNT Equivalence and Yield of an Explosion
Lecture 36 - Atmospheric Dispersion
Lecture 37 - Modeling Atmospheric Dispersion
Lecture 38 - Explosions Involving Atmospheric Dispersion
Lecture 39 - Quantification of Damages in an Explosion
Lecture 40 - Risk Analysis for an Explosion
NPTEL Video Course - Mechanical Engineering - Metrology

Subject Co-ordinator - Dr. K. Sadashivappa

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to Metrology
Lecture 2 - Metrology terminologies
Lecture 3 - Measurement errors
Lecture 4 - Linear measuring instruments Â□ 1 (Angle plate, steel rule, spring calipers)
Lecture 5 - Linear measuring instruments Â□ 2 (Combination set, Vernier calipers)
Lecture 6 - Linear measuring instruments Â□ 3 (Height gauge, Micrometers Â□ 1)
Lecture 7 - Linear measuring instruments Â□ 4 (Micrometers Â□ 2, Bore gauge)
Lecture 8 - Linear measuring instruments Â□ 5 (Dial indicators, thickness gauges, depth gauges)
Lecture 9 - Manufacturing tolerances and fits
Lecture 10 - Terminologies of limits fits and tolerances
Lecture 11 - Numerical problems on fit and tolerances
Lecture 12 - Selection of fits, Geometrical tolerances
Lecture 13 - Positional tolerances
Lecture 14 - Limit gauging - 1
Lecture 15 - Limit gauging - 2
Lecture 16 - Design of limit gauges
Lecture 17 - Measurement of straightness, flatness and squareness
Lecture 18 - Perpendicularity measurement
Lecture 19 - Basics of surface roughness
Lecture 20 - Surface finish parameters
Lecture 21 - Stylus type surface finish measuring instruments
Lecture 22 - Non-contact type surface finish measuring instruments
Lecture 23 - Screw thread production and terminology
Lecture 24 - Measurement of screw thread elements
Lecture 25 - Introduction to gears
Lecture 26 - Measurement of gear elements
Lecture 27 - Angle measurement - 1
Lecture 28 - Angle measurement - 2
Lecture 29 - Radius measurement, Contact angle measurement

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Lecture 30 - Basics of interferometry
Lecture 31 - Interferometers
Lecture 32 - Introduction to comparators, Mechanical comparators
Lecture 33 - Electrical and electronic comparators, Optical comparators
Lecture 34 - Pneumatic comparators
Lecture 35 - Geometrical tests on lathe
Lecture 36 - Geometrical tests on pillar type drilling machine
Lecture 37 - Universal measuring machine (UMM) and Coordinate measuring machine (CMM)
Lecture 38 - CMM probes and CMM software
Lecture 39 - Feature measurement using CMM, Laser vision
Lecture 40 - In-process gauging and control
Lecture 41 - Stage position metrology
Lecture 42 - Micro and Nano stages, Nano technology instrumentation
Lecture 43 - Optical system design
Lecture 44 - Complex opto-mechanical assemblies, Metrology testing and certification services
NPTEL Video Course - Mechanical Engineering - NOC: Engineering Mechanics Statics and Dynamics

Subject Co-ordinator - Prof. Mahesh Panchagnula

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to the course
Lecture 2 - Newton's laws
Lecture 3 - Equilibrium
Lecture 4 - Example 1 - Statics
Lecture 5 - Example 2 - Rigid Body Systems
Lecture 6 - Example 3 - Rigid Body Systems
Lecture 7 - Structural Systems with rigid bodies
Lecture 8 - Types of 1-D Structural Elements
Lecture 9 - Axial members
Lecture 10 - Analysis of the truss system
Lecture 11 - Stability of Structural systems
Lecture 12 - Beams - Example 1
Lecture 13 - Beams - BMD and SFD
Lecture 14 - Beams - Loading, Shear and Bending Moment Relations
Lecture 15 - Static Friction
Lecture 16 - Friction - Solving Problems
Lecture 17 - Particle Kinematics - 1
Lecture 18 - Particle Kinematics - 2 (Example)
Lecture 19 - Particle Kinematics - Curvilinear Coordinates
Lecture 20 - Rigid Body Kinematics
Lecture 21 - Rotational Motion (Example 1)
Lecture 22 - Rotational Motion (Example 2)
Lecture 23 - Dynamics (Introduction)
Lecture 24 - Dynamics - Example 1
Lecture 25 - Dynamics - Example 2
Lecture 26 - Dynamics - Example 3
Lecture 27 - Dynamics - Example 4
Lecture 28 - Center of Percussion - Example
Lecture 29 - Impulse / Momentum - Example 1

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Lecture 30 - Impulse / Momentum - Example 2
Lecture 31 - Impulse / Momentum - Example 3
Lecture 32 - Impulse / Momentum - Example 4
Lecture 33 - Work Energy Methods - Example 1
Lecture 34 - Work Energy Methods - Example 2
Lecture 35 - Work Energy Methods - Example 3
NPTEL Video Course - Mechanical Engineering - NOC: Foundation of Computational Fluid Dynamics

Subject Co-ordinator - Dr.S.Vengadesan

Co-ordinating Institute - IIT - Madras

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

- Week 1 - Module-1
- Week 1 - Module-2
- Week 1 - Module-3
- Week 1 - Module-4
- Week 1 - Module-5
- Week 2 - Module-1
- Week 2 - Module-2
- Week 2 - Module-3
- Week 2 - Module-4
- Week 2 - Module-5
- Week 3 - Module-1
- Week 3 - Module-2
- Week 3 - Module-3
- Week 3 - Module-4
- Week 3 - Module-5
- Week 4 - Module-1
- Week 4 - Module-2
- Week 4 - Module-3
- Week 4 - Module-4
- Week 4 - Module-5
- Week 5 - Module-1
- Week 5 - Module-2
- Week 5 - Module-3
- Week 5 - Module-4
- Week 5 - Module-5
- Week 5 - Module-6
- Week 6 - Module-1
- Week 6 - Module-2 - Part 1
- Week 6 - Module-2 - Part 2

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Week 6 - Module-3
Week 6 - Module-4
Week 6 - Module-5
Week 7 - Module-1
Week 7 - Module-2
Week 7 - Module-3
Week 7 - Module-4
Week 7 - Module-5
Week 8 - Module-1
Week 8 - Module-2
Week 8 - Module-3
Week 8 - Module-4
Week 8 - Module-5
Week 8 - Module-6
Conclusion
NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Boundary Layers

Subject Co-ordinator - Dr. Rinku Mukherjee
Co-ordinating Institute - IIT - Madras

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Lecture 1 - Review of fundamentals of fluid mechanics - I
Lecture 2 - Review of fundamentals of fluid mechanics - II
Lecture 3 - Concept of a Boundary Layer (BL) - I
Lecture 4 - Concept of a Boundary Layer (BL) - II
Lecture 5 - Concepts of BL thickness (?)
Lecture 6 - Concepts of BL displacement thickness (?) and BL momentum thickness (?)
Lecture 7 - Control Volume approach to derive expressions for ?* over a flat plate
Lecture 8 - Control Volume approach to derive expressions for ? over a flat plate
Lecture 9 - Concept of wall friction
Lecture 10 - Concept of friction drag
Lecture 11 - Skin Friction Coefficient - I
Lecture 12 - Skin Friction Coefficient - II
Lecture 13 - Derivation of Prandtl's Laminar BL Equations - I
Lecture 14 - Derivation of Prandtl's Laminar BL Equations - II
Lecture 15 - Derivation of Prandtl's Laminar BL Equations - III
Lecture 16 - Derivation of Prandtl's Laminar BL Equations - IV
Lecture 17 - Similarity Solutions to the BL Equations Applied to a Flat Plate - I
Lecture 18 - Similarity Solutions to the BL Equations Applied to a Flat Plate - II
Lecture 19 - Similarity Solutions to the BL Equations Applied to a Flat Plate - III
Lecture 20 - Runge-Kutta Method to Numerically Solve the BL Equations Applied to a Flat Plate
Lecture 21 - Description of the Numerical Code to Solve the BL Equations Applied to a Flat Plate
Lecture 22 - Similarity Solutions to the BL Equations (other than flat plate) - I
Lecture 23 - Similarity Solutions to the BL Equations (other than flat plate) - II
Lecture 24 - Similarity Solutions to the BL Equations (other than flat plate) - III
Lecture 25 - Similarity Solutions to the BL Equations (other than flat plate) - IV
Lecture 26 - Description of the Numerical Code to Solve the BL Equations (other than flat plate)
Lecture 27 - The Energy Equation - I
Lecture 28 - The Energy Equation - II
Lecture 29 - Similarity Solutions to Thermal BL - I

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Lecture 30 - Similarity Solutions to Thermal BL - II
Lecture 31 - Similarity Solutions to Thermal BL - III
Lecture 32 - BL Separation with Pressure-Gradient - I
Lecture 33 - BL Separation with Pressure Gradient - II
Lecture 34 - Effect of Prandtl Number in Thermal BL - I
Lecture 35 - Effect of Prandtl Number in Thermal BL - II
Lecture 36 - Effect of Prandtl Number in Thermal BL - III
Lecture 37 - Effect of Dissipation in Thermal BL - I
Lecture 38 - Effect of Dissipation in Thermal BL - II
Lecture 39 - Effect of Dissipation in Thermal BL - III
Lecture 40 - Similarity Solutions to Thermal BL - An Overview
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Gas Dynamics

Subject Co-ordinator - Prof. A. Sameen
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction
Lecture 2 - Basics of Thermodynamics
Lecture 3 - Tutorial 1
Lecture 4 - Control Volume Approach
Lecture 5 - Conservation Equations
Lecture 6 - Tutorial 2
Lecture 7 - Energy Equation
Lecture 8 - Concept of stagnation
Lecture 9 - Discussion on stagnation
Lecture 10 - Velocity of sound
Lecture 11 - Discussion on velocity of sound and mach number
Lecture 12 - Wave propagation
Lecture 13 - Mach wave
Lecture 14 - Mach number relations
Lecture 15 - Variable Area Adiabatic flow
Lecture 16 - Variable Area Adiabatic flow (Continued...)
Lecture 17 - * reference quantities and their relations
Lecture 18 - Importance of stagnation temperature in relation to v
Lecture 19 - Discussion on variable area adiabatic flow and * reference quantities
Lecture 20 - Gas tables
Lecture 21 - Converging nozzle
Lecture 22 - Condition of choked flow and associated properties
Lecture 23 - Area ratio and pressure ratio in converging nozzles
Lecture 24 - Discussion on converging nozzles
Lecture 25 - Converging - Diverging (C-D) nozzles
Lecture 26 - More on C-D nozzles
Lecture 27 - Discussion on C-D nozzles - 1
Lecture 28 - Discussion on C-D nozzles - 2
Lecture 29 - Examples and applications of flow through C-D nozzles

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Lecture 30 - Introduction to normal shocks
Lecture 31 - Normal shock relations - 1
Lecture 32 - Normal shock relations - 2
Lecture 33 - Rankine-Hugoniot equation
Lecture 34 - Discussion on Normal Shocks - 1
Lecture 35 - Discussion on Normal Shocks - 2
Lecture 36 - Normal shocks in C-D nozzles
Lecture 37 - Normal shocks in C-D nozzles (Continued...)
Lecture 38 - Moving Normal Shocks
Lecture 39 - Discussion on moving normal shocks
Lecture 40 - Oblique shocks
Lecture 41 - Oblique shock relations
Lecture 42 - Discussion on oblique shocks
Lecture 43 - Reflection of oblique shocks
Lecture 44 - Discussion on reflection of oblique shocks
Lecture 45 - Prandtl-Meyer flow
Lecture 46 - Prandtl-Meyer flow (Continued...)
Lecture 47 - Discussion on Prandtl-Meyer expansion
Lecture 48 - Shock Polar diagram and Prandtl-Meyer relation for Oblique shocks
Lecture 1 - Introduction to Stress Analysis - Analytical and Numerical Approaches
Lecture 2 - Introduction to Stress Analysis - Experimental Approaches
Lecture 3 - Optical Methods Work as Optical Computers
Lecture 4 - Basic information provided by various experimental methods
Lecture 5 - Visual Appreciation of Field Information - Part 1
Lecture 6 - Visual Appreciation of Field Information - Part 2
Lecture 7 - Visual Appreciation of Field Information - Part 3
Lecture 8 - Visual Appreciation of Field Information - Part 4
Lecture 9 - Visual Appreciation of Field Information - Part 5
Lecture 10 - Completeness of a Numerical Solution
Lecture 11 - Principle of Strain Gauges
Lecture 12 - Overview of Strain Gauge Measurements
Lecture 13 - Elegance of Photoelasticity
Lecture 14 - Introduction to Photoelasticity
Lecture 15 - Different Polariscopes
Lecture 16 - Principles of Moiré®
Lecture 17 - Introduction to Moiré®
Lecture 18 - Introduction to Brittle Coatings
Lecture 19 - Introduction to Holography
Lecture 20 - Introduction to Hologram Interferometry
Lecture 21 - Introduction to Double exposure hologram interferometry
Lecture 22 - Introduction to Speckle Methods
Lecture 23 - Introduction to Speckle Interferometry Techniques
Lecture 24 - Introduction to TSA and DIC
Lecture 25 - Introduction to Caustics
Lecture 26 - Introduction to Coherent Gradient Sensor
Lecture 27 - Naming of Experimental Methods
Lecture 28 - Fringe Patterns - Richness of Qualitative Information
Lecture 29 - Key technologies that have influenced Experimental Mechanics

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Lecture 30 - Multiscale analysis and trends in experimental mechanics
Lecture 31 - Selection of an experimental technique - Part 1
Lecture 32 - Selection of an experimental technique - Part 2
NPTEL Video Course - Mechanical Engineering - NOC: Fluid Dynamics and Turbomachines

Subject Co-ordinator - Prof. Dhiman Chatterjee, Prof. Shamit Bakshi

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to Fluid Flow
Lecture 2 - Flow field, Stresses on fluid element, Newtonian fluid
Lecture 3 - Non Newtonian fluid, Classification of flow, Analysis of flow
Lecture 4 - Tutorial
Lecture 5 - Lecture 1 - Integral analysis, Control volume, Generalised conservation equation
Lecture 6 - Lecture 2 - Mass and linear momentum conservation in CV
Lecture 7 - Lecture 3 - Angular momentum conservation, Non-inertial frame of reference
Lecture 8 - Lecture 4 - Tutorial
Lecture 9 - Lecture 1 - Differential Analysis
Lecture 10 - Lecture 2 - Navier-Stokes equation for 2D incompressible flow
Lecture 11 - Lecture 3 - Vorticity, Stream function, Bernoulli's equation
Lecture 12 - Lecture 4 - Tutorial
Lecture 13 - Lecture 1 - External flows, Laminar and Turbulent Boundary Layer
Lecture 14 - Lecture 2 - Differential analysis of boundary layer, Blasius equation
Lecture 15 - Lecture 3 - Boundary Layer flow with pressure gradient, Flow separation
Lecture 16 - Lecture 4 - Internal flow, Pipe friction
Lecture 17 - Lecture 1 - Basic Thermodynamics
Lecture 18 - Lecture 2 - Turbomachines
Lecture 19 - Lecture 3 - Dimensional Analysis
Lecture 20 - Lecture 4 - Tutorial
Lecture 21 - Lecture 1 - Representation of Turbomachines and Definition of velocity
Lecture 22 - Lecture 2 - Euler's energy equation
Lecture 23 - Lecture 3 - Real fluid flow and efficiency of turbomachine
Lecture 24 - Lecture 4 - Tutorial
Lecture 25 - Lecture 1 - Pumps
Lecture 26 - Lecture 2 - Pumping Systems
Lecture 27 - Lecture 3 - Hydraulic Turbines
Lecture 28 - Lecture 4 - Hydraulic Turbines
Lecture 29 - Lecture 5 - Cavitation in Hydroturbomachines

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Lecture 30 - Lecture 6 - Tutorial
Lecture 31 - Lecture 1 - Introduction to compressible flow
Lecture 32 - Lecture 2 - Steam and Gas Turbine
Lecture 33 - Lecture 3 - Steam and Gas Turbine
Lecture 34 - Lecture 4 - Tutorial
Lecture 30 - Gas flow and Heat transport in Microchannels - Part 1
Lecture 31 - Gas flow and Heat transport in Microchannels - Part 2
Lecture 32 - Single phase liquid flow and Heat transport in Microchannels - Part 1
Lecture 33 - Single phase liquid flow and Heat transport in Microchannels - Part 2
Lecture 34 - Fundamentals of Electro kinetics in Microchannels Part 1
Lecture 35 - Fundamentals of Electro kinetics in Microchannels Part 2
Lecture 36 - Fundamentals of Electro kinetics in Microchannels Part 3
Lecture 37 - Two phase Heat transfer in Microchannels - Part 1
Lecture 38 - Two phase Heat transfer in Microchannels - Part 2
Lecture 39 - Nano fluid Heat transfer - Part 1
Lecture 40 - Nano fluid Heat transfer - Part 2
Lecture 41 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 1
Lecture 42 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 2
NPTEL Video Course - Mechanical Engineering - NOC: Electron Diffraction and Imaging

Subject Co-ordinator - Prof. Sundararaman M
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - 1D-2D-3D lattice
Lecture 2 - Stereographic projection - 1
Lecture 3 - Stereographic Projection - 2
Lecture 4 - Symmetry in 1-D crystals
Lecture 5 - Symmetry in 2-D crystals
Lecture 6 - Symmetry in 3-D crystals
Lecture 7 - Understanding IUCr tables
Lecture 8 - Symmetry in 3-D Crystals
Lecture 9 - Reciprocal lattice
Lecture 10 - Directions Planes and zone axes
Lecture 11 - Interplanar distances and angles
Lecture 12 - Diffraction - 1
Lecture 13 - Diffraction - 2
Lecture 14 - Diffraction - Structure and Shape Factor
Lecture 15 - Transformation of Indices
Lecture 16 - Microscope - 1
Lecture 17 - Microscope - 2
Lecture 18 - Kikuchi Diffraction
Lecture 19 - Double Diffraction and CBED
Lecture 20 - CBED and Precession Electron Diffraction
Lecture 21 - Indexing Diffraction Pattern
Lecture 22 - Correlation of Diffraction Spots to Microstructure
Lecture 23 - 3-Index to 4-Index System
Lecture 24 - Kinematical and Dynamical Theory of Diffraction and Imaging
Lecture 25 - Contrast from Planar Defects
Lecture 26 - Contrast from Strain Fields
Lecture 27 - Atomic Scattering Factor
Lecture 28 - Coherence
Lecture 29 - Lens Aberrations

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Lecture 30 - Phase Contrast Microscopy - 1
Lecture 31 - Phase Contrast Microscopy - 2
Lecture 32 - Phase Contrast Microscopy - 3
Lecture 33 - STEM
Lecture 34 - ELES and EDS
Lecture 35 - Recent trends
Lecture 36 - Energy dispersive Spectroscopy
Lecture 37 - Revision - 1
Lecture 38 - Revision - 2
Lecture 39 - Revision of Recent trends in Microscopy
Lecture 40 - Crystallography Revision
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Acoustic and Noise Control

Subject Co-ordinator - Prof. Abijith Sarkar
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Module 1 - Introduction - 1
Lecture 2 - Module 1 - Introduction - 2
Lecture 3 - Module 2 - Governing Equation - 1
Lecture 4 - Module 2 - Governing Equation - 2
Lecture 5 - Module 3 - Plane Wave - 1
Lecture 6 - Module 3 - Plane Wave - 2
Lecture 7 - Module 4 - Reflection Of Plane Waves - 1
Lecture 8 - Module 4 - Reflection Of Plane Waves - 2
Lecture 9 - Module 5 - Frequency Analysis - 1
Lecture 10 - Module 5 - Frequency Analysis - 2
Lecture 11 - Module 6 - Harmonic Plane Waves
Lecture 12 - Module 7 - Travelling And Standing Waves
Lecture 13 - Module 8 - Acoustic Mode Shapes, Reflection
Lecture 14 - Module 9 - Plane Waves
Lecture 15 - Module 10 - Flexural Waves, evanescent Waves
Lecture 16 - Module 11 - Near Field Acoustic Waves
Lecture 17 - Module 12 - cuton Waves in duct
Lecture 18 - Module 13 - Power Calculation
Lecture 19 - Module 14 - Decibel Scale
Lecture 20 - Module 15 - Db Arithmetic
Lecture 21 - Module 16 - Sound Power Level
Lecture 22 - Module 17 - Human factors in Acoustic Engineering
Lecture 23 - Module 18 - Microphone
Lecture 24 - Module 19 - Acoustic Measurements
Lecture 25 - Module 20 - Muffler Analysis
Lecture 26 - Module 21 - Transfer Matrix Method
Lecture 27 - Module 22 - Electro Mechanical Analogies - Part 1
Lecture 28 - Module 23 - Electro Mechanical Analogies Simple Example
Lecture 29 - Module 24 - Electro Mechanical Analogies Example

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Lecture 30 - Module 25 - Helmholtz Resonator
Lecture 31 - Module 26 - Source Impedance
Lecture 32 - Module 27 - Insertion Loss
Lecture 33 - Module 28 - Analysis Of Industrial Mufflers
Lecture 34 - Module 29 - Spherical Waves
Lecture 35 - Module 30 - Monopole and Dipole
Lecture 36 - Module 31 - Inhomogeneous Wave Equation
Lecture 37 - Module 32 - Green's Function
Lecture 38 - Module 33 - Kirchoff Helmholtz Integral Equation
Lecture 39 - Tutorial 1
Lecture 40 - Tutorial 2
Lecture 41 - Tutorial 3
Lecture 42 - Tutorial 4
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Steel Quality - Role of Secondary Refining and Continuous Casting

Subject Co-ordinator - Prof. Santanu Kr. Ray
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Concept of Steel Quality
Lecture 2 - Control of Residuals and Impact on Quality
Lecture 3 - Non-Metallic Inclusions
Lecture 4 - Evaluation of Residuals and Inclusions
Lecture 5 - Cleanliness Requirements for Different applications
Lecture 6 - Limitation of Primary Steelmaking and Importance of secondary Refining
Lecture 7 - Deoxidation
Lecture 8 - Prevention of Slag carryover
Lecture 9 - Desulphurisation
Lecture 10 - Degassing
Lecture 11 - Secondary Refining Processes
Lecture 12 - Injection of Calcium
Lecture 13 - Different Routes and Temperature Control
Lecture 14 - Decarburisation
Lecture 15 - Cleanliness Measures in Ladle and Tundish
Lecture 16 - Cleanliness Measures in Mould
Lecture 17 - Nature and Distribution of Entrapments in Casting
Lecture 18 - Genesis of Entrapment
Lecture 19 - Effect of Vertical vis-a-vis Curved Mould
Lecture 20 - Quality of Cast Product
Lecture 21 - Role of Concast Process, Caster Design and Steel Grade
Lecture 22 - Primary Cooling in Caster Mould
Lecture 23 - Heat Transfer in Mould
Lecture 24 - Role of Mould Oscillation
Lecture 25 - Cast Structure and Dendrite Size
Lecture 26 - Role of Chemistry - Part I
Lecture 27 - Role of Chemistry - Part II
Lecture 28 - Role of Segregation - Part I
Lecture 29 - Role of Segregation - Part II

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NPTEL Video Course - Mechanical Engineering - NOC:X-ray Crystallography and Diffraction

Subject Co-ordinator - Prof. Ranjit Kumar Ray

Co-ordinating Institute - IIEST - Shibpur

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

Lecture 1 - Geometry of Crystals
Lecture 2 - Geometry of Crystals (Continued...)
Lecture 3 - Tutorial-1
Lecture 4 - Reciprocal Lattice
Lecture 5 - Stereographic Projection
Lecture 6 - Tutorial-2
Lecture 7 - Point Groups and Space Groups
Lecture 8 - Point Groups and Space Groups (Continued...)
Lecture 9 - Tutorial-3
Lecture 10 - Point Groups and Space Groups (Continued...)
Lecture 11 - Basics of X-Rays
Lecture 12 - Production and Detection of X-Rays
Lecture 13 - Production and Detection of X-Rays (Continued...)
Lecture 14 - Principles of X-Ray Diffraction
Lecture 15 - X-Ray Diffraction Methods
Lecture 16 - Debye Sherrer Camera
Lecture 17 - Diffractometer Measurements
Lecture 18 - Tutorial-4
Lecture 19 - Intensity of Diffracted Beams
Lecture 20 - Intensity of Diffracted Beams (Continued...)
Lecture 21 - Determination of Crystal Structures
Lecture 22 - Precise Lattice Parameter Determination
Lecture 23 - XRD - Lab Demonstration
Lecture 24 - Discussion - Based on Forum Queries - 1
Lecture 25 - Phase Diagram Determination
Lecture 26 - Ordered Disordered Transformation
Lecture 27 - Ordered Disordered Transformation (Continued...)
Lecture 28 - Qualitative Phase Analysis
Lecture 29 - Quantitative Phase Analysis - 1

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Lecture 30 - Precise Lattice Parameter Determination - 1
Lecture 31 - Chemical Analysis by X-Ray Fluorescence
Lecture 32 - Chemical Analysis by X-Ray Absorption
Lecture 33 - Effect of Crystallite Size on Diffracted X-Ray Intensity
Lecture 34 - Texture Determination by XRD
Lecture 35 - Particle Size Determination by XRD
Lecture 36 - Effect of Crystallite Size on Diffracted X-Ray Intensity
Lecture 37 - Determination of Single Crystal Orientation by X-Rays
Lecture 38 - Stress Analysis by X-Rays
Lecture 39 - Factors Contributing to Peak Broadening
Lecture 40 - Residual Stress Measurement by X-Rays
NPTEL Video Course - Mechanical Engineering - NOC: Transport Phenomena in Materials

Subject Co-ordinator - Dr. G. Phanikumar
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Subscript Notation - Part 1
Lecture 2 - Subscript Notation - Part 2
Lecture 3 - Coordinate Rotation
Lecture 4 - Introduction to Tensors
Lecture 5 - Symmetry of Properties
Lecture 6 - Material Derivative
Lecture 7 - Planar Flows
Lecture 8 - Reynolds Transport Theorem
Lecture 9 - Derivation of Navier-Stokes equation
Lecture 10 - Navier Stokes equations - Part 2
Lecture 11 - Flow problem statements
Lecture 12 - Simple cases in fluid flow
Lecture 13 - Simple cases in fluid flow
Lecture 14 - Pipe flow and porous medium
Lecture 15 - Simple cases in fluid flow
Lecture 16 - Friction factors and correlations
Lecture 17 - Energy Transport
Lecture 18 - Conduction cases - steady state
Lecture 19 - Conduction cases - transient state
Lecture 20 - Convective heat transfer

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NPTEL Video Course - Mechanical Engineering - NOC:Experimental Stress Analysis - An Overview

Subject Co-ordinator - Prof. K. Ramesh
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Overview of Experimental Stress Analysis
Lecture 2 - Optical Methods Work as Optical Computers
Lecture 3 - Stress, Strain and Displacement Fields
Lecture 4 - Completeness of a numerical solution
Lecture 5 - Fringe Patterns - Richness of Qualitative Information
Lecture 6 - Multi-Scale Analysis in Experimental Mechanics
Lecture 7 - Selection of an Experimental Technique
Lecture 8 - Introduction to Transmission Photoelasticity
Lecture 9 - Ordinary and Extraordinary Rays
Lecture 10 - Light Ellipse, Passage of Light Through a Crystal Plate
Lecture 11 - Retardation Plates, Stress-optic Law
Lecture 12 - Plane Polariscope
Lecture 13 - Jones Calculus
Lecture 14 - Circular Polariscope
Lecture 15 - Determination of Photoelastic Parameters at an Arbitrary Point
Lecture 16 - Tardyâ’s Method of Compensation
Lecture 17 - Calibration of Photoelastic Materials
Lecture 18 - Fringe Thinning Methodologies
Lecture 19 - Fringe Ordering in Photoelasticity
Lecture 20 - Miscellaneous Topics in Transmission Photoelasticity
Lecture 21 - Three Dimensional Photoelasticity
Lecture 22 - Overview of Digital Photoelasticity
Lecture 23 - Introduction to Photoelastic Coatings
Lecture 24 - Correction Factors for Photoelastic Coatings
Lecture 25 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatings
Lecture 26 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings
Lecture 27 - Analysis of Brittle Coatings
Lecture 28 - Introduction to Strain Gauges
Lecture 29 - Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes

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NPTEL Video Course - Mechanical Engineering - NOC: Mechanics of Human Movement

Subject Co-ordinator - Prof. Sujatha Srinivasan
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Terminologies
Lecture 2 - Skeletal System
Lecture 3 - Axial and Appendicular Skeleton
Lecture 4 - Bones in the Human Body
Lecture 5 - Types of Joints
Lecture 6 - Movements about Joints
Lecture 7 - Levers in the Human Body
Lecture 8 - Skeletal Muscles
Lecture 9 - Skeletal Muscles
Lecture 10 - Skeletal Muscles
Lecture 11 - Mechanics and Modeling of Muscles
Lecture 12 - Muscle Action - Part I
Lecture 13 - Muscle Action - Part II
Lecture 14 - Principles of Statics
Lecture 15 - Static Analysis of Elbow - Part I
Lecture 16 - Static Analysis of Elbow - Part II
Lecture 17 - Static Analysis of Shoulder - Part I
Lecture 18 - Static Analysis of Shoulder - Part II
Lecture 19 - Static Analysis of Spine - Part I
Lecture 20 - Static Analysis of Spine - Part II
Lecture 21 - Static Analysis of Spine - Part III
Lecture 22 - Static Analysis of Hip - Part I
Lecture 23 - Static Analysis of Hip - Part II
Lecture 24 - Static Analysis of the Knee
Lecture 25 - Static Analysis of the Knee and Ankle
Lecture 26 - Kinetics
Lecture 27 - Kinetics
Lecture 28 - Kinetics
Lecture 29 - Kinetics

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Lecture 30 - Kinetics
Lecture 31 - Kinetics
Lecture 32 - Kinetics
Lecture 33 - Kinetics of Arm Swinging during Walking
Lecture 34 - Inverse Dynamics Analysis
Lecture 35 - Biomechanics of Balance - Part I
Lecture 36 - Biomechanics of Balance - Part II
Lecture 37 - Biomechanics of Balance - Part III
Lecture 38 - Human Gait
Lecture 39 - Human Gait Terminologies
Lecture 40 - Characteristics of Normal Gait - Part I
Lecture 41 - Characteristics of Normal Gait - Part II
Lecture 42 - Characteristics of Normal Gait - Part III
Lecture 43 - Pathological Gait Part - I
Lecture 44 - Pathological Gait Part - II
Lecture 45 - Pathological Gait Part - III
Lecture 46 - Introduction to Assistive Devices for Mobility
Lecture 47 - Design Considerations
Lecture 48 - Design Considerations
Lecture 49 - Design Considerations
Lecture 50 - Journey of Standing Wheelchair Development
NPTEL Video Course - Mechanical Engineering - NOC:Design for Quality, Manufacturing and Assembly

Subject Co-ordinator - Prof. Palaniappaan Ramu
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to DfX
Lecture 2 - Introduction to Quality
Lecture 3 - Introduction to Robustness
Lecture 4 - Introduction to Six Sigma Concept
Lecture 5 - Recap and clarifications of basic concepts
Lecture 6 - Review of Six Sigma and Quality Loss Function (QLF)
Lecture 7 - Types of QLF and SN Ratio
Lecture 8 - Linking Quality and Robustness
Lecture 9 - Design for Six Sigma - Stages, Design of Experiments
Lecture 10 - Introduction To Design Of Experiments
Lecture 11 - Need for DoE and basic DoE methods
Lecture 12 - Factorial Design
Lecture 13 - Orthogonal Array- L4 and L8 example
Lecture 14 - Setting up an Orthogonal Array
Lecture 15 - Confounding OA and Resolution Table
Lecture 16 - Confounding Logic and Randomization of Experiments
Lecture 17 - Paper Helicopter Case Study - Part I
Lecture 18 - Paper Helicopter Case Study - Part II
Lecture 19 - Introduction To Injection Molding Process, Materials, Terminologies Related To Plastic Parts and Design Guidelines
Lecture 20 - Estimation of Mold Cost for Injection Molding (Dixon and Poli's Method)
Lecture 21 - Estimation of Mold Cost for Injection Molding (Dixon and Poli's Method) (Continued...)
Lecture 22 - Mold Cost Estimation - Tutorial
Lecture 23 - Design for Additive Manufacturing
Lecture 24 - Demo
Lecture 25 - Introduction to Sustainable Development and Sustainability Indicators - Part 1
Lecture 26 - Introduction to Sustainable Development and Sustainability Indicators - Part 2
Lecture 27 - Introduction to design process
Lecture 28 - Accounting for manufacturability and assembly in design - An overview
Lecture 29 - DfMA in product design

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Lecture 30 - General design guidelines for manual assembly
Lecture 31 - Systematic DFA methodology
Lecture 32 - Alpha symmetry, Beta symmetry
Lecture 33 - Quantification of part size and thickness
Lecture 34 - Systematic DFA Case study - controller assembly
Lecture 35 - DFA examples and discussion
Lecture 36 - Xerox Producibility Index (XPI)
Lecture 37 - High Speed and Robotic Assembly
Lecture 38 - Sheet Metal Working
Lecture 39 - Overview of DoE Workflow
Lecture 40 - DFA Software
Lecture 41 - DFM Software and Case Studies
NPTEL Video Course - Mechanical Engineering - NOC: Surrogates and Approximations in Engineering Design

Subject Co-ordinator - Prof. Palaniappaan Ramu

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Overview and Motivation of Course
Lecture 2 - Basic Optimization Problem Formulation
Lecture 3 - Problem Formulation Example
Lecture 4 - Calculus related to Optimization
Lecture 5 - The big picture - Overview
Lecture 6 - Introduction to DOE - 1
Lecture 7 - Introduction to DOE - 2
Lecture 8 - Types of DOE - 1
Lecture 9 - Types of DOE - 2 and some examples
Lecture 10 - Introduction to surrogate modeling
Lecture 11 - Types of surrogate - Polynomial models
Lecture 12 - Radial basis function - 1
Lecture 13 - Radial basis function - 2
Lecture 14 - Kriging - 1
Lecture 15 - Kriging - 2
Lecture 16 - Metamodels for Safe and Efficient Automotive Structures
Lecture 17 - Exploration and Exploitation in Surrogates
Lecture 18 - Errors Based Exploration
Lecture 19 - Ensemble of Surrogates

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Lecture 1 - Concept of Steel Quality
Lecture 2 - Typical Examples of Surface Defects
Lecture 3 - Origin of Common Quality Problems
Lecture 4 - Present Scenario on Quality Demands
Lecture 5 - Control of Residuals and Impact on Quality
Lecture 6 - Non-Metallic Inclusions
Lecture 7 - Evaluation of Residuals and Inclusions
Lecture 8 - Cleanliness Requirements for Different applications
Lecture 9 - Limitation of Primary Steelmaking and Importance of secondary Refining
Lecture 10 - Deoxidation
Lecture 11 - Prevention of Slag carryover
Lecture 12 - Desulphurisation
Lecture 13 - Degassing
Lecture 14 - Secondary Refining Processes
Lecture 15 - Injection of Calcium
Lecture 16 - Decarburisation
Lecture 17 - Cleanliness Measures in Ladle and Tundish
Lecture 18 - Cleanliness Measures in Mould
Lecture 19 - Different Routes and Temperature Control
Lecture 20 - Nature and Distribution of Entrapments in Casting
Lecture 21 - Sources of Exogenous Entrapments
Lecture 22 - Effect of Vertical vis-a-vis Curved Mould
Lecture 23 - Quality of Cast Product
Lecture 24 - Role of Concast Process, Caster Design and Steel Grade
Lecture 25 - Primary Cooling in Caster Mould
Lecture 26 - Heat Transfer in Mould
Lecture 27 - Cast Structure and Dendrite Size
Lecture 28 - Role of Mould Oscillation
Lecture 29 - Role of Chemistry - Part I
Lecture 30 - Role of Chemistry - Part II
Lecture 31 - Role of Segregation - Part I
Lecture 32 - Role of Segregation - Part II
Lecture 33 - Deleterious Effect of Phosphorus
Lecture 34 - Strength of Solidifying Strand
Lecture 35 - Brittle Zone Near Solidus
Lecture 36 - Strength and Toughness of Solid Shell
Lecture 37 - Role of Chemistry on Solidification Behaviour
Lecture 38 - Sticking vis-a-vis Depression Behaviour
Lecture 39 - Role of Chemistry on Bulging or Depression Tendency - Part I
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Lecture 42 - Brittle Temperature Regions
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Lecture 50 - Grade - Specific Casting Parameters - Part I
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Lecture 52 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part I
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Lecture 55 - Some Examples of Quality Problems
NPTEL Video Course - Mechanical Engineering - Theory of Mechanism

Subject Co-ordinator - Prof. Sujatha Srinivasan
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Review of Kinematics Fundamentals-I
Lecture 2 - Links, Pairs, Kinematic Chains; Planar Mobility Criterion
Lecture 3 - Mobility of Mechanisms, Grubler's Criterion and Applications
Lecture 4 - Inversions, Grashof Criterion, Kinematic equivalence
Lecture 5 - Linkage Synthesis Classification, 2-position Motion Generation
Lecture 6 - Driver dyad, Quick-return synthesis - I
Lecture 7 - Quick-return synthesis - II, 3-position Motion Generation
Lecture 8 - Specified fixed pivots, Path generation
Lecture 9 - Function generation
Lecture 10 - Function generation using relative poles
Lecture 11 - Structural Error, and Chebyshev Spacing
Lecture 12 - Chebyshev Spacing
Lecture 13 - Analytical Linkage Synthesis-I
Lecture 14 - Analytical Linkage Synthesis-II
Lecture 15 - Four-bar Position Analysis, Dyad or Standard Form Synthesis
Lecture 16 - Dyad Form Synthesis
Lecture 17 - Dyad Form Synthesis
Lecture 18 - Dyad Form Synthesis
Lecture 19 - Dyad Form Synthesis
Lecture 20 - Coupler Curves - I
Lecture 21 - Coupler Curves - II, Fixed and Moving Centrodes
Lecture 22 - Coupler Curves - III, Symmetrical Coupler Curves
Lecture 23 - Roberts-Chebyshev Theorem
Lecture 24 - Cognates
Lecture 25 - Velocity Analysis
Lecture 26 - Velocity Analysis
Lecture 27 - Velocity Analysis
Lecture 28 - Auxiliary Point Method
Lecture 29 - Velocity and Acceleration Analysis

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Lecture 30 - Acceleration Analysis
Lecture 31 - Acceleration Analysis
Lecture 32 - Force Analysis of Mechanisms, Mechanical Advantage
Lecture 33 - Force Analysis of Mechanisms - II
Lecture 34 - Balancing of Mechanisms using Counterweights
Lecture 35 - Balancing of Mechanisms using Springs
Lecture 36 - Spatial Mechanisms
Lecture 37 - Introduction to the Kinematics of Spatial Mechanisms
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Engineering Mechanics

Subject Co-ordinator - Prof. K. Ramesh
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Mechanics - I
Lecture 2 - Introduction to Engineering Mechanics - II
Lecture 3 - Force Systems - I
Lecture 4 - Force Systems - II
Lecture 5 - Equilibrium of Rigid bodies - I
Lecture 6 - Equilibrium of Rigid bodies - II
Lecture 7 - Trusses - I
Lecture 8 - Trusses - II
Lecture 9 - Trusses - III
Lecture 10 - Beams - I
Lecture 11 - Beams - II
Lecture 12 - Beams - III
Lecture 13 - Beams - IV
Lecture 14 - Virtual Work - I
Lecture 15 - Virtual Work - II
Lecture 16 - Energy Relations
Lecture 17 - Review Before Quiz - I
Lecture 18 - Friction - I
Lecture 19 - Friction - II
Lecture 20 - Friction - III
Lecture 21 - Particle Dynamics
Lecture 22 - Circular Motion
Lecture 23 - Absolute Motion
Lecture 24 - Relative Motion - I
Lecture 25 - Relative Motion - II
Lecture 26 - Relative Motion - III and Instantaneous Center
Lecture 27 - Rotating frame of reference I - Velocity
Lecture 28 - Rotating frame of reference II - Acceleration
Lecture 29 - Rotating frame of reference III - Choice of rotating frame of reference

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Lecture 30 - RFR- IV Crank and slotted bar
Lecture 31 - RFR-V Understanding Coriolis Acceleration
Lecture 32 - Kinetics - I
Lecture 33 - Kinetics - II
Lecture 34 - Kinetics - III
Lecture 35 - 3D Kinematics - I
Lecture 36 - 3D Kinematics - II
Lecture 37 - 3D Kinematics - III
NPTEL Video Course - Mechanical Engineering - NOC: Foundations of Computational Materials Modelling

Subject Co-ordinator - Dr. Narasimhan Swaminathan

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to the course
Lecture 2 - Some applications of MD simulations
Lecture 3 - Introduction to Bravais lattices and constructing simple crystals with MATLAB
Lecture 4 - Introduction to symmetry - 1
Lecture 5 - Symmetry Elements - 1
Lecture 6 - Symmetry elements - 2
Lecture 7 - Plane groups and their Hermann-Mauguin (HM) symbols
Lecture 8 - Glide reflection; Examples of writing point group symbols; Wyckoff positions
Lecture 9 - Generating 2D crystal with MATLAB using Bilbao crystallography website
Lecture 10 - Symmetry of space groups
Lecture 11 - Hernann maugin symbols of space groups
Lecture 12 - Translational symmetry operators
Lecture 13 - The Space groups
Lecture 14 - Generation of crystals
Lecture 15 - Generation of monoclinic lattice
Lecture 16 - Introduction to Statistical Mechanica - 1
Lecture 17 - Introduction to Statistical Mechanica - 2
Lecture 18 - Introduction to Statistical Mechanics - 3
Lecture 19 - Statistical mechanics - 1
Lecture 20 - Statistical mechanics - 2
Lecture 21 - Basic introduction to mechanics
Lecture 22 - Introduction to phase space
Lecture 23 - Introduction to phase average and time average
Lecture 24 - Canonical ensemble; Partition function
Lecture 25 - Basic introduction to MD
Lecture 26 - Input script for LAMMPS - 1
Lecture 27 - Input script for LAMMPS - 2
Lecture 28 - Input script for LAMMPS - 3
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NPTEL Video Course - Mechanical Engineering - Computational Fluid Dynamics (Dr. K.M. Singh)

Subject Co-ordinator - Dr. K.M. Singh

Co-ordinating Institute - IIT - Roorkee

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

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Lecture 2 - CFD
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Lecture 5 - Momentum Equation
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Lecture 7 - Navier-Stokes Equation and its Simplified Forms
Lecture 8 - Energy and Scalar Transport Equations
Lecture 9 - Scalar Transport, Mathematical Classification and Boundary Conditions
Lecture 10 - Finite Difference Method
Lecture 11 - Finite Difference Approximation of First Order Derivatives
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Lecture 14 - Approximation of Mixed Derivatives and Multi-Dimensional F.D. Formulae
Lecture 15 - Implementation of Boundary Conditions and Finite Difference Algebraic System
Lecture 16 - Applications of FDM to Scalar Transport Problems - 1
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Lecture 18 - Application of FDM to Advection-Diffusion and Computer Implementation Aspects
Lecture 19 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 1
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Lecture 38 - Inspection, Testing and Quality Control
Lecture 39 - Design Consideration and Economics
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| Lecture 3 | Glass Structure and Properties |
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| Lecture 6 | Ceramics - I |
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| Lecture 8 | Ceramic Powder Preparation |
| Lecture 9 | Ceramic Powder Preparation 1 |
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| Lecture 12 | Ceramics |
| Lecture 13 | Thermoplastics and Thermosets |
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| Lecture 16 | Transfer Molding and Compression Molding |
| Lecture 17 | Injection Molding |
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| Lecture 19 | Rotational Molding and Blow Molding |
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Lecture 32 - Powder Processing
Lecture 33 - Chemical Vapour Infiltration
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Lecture 38 - Joining of Polymer Matrix Composites
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Lecture 40 - Research Tools for Secondary Processing
NPTEL Video Course - Mechanical Engineering - Vibration control

Subject Co-ordinator - Dr. S. P. Harsha

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Basics of Vibrations for Simple Mechanical Systems
Lecture 2 - Introduction to Damping in Free and Force Vibrations
Lecture 3 - Free and Forced Vibrations of Two Degree of Systems
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Lecture 14 - Self Excitation Vibration
Lecture 15 - Flow Induction Vibration
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Lecture 22 - Design for Enhanced Material Damping
Lecture 23 - Basics of Passive Vibration Control
Lecture 24 - Design of Absorber
Lecture 25 - Shock Absorber
Lecture 26 - Isolators with Stiffness and Damping
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Lecture 31 - Electro-rheological (ER) Fluids
Lecture 32 - Magneto-rheological (MR) Fluids
Lecture 33 - Magneto and Electrostrictive Materials
Lecture 34 - Shape Memory Alloy
Lecture 35 - Electro-Magnetics
Lecture 36 - Numerical Problems
Lecture 37 - Basics of Vibration Measurement System
Lecture 38 - Data Acquisition
Lecture 39 - Fourier Transformation
Lecture 40 - Filters

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NPTEL Video Course - Mechanical Engineering - Welding Engineering

Subject Co-ordinator - Dr. D.K. Dwivedi
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Welding Engineering
Lecture 2 - Classification of Welding Processes - I
Lecture 3 - Classification of Welding Processes - II
Lecture 4 - Sources of Heat and Protection of Weld pool
Lecture 5 - Protection of Weld Pool
Lecture 6 - Introduction
Lecture 7 - Fundamentals of Arc Initiation
Lecture 8 - Arc Maintenance & Arc Characteristics
Lecture 9 - Arc Forces
Lecture 10 - Arc Efficiency
Lecture 11 - Melting Rate in Different Welding Processes
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Lecture 17 - GTAW - II
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Lecture 19 - SAW
Lecture 20 - GMAW
Lecture 21 - Brazing, Soldering & Braze Welding
Lecture 22 - Braze welding and Electroslag welding
Lecture 23 - Weld Thermal Cycle
Lecture 24 - Effect of WTC and Cooling rate in welding
Lecture 25 - Cooling rate
Lecture 26 - Peak temperature & Solidification rate
Lecture 27 - Residual stress - I
Lecture 28 - Residual stress - II
Lecture 29 - Introduction

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Lecture 30 - Type of joints and welds
Lecture 31 - Edge preparation
Lecture 32 - Design for static and fatigue loading
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Lecture 39 - Weldability of Al alloys
Lecture 40 - Failure analysis and prevention
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - Industrial Engineering

Subject Co-ordinator - Prof. P.K. Jain, Dr. Pradeep Kumar, Dr. Inderdeep Singh, Dr. D.K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Production Planning and Control
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Lecture 6 - Productivity
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Lecture 8 - Improving the Productivity Introduction to Work Study
Lecture 9 - Work Study Human Component and Method Study
Lecture 10 - Recording Techniques for Method Study - Part I
Lecture 11 - Recording Techniques for Method Study - Part II
Lecture 12 - Recording Techniques Critical Examination
Lecture 13 - Principles of Motion Economy
Lecture 14 - Work Measurement Time Study - Part I
Lecture 15 - Work Measurement Time Study - Part II
Lecture 16 - Performance Rating Allowances
Lecture 17 - Work Measurement
Lecture 18 - PMT System Standard Data Method
Lecture 19 - Ergonomics
Lecture 20 - Metabolism and Organization at Work
Lecture 21 - Working Conditions Lights Vibrations
Lecture 22 - Materials Management - Part I
Lecture 23 - Materials Management - Part II
Lecture 24 - Materials Requirement Planning
Lecture 25 - Sales Forecasting - Part I
Lecture 26 - Sales Forecasting - Part II
Lecture 27 - Capacity Planning - Part I
Lecture 28 - Capacity Planning - Part II
Lecture 29 - Network Analysis - Part I

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Lecture 30 - Network Analysis - Part II
Lecture 31 - Facility Design Part - Part I
Lecture 32 - Facility Design Part - Part II
Lecture 33 - Facility Design Part - Part III
Lecture 34 - Facility Design Part - Part IV
Lecture 35 - Product Design Development
Lecture 36 - Materials Handling
Lecture 37 - Quality Concepts
Lecture 38 - Value Engineering
Lecture 39 - Reliability
Lecture 40 - Industrial Safety
NPTEL Video Course - Mechanical Engineering - Manufacturing Processes I

Subject Co-ordinator - Dr. D.B. Karunakar, Dr. Inderdeep Singh, Dr. D.K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

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

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Lecture 2 - Powder Metallurgy - Part II
Lecture 3 - Powder Metallurgy - Part III
Lecture 4 - Metal Forming - Fundamentals
Lecture 5 - Forging
Lecture 6 - Swaging and Wire Drawing
Lecture 7 - Sheet Metal Operations - Part I
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NPTEL Video Course - Mechanical Engineering - NOC: Two Phase Flow and Heat Transfer

Subject Co-ordinator - Dr. Arup Kumar Das

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Flow Regimes
Lecture 3 - Homogeneous Model
Lecture 4 - Drift Flux Model
Lecture 5 - (Missing Lecture)
Lecture 6 - Dispersed Flow
Lecture 7 - Slug Flow
Lecture 8 - Annular Flow
Lecture 9 - Droplet Annular and Stratified Flow
Lecture 10 - Measurement of Void Fraction
Lecture 11 - Signal Analysis
Lecture 12 - Two Fluid and Population Balance Model
Lecture 13 - Interface Tracking
Lecture 14 - Lattice Boltzmann Method
Lecture 15 - Smoothed Particle Hydrodynamics
Lecture 16 - Molecular Perspective of Two Phase Flow
Lecture 17 - Boiling Heat Transfer
Lecture 18 - Condensation
Lecture 19 - Solid-Liquid Flow
Lecture 20 - Gas-Solid Flow

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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Refrigeration and Air-Conditioning

Subject Co-ordinator - Prof. Ravi Kumar
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Recapitulation of Thermodynamics
Lecture 2 - Introduction to Refrigeration
Lecture 3 - Air Refrigeration Cycle
Lecture 4 - Aircraft Refrigeration Cycles - 1
Lecture 5 - Aircraft Refrigeration Cycles - 2
Lecture 6 - Aircraft Refrigeration Cycles - 3
Lecture 7 - Vapour Compression Cycle - 1
Lecture 8 - Vapour Compression Cycle - 2
Lecture 9 - P-h Charts
Lecture 10 - Actual Vapour Compression Cycle - 1
Lecture 11 - Actual Vapour Compression Cycle - 2
Lecture 12 - Compound Compression with Intercooling - 1
Lecture 13 - Compound Compression with Intercooling - 2
Lecture 14 - Multiple Evaporator and Cascade System
Lecture 15 - Problem Solving - 1
Lecture 16 - Refrigerants - 1
Lecture 17 - Refrigerants - 2
Lecture 18 - Vpour Absorption Systems - 1
Lecture 19 - Vpour Absorption Systems - 2
Lecture 20 - Vpour Absorption Systems - 3
Lecture 21 - Introduction to Air-conditioning
Lecture 22 - Properties of Moist Air
Lecture 23 - Psychrometric Chart
Lecture 24 - Psychrometric Processes - 1
Lecture 25 - Psychrometric Processes - 2
Lecture 26 - Psychrometric Processes - 3
Lecture 27 - Infiltration
Lecture 28 - Design Conditions
Lecture 29 - Cooling Load - 1

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Lecture 30 - Cooling Load - 2
Lecture 31 - Cooling Load - 3
Lecture 32 - Air Distribution System - 1
Lecture 33 - Air Distribution System - 2
Lecture 34 - Problem Solving - 2
Lecture 35 - Air-Conditioning Systems
Lecture 36 - Human Physiology
Lecture 37 - Thermal Comfort
Lecture 38 - Indoor Environmental Health - 1
Lecture 39 - Indoor Environmental Health - 2
Lecture 40 - Problem Solving - 3
NPTEL Video Course - Mechanical Engineering - NOC: Engineering Economic Analysis

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Engineering Economy, Physical and Economic Environment, Phases in Engg. process
Lecture 2 - Some economic concepts, Value and utility, Interest and Interest rate, Time value of money
Lecture 3 - Interest formulas
Lecture 4 - Interest formulas for discrete compounding and discrete payments
Lecture 5 - Interest formulas for discrete compounding and discrete payments
Lecture 6 - Problem solving on discrete compounding, discrete payment
Lecture 7 - Interest formulas for Uniform gradient series
Lecture 8 - Interest formulas for geometric gradient series
Lecture 9 - Compounding frequency of Interest
Lecture 10 - Problem solving on frequency compounding of interest and gradient series factors
Lecture 11 - Economic equivalence
Lecture 12 - Equivalence calculations involving cash flows
Lecture 13 - Methods of comparison of alternatives
Lecture 14 - comparison of alternatives
Lecture 15 - Problem solving on equivalence and comparison of alternatives
Lecture 16 - Replacement analysis
Lecture 17 - Proper treatment of sunk cost in replacement
Lecture 18 - Replacement because of improved efficiency, inadequacy, demand etc.
Lecture 19 - Problem solving on replacement analysis
Lecture 20 - Economic life of the asset
Lecture 21 - Depreciation
Lecture 22 - Basic depreciation methods
Lecture 23 - Depreciation
Lecture 24 - Modified accelerated cost recovery system (MACRS) method of depreciation, Depletion
Lecture 25 - Depreciation
Lecture 26 - Problem solving based on Depreciation and Depletion
Lecture 27 - Elements of cost
Lecture 28 - Breakeven analysis, Effect of fixed and variable cost on BEP.
Lecture 29 - Economic order quantity

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Lecture 30 - Problem solving based on Breakeven analysis and EOQ
Lecture 31 - Cost estimation
Lecture 32 - cost estimating relationships
Lecture 33 - Introduction to decision under risk Criteria for decision under risk
Lecture 34 - Expected value decision making under risk
Lecture 35 - Expected variance decision making under risk
Lecture 36 - Problem solving based on decision under risk
Lecture 37 - Income taxes
Lecture 38 - Effect of method of depreciation on income taxes
Lecture 39 - After tax economic analysis
Lecture 40 - Problem solving based on Income tax analysis
NPTEL Video Course - Mechanical Engineering - NOC: Convective Heat Transfer

Subject Co-ordinator - Dr. Arup Kumar Das
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Balance of Total Energy
Lecture 3 - Different Forms of Thermal Energy Equation
Lecture 4 - Thermal Boundary Layer
Lecture 5 - Forced Convection
Lecture 6 - Forced Convection
Lecture 7 - Forced Convection over a Flat Plate
Lecture 8 - Natural Convection
Lecture 9 - Natural Convection
Lecture 10 - Tutorial
Lecture 11 - Forced Convection in Ducts
Lecture 12 - Thermally Developed Slug Flow in a Duct
Lecture 13 - Thermally and Hydrodynamically Developed Flow
Lecture 14 - Thermally and Hydrodynamically Developed Flow
Lecture 15 - Thermal Entrance Region
Lecture 16 - Thermal Entrance Region
Lecture 17 - Rayleigh Benard Convection
Lecture 18 - Heat Transfer with Phase Change
Lecture 19 - Mass Transfer
Lecture 20 - Tutorial
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Introduction to Mechanical Vibration

Subject Co-ordinator - Prof. Anil Kumar
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lesson 1 - Introduction
Lecture 2 - Lesson 2 - Addition of two harmonic motions and beat phenomenon
Lecture 3 - Lesson 3 - Fourier series and harmonic analysis
Lecture 4 - Lesson 4 - Vibration analysis procedure
Lecture 5 - Lesson 5 - Numerical problems
Lecture 6 - Lesson 1 - Undamped free vibration
Lecture 7 - Lesson 2 - Energy method
Lecture 8 - Lesson 3 - Damped free vibration
Lecture 9 - Lesson 4 - Viscous damped systems and logarithmic decrement
Lecture 10 - Lesson 5 - Coulomb damping
Lecture 11 - Lesson 1 - Harmonic excitations
Lecture 12 - Lesson 2 - Magnification factor and frequency response curve
Lecture 13 - Lesson 3 - Rotating unbalance
Lecture 14 - Lesson 4 - Excitation of the support
Lecture 15 - Lesson 5 - Energy input and dissipation by viscous damping
Lecture 16 - Lesson 1 - Coulomb damping and equivalent viscous damping
Lecture 17 - Lesson 2 - Structural damping and equivalent viscous damping
Lecture 18 - Lesson 3 - Vibration isolation and force transmissibility
Lecture 19 - Lesson 4 - Motion transmissibility
Lecture 20 - Lesson 5 - Numerical problems
Lecture 21 - Lesson 1 - Transducers and vibration pickup
Lecture 22 - Lesson 2 - Vibrometer
Lecture 23 - Lesson 3 - Accelerometer
Lecture 24 - Lesson 4 - Velocity pickup or Velometer
Lecture 25 - Lesson 5 - Phase distortion and frequency measurement
Lecture 26 - Lesson 1 - Undamped free vibration
Lecture 27 - Lesson 2 - Principal modes of vibration
Lecture 28 - Lesson 3 - Combined rectilinear and angular modes
Lecture 29 - Lesson 4 - Damped free vibration

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NPTEL Video Course - Mechanical Engineering - NOC:Joining Technologies of Commercial Importance

Subject Co-ordinator - Prof. Dheerendra Kumar Dwivedi
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Fundamental mechanisms of Joining
Lecture 3 - Classification of Joining Processes
Lecture 4 - Heat Generation in Welding
Lecture 5 - Protection of Weld Metal
Lecture 6 - Principle of Fusion Welding Processes
Lecture 7 - Fundamentals of Welding
Lecture 8 - Physics of Welding Arc
Lecture 9 - Shielded Metal Arc Welding
Lecture 10 - Gas Tungsten Arc Welding
Lecture 11 - Newer variants of Gas tungsten arc welding
Lecture 12 - Gas metal arc welding
Lecture 13 - Submerged arc welding
Lecture 14 - Electro-slag and Electro-gas welding
Lecture 15 - Laser beam welding
Lecture 16 - Brazing
Lecture 17 - Soldering and braze welding
Lecture 18 - Fundamentals of resistance welding
Lecture 19 - Resistance welding processes
Lecture 20 - Flash butt welding
Lecture 21 - Adhesive joining
Lecture 22 - Weld bonding
Lecture 23 - Solid state joining technologies
Lecture 24 - Ultrasonic welding
Lecture 25 - Diffusion welding
Lecture 26 - Explosive welding
Lecture 27 - Magnetic pulse welding
Lecture 28 - Weld thermal cycle
Lecture 29 - Heat affected zone and weld thermal cycle

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Lecture 30 - Heat affected zone and weld thermal cycle
Lecture 31 - Solidification of weld metal
Lecture 32 - Fundamentals of weldability of metals
Lecture 33 - Weldability of carbon and alloys steels
Lecture 34 - Weldability of stainless steels
Lecture 35 - Metallurgical transformations in weld and heat affected zone of steels
Lecture 36 - Weldability of aluminium alloys
Lecture 37 - Solidification cracking and their control
Lecture 38 - Residual Stresses in Weld Joints
Lecture 39 - Cracking of Welded Joints I
Lecture 40 - Cracking of Welded Joints II
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Modelling and Simulation of Dynamic Systems

Subject Co-ordinator - Prof. Pushparaj Mani Pathak

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Modelling
Lecture 2 - Examples of models
Lecture 3 - Modeling of Dynamic Systems
Lecture 4 - Introduction to Simulation
Lecture 5 - MATLAB as a Simulation tool
Lecture 6 - Bond graphs modelling
Lecture 7 - Bond graph model and causality
Lecture 8 - Generation of System Equations
Lecture 9 - Methods of Drawing bond graph models - Mechanical Systems
Lecture 10 - Methods of Drawing bond graph models - Electrical Systems
Lecture 11 - Basic System Models - Mechanical Systems
Lecture 12 - Basic System Models - Electrical Systems
Lecture 13 - Basic System Models - Hydraulic Systems
Lecture 14 - Basic System Models - Pneumatic Systems
Lecture 15 - Basic System Models - Thermal Systems
Lecture 16 - System Models
Lecture 17 - System Model of Combined Rotary and Translatory Systems
Lecture 18 - System Model of Electro Mechanical Systems
Lecture 19 - System Model of Hydro Mechanical Systems
Lecture 20 - System Models of Robots
Lecture 21 - Dynamic response of the 1st order system
Lecture 22 - Dynamic response of 2nd order system
Lecture 23 - Performance measures for 2nd order system
Lecture 24 - System Transfer functions
Lecture 25 - Transfer Function of 1st and 2nd Order System
Lecture 26 - Block Diagram Algebra
Lecture 27 - Signal Flow Graphs
Lecture 28 - State Variable Formulation
Lecture 29 - Frequency Response

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Lecture 30 - Bode Plot
Lecture 31 - Simulation using SIMULINK
Lecture 32 - Simulation of simple and compound pendulums
Lecture 33 - Simulation of planar mechanisms
Lecture 34 - Simulation of wheeled mobile robots
Lecture 35 - Validation and Verification of Simulation Models
Lecture 36 - Parameter estimation methods
Lecture 37 - Parameter estimation examples
Lecture 38 - System identifications
Lecture 39 - Introduction to Optimization
Lecture 40 - Optimization with modeling of engineering problems
NPTEL Video Course - Mechanical Engineering - NOC: Principles of Casting Technology

Subject Co-ordinator - Dr. Pradeep K. Jha
Co-ordinating Institute - IIT - Roorkee

Lecture 1 - Introduction to Casting Technology
Lecture 2 - Mechanism of solidification
Lecture 3 - Solidification of Pure Metals and Alloys
Lecture 4 - Freeze Wave Mechanism and Solidification Time
Lecture 5 - Problem Solving on Solidification
Lecture 6 - Technology of pattern making
Lecture 7 - Allowances in pattern making
Lecture 8 - Moulding sands and its ingredients
Lecture 9 - Testing of molding sands
Lecture 10 - Sand preparation for casting
Lecture 11 - Technology of mould making
Lecture 12 - Technology of core making
Lecture 13 - Special sand moulding process
Lecture 14 - Organic binders
Lecture 15 - Special moulding process
Lecture 16 - Introduction of gating design
Lecture 17 - Types of gate
Lecture 18 - Pouring time calculation
Lecture 19 - Aspiration effects in gating system
Lecture 20 - Problem solving on gating design
Lecture 21 - Solidification analysis
Lecture 22 - Risering methods
Lecture 23 - Shape factor
Lecture 24 - Feeding and Chills effect
Lecture 25 - Problem related to riser design
Lecture 26 - Special casting process - 1
Lecture 27 - Special casting process - 2
Lecture 28 - Special casting process - 3
Lecture 29 - Technology of melting

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Lecture 30 - Melting practices
Lecture 31 - Melting and Casting of cast metal
Lecture 32 - Melting practice for gray iron
Lecture 33 - Melting practice for Malleable iron and S.G iron
Lecture 34 - Casting of steel and alloy steel
Lecture 35 - Casting practices for non-ferrous metals and alloys
Lecture 36 - Fettling of castings
Lecture 37 - Heat treatment of castings
Lecture 38 - Heat treatment practices for cast iron and non-ferrous metals and alloys
Lecture 39 - Casting defects
Lecture 40 - Diagnostics of casting defects
NPTEL Video Course - Mechanical Engineering - NOC: Steam and Gas Power Systems

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Review of Thermodynamics
Lecture 2 - Rankine Cycle
Lecture 3 - Performance of Rankine Cycle
Lecture 4 - Binary vapour cycle and co-generation
Lecture 5 - Problem Solving (Rankine Cycle)
Lecture 6 - Steam Generators
Lecture 7 - Fire Tube Boilers
Lecture 8 - Water Tube Boilers
Lecture 9 - Boiler Mountings and Accessories
Lecture 10 - High Pressure Boilers (Part-1)
Lecture 11 - High Pressure Boilers (Part-2)
Lecture 12 - Draught
Lecture 13 - Performance of Boiler
Lecture 14 - Combustion of Fuel
Lecture 15 - Combustion of Fuel (Problem Solving)
Lecture 16 - Boiler Trial
Lecture 17 - Nozzles and Diffusers - Momentum and Continuity Equations
Lecture 18 - Nozzles and Diffusers - Efficiency and Critical Pressure
Lecture 19 - Nozzles and Diffusers - General Relationships and Supernatuated Flow
Lecture 20 - Problem Solving (Nozzles and diffusers)
Lecture 21 - Steam Turbine
Lecture 22 - Compounding of Steam Turbine
Lecture 23 - Impulse Steam Turbine
Lecture 24 - Impulse Steam Turbine Performance
Lecture 25 - Problem solving (Impulse Steam Turbine)
Lecture 26 - Impulse Reaction Steam Turbine
Lecture 27 - Impulse Reaction Steam Turbine Performance
Lecture 28 - Energy Losses in Steam Turbine
Lecture 29 - Condensers

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Lecture 30 - Problem Solving (Steam Turbine)
Lecture 31 - Gas turbine cycle
Lecture 32 - Gas Turbine cycle Performance Evaluations
Lecture 33 - Gas Turbine cycle - Modifications
Lecture 34 - Problem Solving (Gas Turbine Cycle)
Lecture 35 - Centrifugal Compressors
Lecture 36 - Centrifugal Compressors Characteristics
Lecture 37 - Axial Flow Compressor
Lecture 38 - Axial Flow Compressor Characteristics
Lecture 39 - Jet Propulsion
Lecture 40 - Problem Solving
Lecture 1 - Introduction to product design and development
Lecture 2 - Product life-cycle
Lecture 3 - Product policy of an organization and selection of profitable products
Lecture 4 - Product design
Lecture 5 - Product design steps and product analysis
Lecture 6 - Value engineering concepts
Lecture 7 - Problem Identification and VEJP
Lecture 8 - Function analysis
Lecture 9 - Functional analysis system technique
Lecture 10 - Case study on value engineering
Lecture 11 - Quality function deployment
Lecture 12 - Computer aided design
Lecture 13 - Rubust design
Lecture 14 - Design for X
Lecture 15 - Ergonomics in product design
Lecture 16 - DFMA guidelines
Lecture 17 - Product design for manual assembly
Lecture 18 - Design guidelines for different processes
Lecture 19 - Rapid prototyping
Lecture 20 - Rapid prototyping processes
NPTEL Video Course - Mechanical Engineering - NOC:Modelling and Simulation of Discrete Event System

Subject Co-ordinator - Dr. Pradeep K. Jha
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Simulation
Lecture 2 - Concept of System, Model and Simulation
Lecture 3 - Time advance mechanism, Components of a simulation model
Lecture 4 - Program organization and logic, Steps in a simulation study
Lecture 5 - Simulation examples
Lecture 6 - Statistical Models in Simulation
Lecture 7 - Input probability distribution functions for discrete systems
Lecture 8 - Continuous distribution functions
Lecture 9 - Continuous distribution functions and empirical distribution functions
Lecture 10 - Problem solving on statistical models in simulation
Lecture 11 - Characteristics of a queueing system
Lecture 12 - Performance measures of queueing system
Lecture 13 - Analysis of a single server queueing system
Lecture 14 - Simulation of a single server queueing system
Lecture 15 - Computer representation of simulation of single server queueing system
Lecture 16 - Generation of Random Numbers
Lecture 17 - Issues and Challenges in Congruential Generators
Lecture 18 - Testing of random numbers
Lecture 19 - Generation of Random Variates
Lecture 20 - Problem Solving on Random Number and Random Variate Generation
Lecture 21 - Input modeling
Lecture 22 - Input modeling
Lecture 23 - Input modeling
Lecture 24 - Input modeling
Lecture 25 - Problem Solving on input modeling
Lecture 26 - Output analysis of a single system
Lecture 27 - Obtaining a specified precision
Lecture 28 - Comparison of alternative system configurations
Lecture 29 - Confidence Intervals for comparing more than two systems

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| Lecture 30 | Problem Solving on output analysis of single and alternative systems |
| Lecture 31 | Introduction to simulation of manufacturing and material handling system |
| Lecture 32 | Issues in material handling system |
| Lecture 33 | Modeling of system randomness |
| Lecture 34 | Verification of simulation models |
| Lecture 35 | Model validity and credibility |
| Lecture 36 | Problem solving and case studies on simulation of manufacturing system |
| Lecture 37 | Introduction to Monte Carlo Simulation |
| Lecture 38 | Inventory Control Simulation using Monte Carlo Technique |
| Lecture 39 | In this lecture, Monte Carlo technique was used to solve inventory system problems |
| Lecture 40 | Problem solving on Monte Carlo Simulation |
NPTEL Video Course - Mechanical Engineering - NOC: Processing of Polymers and Polymer Composites

Subject Co-ordinator - Dr. Inderdeep Singh
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to course
Lecture 2 - Engineering materials and processing techniques
Lecture 3 - Thermoplastics and thermosets
Lecture 4 - Processing of polymers
Lecture 5 - Thermoforming processes
Lecture 6 - Extrusion - I
Lecture 7 - Extrusion - II
Lecture 8 - Compression molding
Lecture 9 - Injection molding - I
Lecture 10 - Injection molding - II
Lecture 11 - Transfer molding
Lecture 12 - Rotational molding
Lecture 13 - Blow molding
Lecture 14 - Composite materials
Lecture 15 - Classification of composite materials
Lecture 16 - Processing of polymer composites
Lecture 17 - Hand lay-up
Lecture 18 - Spray lay-up
Lecture 19 - Compression molding
Lecture 20 - Injection molding
Lecture 21 - Reaction injection molding
Lecture 22 - Autoclave molding
Lecture 23 - Resin transfer molding
Lecture 24 - Filament winding
Lecture 25 - Pultrusion process
Lecture 26 - Sheet molding
Lecture 27 - Pre-pregging and challenges in primary processing of composites
Lecture 28 - Secondary processing of polymer composites
Lecture 29 - Joining of polymer composites

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Lecture 30 - Adhesive joining
Lecture 31 - Mechanical joining
Lecture 32 - Microwave joining
Lecture 33 - Induction and resistance welding
Lecture 34 - Drilling of polymer matrix composites - I
Lecture 35 - Drilling of polymer matrix composites - II
Lecture 36 - Methods to prevent drilling induced damage
Lecture 37 - Non-conventional drilling
Lecture 38 - Process simulation of secondary processing
Lecture 39 - Intelligent drilling of polymer matrix composites
Lecture 40 - Web based tools for polymer matrix composites
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NPTEL Video Course - Mechanical Engineering - NOC: Operations Management

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Operations Management
Lecture 2 - Operations Management
Lecture 3 - Operations Management
Lecture 4 - Types of Production Systems
Lecture 5 - Operations Strategy
Lecture 6 - Product Life-Cycle
Lecture 7 - Value Engineering Concepts
Lecture 8 - Design for X (DFX)
Lecture 9 - Ergonomics in Product Design
Lecture 10 - Rapid Prototyping
Lecture 11 - Sales Forecasting
Lecture 12 - Forecasting System
Lecture 13 - Qualitative Methods of Forecasting
Lecture 14 - Quantitative Methods - I
Lecture 15 - Quantitative Methods - II
Lecture 16 - Facility Planning
Lecture 17 - Factors Affecting Plant Location
Lecture 18 - Plant Location
Lecture 19 - Location Evaluation Methods - I
Lecture 20 - Location Evaluation Methods - II
Lecture 21 - Facility Layout and Planning - I
Lecture 22 - Facility Layout and Planning - II
Lecture 23 - Factors Influencing Plant Layout
Lecture 24 - Material Flow Patterns
Lecture 25 - Tools and Techniques used For Plant Layout Planning
Lecture 26 - Production Planning and Control
Lecture 27 - Process Planning
Lecture 28 - Aggregate Production Planning
Lecture 29 - Capacity Planning

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Lecture 30 - Capacity Planning
Lecture 31 - Project Scheduling
Lecture 32 - Network Diagrams
Lecture 33 - Critical Path Method
Lecture 34 - Critical Path Method
Lecture 35 - Critical Path Method
Lecture 36 - Program Evaluation and Review Technique (PERT)
Lecture 37 - PERT Problems - I
Lecture 38 - PERT Problems - II
Lecture 39 - Time Cost Trade Off (Crashing)
Lecture 40 - Project Network
Lecture 41 - Production Control
Lecture 42 - Sequencing
Lecture 43 - Sequencing Problems - I
Lecture 44 - Sequencing Problems - II
Lecture 45 - Master Production Scheduling (MPS)
Lecture 46 - Concept of Quality
Lecture 47 - Total Quality Management (TQM)
Lecture 48 - Total Productive Maintenance
Lecture 49 - Statistical Quality Control (SQC)
Lecture 50 - Six Sigma
Lecture 51 - Materials Management
Lecture 52 - Inventory Control
Lecture 53 - Economic Order Quantity (EOQ) Models
Lecture 54 - Economic Order Quantity (EOQ)
Lecture 55 - Production Quantity Model
Lecture 56 - Just In time (JIT)
Lecture 57 - Kanban System
Lecture 58 - Materials Requirement Planning (MRP) - I
Lecture 59 - Materials Requirement Planning (MRP) - II
Lecture 60 - Enterprise Resource Planning (ERP)
NPTEL Video Course - Mechanical Engineering - NOC: Theory of Production Processes

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Theory and Practics of Casting
Lecture 2 - Theory of Solidification
Lecture 3 - Solidification of pure metals and alloys
Lecture 4 - Factors affecting solidification process
Lecture 5 - Fluidity of liquid metals
Lecture 6 - Technology of patternmaking
Lecture 7 - Patternmaking
Lecture 8 - Molding sand ingredients and sand testing methods
Lecture 9 - Sand molding methods
Lecture 10 - Coremaking
Lecture 11 - Gating system design
Lecture 12 - Gating system design
Lecture 13 - Introduction to riser design
Lecture 14 - Risering methods
Lecture 15 - Problem solving on gating design and risering methods
Lecture 16 - Theory of melting
Lecture 17 - Melting and production of Iron castings
Lecture 18 - Production of steel and non-ferrous castings
Lecture 19 - Casting design considerations
Lecture 20 - Casting defects
Lecture 21 - Concept of stress and strain, Elastic and plastic behavior
Lecture 22 - State of stress in two and three dimensions, Mohr’s circle
Lecture 23 - Description of strain at a point
Lecture 24 - Mean and deviator stresses, Elastic stress strain relationships
Lecture 25 - Theory of plasticity
Lecture 26 - Yield criteria for ductile materials
Lecture 27 - Flow rules, Plastic stress strain relationships
Lecture 28 - Classification of metal working processes
Lecture 29 - Mechanics of metal working
Lecture 30 - Temperature in metalworking
Lecture 31 - Rolling process
Lecture 32 - Analysis of rolling operation
Lecture 33 - Introduction to forging process
Lecture 34 - Analysis of forging process
Lecture 35 - Problem solving on rolling and forging processes
Lecture 36 - Extrusion process
Lecture 37 - Drawing of rods, tubes and wires
Lecture 38 - Analysis of drawing operation
Lecture 39 - Sheet metal operations
Lecture 40 - Metal Forming Defects
Lecture 41 - Classification of joining processes
Lecture 42 - Heat flow in welding
Lecture 43 - Metallurgy of fusion welds
Lecture 44 - Heat affected zone in welding
Lecture 45 - Heat treatment processes in welding
Lecture 46 - Principle of shield arc welding processes
Lecture 47 - Principle of gas shield arc welding processes
Lecture 48 - Principle of Resistance welding
Lecture 49 - Principle of Solid State Welding Processes
Lecture 50 - Brazing, soldering and adhesive bonding
Lecture 51 - Residual stresses in welding
Lecture 52 - Methods of controlling residual stresses in welding
Lecture 53 - Welding Distortion
Lecture 54 - Control of welding distortion
Lecture 55 - Preheat and postweld heat treatment of weldments
Lecture 56 - Weldability of metals
Lecture 57 - Weldability of steels
Lecture 58 - Weldability of cast iron
Lecture 59 - Weldability of non-ferrous materials
Lecture 60 - Welding defects
NPTEL Video Course - Mechanical Engineering - NOC:Automatic Control

Subject Co-ordinator - Dr. Anil Kumar
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Definition and Types
Lecture 2 - Performance Specifications
Lecture 3 - Design Process
Lecture 4 - Block Diagrams
Lecture 5 - Laplace Transform and Transfer Function
Lecture 6 - Translational Mechanical System
Lecture 7 - Rotational Mechanical System
Lecture 8 - Electrical System
Lecture 9 - Linearization of Nonlinear Systems
Lecture 10 - Numerical Problems
Lecture 11 - Poles and Zeros
Lecture 12 - First Order System
Lecture 13 - Second Order System
Lecture 14 - Underdamped Second Order System - I
Lecture 15 - Underdamped Second Order System - II
Lecture 16 - Definition of Stability
Lecture 17 - Routh-Hurwitz Criterion
Lecture 18 - Routh-Hurwitz Criterion - Special Cases
Lecture 19 - Steady State Errors
Lecture 20 - Static Error Constants
Lecture 21 - Define Root Locus
Lecture 22 - Sketching of Root Locus - I
Lecture 23 - Sketching of Root Locus - II
Lecture 24 - Sketching of Root Locus - III
Lecture 25 - Numerical Examples and Second Order Approximation
Lecture 26 - PI Controller Design
Lecture 27 - PD Controller Design
Lecture 28 - PID Controller Design
Lecture 29 - Lag Compensation

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Lecture 30 - Lead and Lag-Lead Compensation
Lecture 31 - State Space Representation
Lecture 32 - Converting a Transfer Function to State Space
Lecture 33 - Converting From State Space to Transfer Function
Lecture 34 - Controller Design
Lecture 35 - Controller Design and Controllability
Lecture 36 - Transfer Function, Poles, Zeros, Response
Lecture 37 - Steady State Error, Root Locus
Lecture 38 - Design Via Root Locus, Compensation - I
Lecture 39 - Design Via Root Locus, Compensation - II
Lecture 40 - State Space Method
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Failure Analysis and Prevention

Subject Co-ordinator - Dr. D. K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction - Need and scope of failure analysis and prevention
Lecture 2 - Introduction - Engineering disasters and understanding failures
Lecture 3 - Fundamental sources of failures - Deficient design - I
Lecture 4 - Fundamental sources of failures - Deficient design - II
Lecture 5 - Fundamental sources of failures - Deficient design - III and upgrading of a part
Lecture 6 - Fundamental sources of failures - Imperfections in base metals
Lecture 7 - Fundamental sources of failures - Improper Manufacturing - I
Lecture 8 - Fundamental sources of failures - Improper Manufacturing - II
Lecture 9 - Fundamental sources of failures - Improper Manufacturing - III
Lecture 10 - Fundamental sources of failures - Improper Manufacturing - IV and improper service conditions
Lecture 11 - Fundamental sources of failures - Poor assembly, service and maintenance
Lecture 12 - Industrial engineering tool for failure analysis - Pareto diagram
Lecture 13 - Industrial engineering tool for failure analysis - Fishbone diagram and FMEA
Lecture 14 - Industrial engineering tool for failure analysis - FMEA
Lecture 15 - Industrial engineering tool for failure analysis - Fault tree analysis
Lecture 16 - Industrial engineering tool for failure analysis - Reliability - I
Lecture 17 - Industrial engineering tool for failure analysis - Reliability - II
Lecture 18 - General procedure of failure analysis - Steps
Lecture 19 - General procedure of failure analysis - Background information collection
Lecture 20 - General procedure of failure analysis - Preliminary examination
Lecture 21 - General procedure of failure analysis - NDT for failure analysis
Lecture 22 - General procedure of failure analysis - Destructive testing
Lecture 23 - General procedure of failure analysis - DT, selection, preservation, cleaning and sectioning of specimen
Lecture 24 - General procedure of failure analysis - Macroscopy of fracture surfaces - I
Lecture 25 - General procedure of failure analysis - Macroscopy of fracture surfaces - II
Lecture 26 - General procedure of failure analysis - Macroscopy of fracture surfaces - III
Lecture 27 - General procedure of failure analysis - Macroscopy of fracture surfaces - IV
Lecture 28 - General procedure of failure analysis - Microscopy of fracture surfaces
Lecture 29 - General procedure of failure analysis - Metallography of failed components

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Lecture 30 - General procedure of failure analysis - Determination of type of fracture - I
Lecture 31 - General procedure of failure analysis - Determination of type of fracture - II
Lecture 32 - General procedure of failure analysis - Determination of type of fracture - III and chemical analysis
Lecture 33 - General procedure of failure analysis - Application of fracture mechanics - I
Lecture 34 - General procedure of failure analysis - Application of fracture mechanics - II
Lecture 35 - General procedure of failure analysis - Simulated test service conditions and analysis of evidence
Lecture 36 - General procedure of failure analysis - Question for analysis
Lecture 37 - General procedure of failure analysis - Reporting failure analysis and failure analysis of welded joint
Lecture 38 - General procedure of failure analysis - Failure analysis of weld joint
Lecture 39 - General procedure of failure analysis - Examples of failure analysis
Lecture 40 - General procedure of failure analysis - Embrittlement of steels
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Mechanical Measurement System

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Basic concepts of measurement
Lecture 2 - Functional elements of instruments
Lecture 3 - Classification of measuring instruments
Lecture 4 - Methods of correction for interfering and modifying inputs
Lecture 5 - Static characteristics of measuring instruments - 1
Lecture 6 - Static characteristics of measuring instruments - 2
Lecture 7 - Loading effect and Impedance matching
Lecture 8 - Statistical analysis
Lecture 9 - Chi-square test
Lecture 10 - Least square method
Lecture 11 - Uncertainty analysis
Lecture 12 - Problem solving - 1
Lecture 13 - Generalized model of a measuring system
Lecture 14 - Zero and first order system
Lecture 15 - First order system - step response
Lecture 16 - First order system - ramp response
Lecture 17 - First order system - impulse response
Lecture 18 - First order system - frequency response
Lecture 19 - Second order system - step response - 1
Lecture 20 - Second order system - step response - 2
Lecture 21 - Second order system - ramp response
Lecture 22 - Second order system - impulse and frequency response
Lecture 23 - Higher order systems
Lecture 24 - Compensation
Lecture 25 - Transducers - 1
Lecture 26 - Transducers - 2
Lecture 27 - Flow measurement - 1
Lecture 28 - Flow measurement - 2
Lecture 29 - Temperature measurement - 1

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Lecture 30 - Temperature measurement - 2
Lecture 31 - Strain gauges
Lecture 32 - Piezoelectric transducers
Lecture 33 - Pressure measurement
Lecture 34 - Force and torque measurement
Lecture 35 - Displacement and acceleration measurement
Lecture 36 - Sound measurement
Lecture 37 - Thermophysical properties measurement
Lecture 38 - Flow visualization
Lecture 39 - Air pollution sampling and measurement
Lecture 40 - Problem solving - 2
Lecture 1 - Introduction and need of surface engineering
Lecture 2 - Surface/sub-surface regions and properties of importance for surface engineering
Lecture 3 - Surface properties and their modification
Lecture 4 - Classification of surface modification techniques - I
Lecture 5 - Classification of surface modification techniques - II
Lecture 6 - Comparison of surface modification techniques and scope of surface engineering
Lecture 7 - Scope of surface engineering - I
Lecture 8 - Surface properties for wear and friction resistance - I
Lecture 9 - Surface properties for wear and friction resistance - II
Lecture 10 - Surface properties for wear and friction resistance - III
Lecture 11 - Issues and application of surface modification
Lecture 12 - Surface damage
Lecture 13 - Surface damage
Lecture 14 - Surface damage
Lecture 15 - Surface damage
Lecture 16 - Surface damage
Lecture 17 - Surface damage
Lecture 18 - Surface damage
Lecture 19 - Surface damage
Lecture 20 - Surface damage
Lecture 21 - Properties and mode of wear
Lecture 22 - Metal systems
Lecture 23 - Thermal barrier coatings
Lecture 24 - Functionally graded materials and other materials
Lecture 25 - Surface modification techniques
Lecture 26 - Surface modification techniques
Lecture 27 - Surface modification techniques
Lecture 28 - Surface modification techniques
Lecture 29 - Surface modification techniques
NPTEL Video Course - Mechanical Engineering - NOC: Work System Design

Subject Co-ordinator - Dr. Inderdeep Singh
Co-ordinating Institute - IIT - Roorkee

Lecture 1 - Work System Design
Lecture 2 - Introduction and Concept of Productivity
Lecture 3 - Measurement of Productivity
Lecture 4 - Productivity Measures
Lecture 5 - Productivity Measurement Models
Lecture 6 - Factors Influencing Productivity
Lecture 7 - Causes of Low Productivity
Lecture 8 - Productivity Improvement Technique
Lecture 9 - Numerical Problems on Productivity
Lecture 10 - Case Study on Productivity
Lecture 11 - Work Study
Lecture 12 - Steps Involved in Work Study
Lecture 13 - Concept of Work Content
Lecture 14 - Techniques of Work Study
Lecture 15 - Human Aspects of Work Study
Lecture 16 - Method Study
Lecture 17 - Method Study
Lecture 18 - Method Study
Lecture 19 - Operation Process Charts
Lecture 20 - Operation Process Charts
Lecture 21 - Flow Process Charts
Lecture 22 - Flow Process Charts
Lecture 23 - Two-Handed-Process Charts
Lecture 24 - Multiple Activity Charts
Lecture 25 - Flow Diagrams
Lecture 26 - String Diagrams
Lecture 27 - Principles of Motion Economy
Lecture 28 - Micro-Motion Study
Lecture 29 - Therbligs

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Lecture 30 - SIMO Charts
Lecture 31 - Memo-Motion Study
Lecture 32 - Cycle Graph and Chronocycle Graph
Lecture 33 - Critical Examination Techniques
Lecture 34 - Development and Selection of New Method
Lecture 35 - Installation and Maintenance of Improved Methods
Lecture 36 - Work Measurement
Lecture 37 - Techniques of Work Measurement
Lecture 38 - Steps Involved in Time Study
Lecture 39 - Steps and Equipment of Time Study
Lecture 40 - Performance Rating
Lecture 41 - Performance Rating
Lecture 42 - Allowances in Time Study
Lecture 43 - Computation of Standard Time - I
Lecture 44 - Computation of Standard Time - II
Lecture 45 - Work Measurement
Lecture 46 - Work Sampling
Lecture 47 - Procedure of Work Sampling
Lecture 48 - Work Sampling
Lecture 49 - Introduction to Synthetic Data and PMTS
Lecture 50 - Introduction to MTM and MOST
Lecture 51 - Ergonomics
Lecture 52 - Industrial Ergonomics
Lecture 53 - Ergonomics
Lecture 54 - Man-Machine System - 1
Lecture 55 - Man-Machine System - 2
Lecture 56 - Case Study
Lecture 57 - Case Study
Lecture 58 - Case Study
Lecture 59 - Case Study
Lecture 60 - Case Study
NPTEL Video Course - Mechanical Engineering - NOC: Principles of Metal Forming Technology

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Metal Forming Technology
Lecture 2 - Classification of Metal Working Processes
Lecture 3 - Behavior of Materials
Lecture 4 - Failure of Materials
Lecture 5 - Concept of stress and strain
Lecture 6 - Description of stress
Lecture 7 - State of stress in three dimension
Lecture 8 - Description of strain
Lecture 9 - Hydrostatic and deviator components of stress and strain
Lecture 10 - Elastic stress strain relationships
Lecture 11 - Introduction to theory of plasticity and flow curve
Lecture 12 - True stress and true strain
Lecture 13 - Yield criteria for ductile materials
Lecture 14 - Yield locus, Octahedral shear stress and strain
Lecture 15 - Plastic stress strain relationships
Lecture 16 - Measures of yielding and ductility in tensile testing
Lecture 17 - Instability in tension
Lecture 18 - Strain rate effects on flow properties
Lecture 19 - Temperature effects on flow properties
Lecture 20 - Influence of various parameters on flow properties
Lecture 21 - Classification of metal working processes
Lecture 22 - Mechanics of metalworking and analysis methods
Lecture 23 - Determination of flow stresses in metal working
Lecture 24 - Hot working and cold working
Lecture 25 - Metallurgical considerations in metal forming
Lecture 26 - Introduction and classification of forging processes
Lecture 27 - Equipments used in forging
Lecture 28 - Forging in plane strain
Lecture 29 - Introduction and classification of rolling processes
Lecture 30 - Analysis of rolling load calculations
Lecture 31 - Defects in rolled and forged products
Lecture 32 - Introduction and classification of extrusion processes
Lecture 33 - Analysis of extrusion processes
Lecture 34 - Extrusion of tubes and pipes, extrusion defect
Lecture 35 - Introduction to rod and wire drawing
Lecture 36 - Analysis of wire drawing and tube drawing processes
Lecture 37 - Sheet metal operations - I
Lecture 38 - Sheet metal operations - II
Lecture 39 - Powder metallurgy forming - I
Lecture 40 - Powder metallurgy forming - II
Lecture 1 - Introduction
Lecture 2 - Fundamentals of Radiation
Lecture 3 - Basic Laws of Thermal Radiation
Lecture 4 - Properties of Plane Surfaces
Lecture 5 - Radiative Properties of Materials
Lecture 6 - View Factor
Lecture 7 - Hottel Crossed String Method
Lecture 8 - Inside Sphere and Monte Carlo Method
Lecture 9 - Radiative Heat Exchange Between Black Surfaces
Lecture 10 - Radiative Heat Exchange Between Gray Diffuse Surfaces
Lecture 11 - Network Analogy
Lecture 12 - Solution Methods for Governing Integral Equations
Lecture 13 - Radiative Heat Exchange between Partially Specular Gray Surfaces
Lecture 14 - Non-Gray Surfaces
Lecture 15 - Radiative Heat Transfer in the Presence of Conduction/Convection
Lecture 16 - Radiative Transfer in Participating Media
Lecture 17 - Equation of Radiative Transfer
Lecture 18 - Solution of Radiative Transfer Equation
Lecture 19 - Radiative Heat Transfer in Cylindrical Media
Lecture 20 - Approximate Methods-I
Lecture 21 - Approximate Methods-II
Lecture 22 - The Method of Spherical Harmonics (PN Approximation) - I
Lecture 23 - The Method of Spherical Harmonics (PN Approximation) - II
Lecture 24 - Discrete Ordinate Method (DOM)
Lecture 25 - Zone Method
Lecture 26 - Exchange Areas
Lecture 27 - Monte Carlo Method for Thermal Radiation - I
Lecture 28 - Monte Carlo Method for Thermal Radiation - II
Lecture 29 - Radiative Properties of Gases
Lecture 30 - Atomic and Molecular Spectra
Lecture 31 - Line Radiation
Lecture 32 - Spectral Modelling
Lecture 33 - Wide Band Models
Lecture 34 - WSGG Model
Lecture 35 - k-Distribution Model
Lecture 36 - Radiative Properties of Particulate Media
Lecture 37 - Combustion and Flame
Lecture 38 - Solar and Atmospheric Radiation
Lecture 39 - Concentrated Solar Collector
Lecture 40 - Experimental Methods
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Weldability of Metals

Subject Co-ordinator - Dr. D. K. Dwivedi
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Weldability
Lecture 2 - Understanding Weldability
Lecture 3 - Metal Properties and Weldability - I
Lecture 4 - Metal Properties and Weldability - II
Lecture 5 - Weldability of Work Hardenable Metals
Lecture 6 - Weldability of Work Hardenable and Precipitation Strengthened Metals
Lecture 7 - Weldability of Precipitation Strengthened Metals
Lecture 8 - Weldability of Metals Strengthened by Grain Refinement, dispersion Hardening and Transformation Hardening
Lecture 9 - Weldability of Transformation Hardening Metals
Lecture 10 - Weldability of Metals
Lecture 11 - Weldability Consideration
Lecture 12 - Weldability of Carbon and Alloy Steel - I
Lecture 13 - Weldability of Carbon and Alloy Steel - II
Lecture 14 - Weldability of Carbon and Alloy Steel - III
Lecture 15 - Weldability of Low Carbon Steel and Mild Steel
Lecture 16 - Weldability of Medium Carbon Steel and High Carbon Steel
Lecture 17 - Weldability of Carbon and Welding Processes - I
Lecture 18 - Weldability of Carbon and Welding Processes - II
Lecture 19 - Weldability of Carbon Steel and Welding Processes - III
Lecture 20 - Weldability of Carbon Steel and Radiation Welding and Thermal Cutting
Lecture 21 - Weldability of High Strength Low Alloy Steels
Lecture 22 - Weldability of Q&T Steels - I
Lecture 23 - Weldability of Q&T Steels - II
Lecture 24 - Weldability of Q&T Steels - III
Lecture 25 - Weldability of Q&T Steels - IV
Lecture 26 - Weldability of HTLA Steel - I
Lecture 27 - Weldability of HTLA Steel - II
Lecture 28 - Weldability of Cr-Mo Steel - I
Lecture 29 - Weldability of Cr-Mo Steel - II

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Lecture 30 - Weldability of Cr-Mo Steel - III
Lecture 31 - Weldability of Pre-Coated Steel - I
Lecture 32 - Weldability of Pre-Coated Steel - II
Lecture 33 - Weldability of Stainless Steel - I
Lecture 34 - Weldability of Stainless Steel - II
Lecture 35 - Weldability of Martensitic Stainless Steel - I
Lecture 36 - Weldability of Martensitic Stainless Steel - II
Lecture 37 - Weldability of Ferritic Stainless Steel - I
Lecture 38 - Weldability of Austenitic Stainless Steel - I
Lecture 39 - Weldability of Austenitic Stainless Steel - II
Lecture 40 - Weldability of PH Stainless Steel
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Guidelines for Product Design

Subject Co-ordinator - Dr. Inderdeep Singh
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Product Design
Lecture 2 - Introduction of Manufacturing Processes
Lecture 3 - Manufacturing Processes
Lecture 4 - Manufacturing Processes
Lecture 5 - Process Capabilities
Lecture 6 - Engineering Materials
Lecture 7 - Properties of materials
Lecture 8 - Selection of materials - I
Lecture 9 - Selection of materials - II
Lecture 10 - Applications of Engineering Material
Lecture 11 - Robust design
Lecture 12 - Design for X
Lecture 13 - Product Design for Manual Assembly
Lecture 14 - DFMA Guidelines
Lecture 15 - Ergonomics in Product Design
Lecture 16 - Selection of processes - I
Lecture 17 - Selection of processes - II
Lecture 18 - Process Capabilities.
Lecture 19 - Design Guidelines for Sand Casting
Lecture 20 - Design Guidelines for Die Casting
Lecture 21 - Product Design Guidelines
Lecture 22 - Design Guidelines for Extrusion and Injection Molding
Lecture 23 - Design Guidelines for Sheet Metal Working
Lecture 24 - Design Guidelines for Machining
Lecture 25 - Design Guidelines for Powder Metal Processing
Lecture 26 - Assembly Processes
Lecture 27 - Adhesive Joining
Lecture 28 - Design Guidelines for Mechanical Fasteners
Lecture 29 - Design Guidelines for Welding

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Lecture 30 - Design guidelines
Lecture 31 - Induction Welding
Lecture 32 - Ultrasonic Welding
Lecture 33 - Vibration and Spin Welding
Lecture 34 - Microwave Joining
Lecture 35 - Hole making
Lecture 36 - Design for Environment
Lecture 37 - Design for Environment
Lecture 38 - Product Architecture
Lecture 39 - Rapid Prototyping
Lecture 40 - Product Design
NPTEL Video Course - Mechanical Engineering - NOC: Inspection and Quality Control in Manufacturing

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Need of Inspection
Lecture 3 - Destructive Inspection - I
Lecture 4 - Destructive Inspection - II
Lecture 5 - Testing of Composite Materials
Lecture 6 - Nondestructive Inspection - Visual Inspection
Lecture 7 - Dye Penetrant Inspection
Lecture 8 - Magnetic Particle Inspection
Lecture 9 - Eddy Current Inspection
Lecture 10 - Ultrasonic Inspection
Lecture 11 - Acoustic Emission Inspection
Lecture 12 - Radiography Inspection
Lecture 13 - Leak Testing
Lecture 14 - Thermographic Nondestructive Testing
Lecture 15 - Advanced Nondestructive Testing Techniques, NDT Standards, Safety in NDT
Lecture 16 - Engineering Metrology - Linear Measurement
Lecture 17 - Angular Measurement and Measurement of Surface Finish
Lecture 18 - Screw Thread Metrology
Lecture 19 - Gear Measurement
Lecture 20 - Miscellaneous Measurements
NPTEL Video Course - Mechanical Engineering - NOC: Financial Mathematics

Subject Co-ordinator - Dr. Pradeep K. Jha
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial Mathematics
Lecture 2 - Important Mathematical Functions and its Characteristics
Lecture 3 - Progressions and Series, Growth and Decay Curves
Lecture 4 - Statistical Measures
Lecture 5 - Problem Solving on Mathematical Functions and Statistical Measures
Lecture 6 - Interest and Interest Rate, Time Value of Money
Lecture 7 - Simple Discount, Focal Date and Equation of Value
Lecture 8 - Introduction to Bank Discount
Lecture 9 - Introduction to Compound Interest
Lecture 10 - Problem Solving on Simple Interest and Bank Discount
Lecture 11 - Introduction to Discrete Compounding and Discrete Payments
Lecture 12 - Equal Payment Series and Gradient Series Factors
Lecture 13 - Geometric Gradient Series Factors
Lecture 14 - Annuities Due and Annuities Deferred
Lecture 15 - Problem Solving on Compounding Factors
Lecture 16 - Compounding Frequency of Interest
Lecture 17 - Interest Factors for Continuous Compounding
Lecture 18 - Introduction to Economic Equivalence
Lecture 19 - Principles of Equivalence
Lecture 20 - Problem Solving on Compounding Frequency and Economic Equivalence
Lecture 21 - Methods of Comparison of Alternatives
Lecture 22 - Payback Period
Lecture 23 - Capitalized Equivalent and Capital Recovery with Return
Lecture 24 - Project Balance
Lecture 25 - Problem Solving on Alternatives Comparison and Project Balance
Lecture 26 - Analysis of Credit and Loans
Lecture 27 - Assessing Interest and Structured Payments in Loans
Lecture 28 - Introduction to Cost of Credit and Amortization
Lecture 29 - Analysis of Amortization Schedule

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Lecture 30 - Graduated Payment Mortgage, Sinking Funds
Lecture 31 - Introduction to Depreciation and Depletion
Lecture 32 - Types of Depreciation
Lecture 33 - Tax Depreciation Methods
Lecture 34 - SOD and UOP Method of Depreciation, Depletion
Lecture 35 - Problem Solving on Depreciation and Depletion
Lecture 36 - Introduction to Break-Even Analysis
Lecture 37 - Analysis of Break-Even Time and Dual Break-Even Points
Lecture 38 - Economic Order Quantity
Lecture 39 - Introduction to Leverage
Lecture 40 - Financial Leverage and Total Leverage
Lecture 41 - Introduction to Stocks
Lecture 42 - Stock Valuation
Lecture 43 - Two Stage Dividend Growth and Preferred Stocks
Lecture 44 - Introduction to Bonds
Lecture 45 - Bond Premium and Discount, Bond Purchase
Lecture 46 - Introduction to Mutual funds
Lecture 47 - Performance Measures
Lecture 48 - Options
Lecture 49 - Option Valuation
Lecture 50 - Introduction to Cost of Capital and Ratio Analysis
Lecture 51 - Introduction to Risk Measurement
Lecture 52 - Decision-Making Under Risk
Lecture 53 - Decision Under Uncertainty
Lecture 54 - Risk Premium, Portfolio Return and Risk
Lecture 55 - Portfolio Diversification
Lecture 56 - Introduction to Insurance, Mortality Table
Lecture 57 - Pure Endowment and Life Annuities
Lecture 58 - Introduction to Life Insurance
Lecture 59 - Types of Life Insurance Policies
Lecture 60 - Reserve Funds, Property and Casualty Insurance
NPTEL Video Course - Mechanical Engineering - NOC: Product Design Using Value Engineering

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction to Product Design and Development
Lecture 2 - Product Design Steps and Product Analysis
Lecture 3 - Profit Consideration
Lecture 4 - Value Engineering (VE) History, Concept and Definitions
Lecture 5 - Value Engineering vs Cost Cutting
Lecture 6 - Creative Thinking
Lecture 7 - Problem Identification and VEJP
Lecture 8 - Types of Product Functions
Lecture 9 - Functional Analysis
Lecture 10 - Functional Analysis System Technique
Lecture 11 - Function-Cost Relationship - I
Lecture 12 - Function-Cost Relationship - II
Lecture 13 - VE Applications in Product Design
Lecture 14 - Value Engineering
Lecture 15 - Value Engineering
Lecture 16 - VE Tools and Techniques - I
Lecture 17 - VE Tools and Techniques - II
Lecture 18 - VE Success Stories - I
Lecture 19 - VE Success Stories - II
Lecture 20 - Behavioral Roadblocks
NPTEL Video Course - Mechanical Engineering - NOC:Selection of Nanomaterials for Energy Harvesting and Storage

Subject Co-ordinator - Prof. Kaushik Pal
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Solar Energy Harvesting
Lecture 3 - Perovskite Solar Cells
Lecture 4 - Solar Thermal Energy
Lecture 5 - Heat Transfer Fluids
Lecture 6 - Hydrogen Energy
Lecture 7 - Hydrogen Production from Thermochemical Process
Lecture 8 - Hydrogen Production from Electrolysis
Lecture 9 - Photo-electrochemical Production of Hydrogen Using Solar Energy
Lecture 10 - Hydrogen Production from Biological Process
Lecture 11 - Nanogenerators
Lecture 12 - Triboelectric Nanogenerators
Lecture 13 - Pyroelectric Nanogenerators
Lecture 14 - Thermoelectric Nanogenerators and Electromagnetic generators
Lecture 15 - Other Energy Resources
Lecture 16 - Energy Storage
Lecture 17 - Electrochemical Energy Storage (Batteries)
Lecture 18 - Supercapacitors
Lecture 19 - Hydrogen Storage
Lecture 20 - Thermal Energy Storage

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Lecture 30 - Neural Control of a Hand Exoskeleton Based on Human Subject’s Intention
Lecture 31 - Robot Assisted Percutaneous Interventions
Lecture 32 - Experiments on Robot Assisted Percutaneous Interventions
Lecture 33 - Sliding Mode Control
Lecture 34 - Higher Order Sliding Mode Control
Lecture 35 - Smart Needles for Percutaneous Interventions - I
Lecture 36 - Smart Needles for Percutaneous Interventions - II
Lecture 37 - Flexible Link Kinematics - I
Lecture 38 - Flexible Link Kinematics - II
Lecture 39 - Model Based Control of Robot Manipulators
Lecture 40 - Simulation of Robot Manipulators
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC: Acoustic Metamaterials

Subject Co-ordinator - Prof. Sneha Singh
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

| Lecture 1 - Introduction |
| Lecture 2 - Sound Wave Propagation in Fluid - I |
| Lecture 3 - Sound Wave Propagation in Fluid - II |
| Lecture 4 - Sound Wave Propagation in Fluid - III |
| Lecture 5 - Sound Propagation at Medium Boundaries - I |
| Lecture 6 - Sound Propagation at Medium Boundaries - II |
| Lecture 7 - Standing Waves and Modes |
| Lecture 8 - Sound Signal Analysis - I |
| Lecture 9 - Sound Signal Analysis - II |
| Lecture 10 - Principles of Noise Control |
| Lecture 11 - Acoustic Materials |
| Lecture 12 - Enclosures |
| Lecture 13 - Barriers |
| Lecture 14 - Enclosures and Barriers - Tutorial |
| Lecture 15 - Sound Absorbing Materials |
| Lecture 16 - Porous-Fibrous Sound Absorbers |
| Lecture 17 - Panel Sound Absorbers |
| Lecture 18 - Helmholtz Resonators |
| Lecture 19 - Tutorial on Sound Absorbers |
| Lecture 20 - Perforated Panel Absorbers |
| Lecture 21 - Microperforated Panel Absorbers - 1 |
| Lecture 22 - Microperforated Panel Absorbers - 2 |
| Lecture 23 - Microperforated Panel Absorbers - 3 |
| Lecture 24 - Introduction to Acoustic Metamaterials - 1 |
| Lecture 25 - Introduction to Acoustic Metamaterials - 2 |
| Lecture 26 - History of Acoustic Metamaterials |
| Lecture 27 - Applications of Acoustic Metamaterials |
| Lecture 28 - Membrane Type Acoustic Metamaterials - 1 |
| Lecture 29 - Membrane Type Acoustic Metamaterials - 2 |

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Lecture 30 - Membrane Type Acoustic Metamaterials - 3
Lecture 31 - Membrane Type Acoustic Metamaterials - 4
Lecture 32 - Advantages and Applications of Membrane Type AMM
Lecture 33 - Tutorial on Membrane Type AMM
Lecture 34 - Introduction to Sonic Crystals
Lecture 35 - Fundamentals of Crystals
Lecture 36 - Principle of Working of Sonic Crystals - 1
Lecture 37 - Principle of Working of Sonic Crystals - 2
Lecture 38 - Tutorial on Sonic Crystals
Lecture 39 - More on Sonic Crystals and Conclusions
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Power Plant Engineering

Subject Co-ordinator - Prof. Ravi Kumar
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Scenario and Basic Concepts
Lecture 2 - Steam Power Plant Cycle
Lecture 3 - Fossil Fuel Steam Generator - I
Lecture 4 - Fossil Fuel Steam Generator - II
Lecture 5 - Mountings and Accessories - I
Lecture 6 - Mountings and Accessories - II
Lecture 7 - Boiler Performance
Lecture 8 - Coal Properties
Lecture 9 - Coal Handling
Lecture 10 - Problem Solving - I
Lecture 11 - Burning of Fuel
Lecture 12 - Ash Handling
Lecture 13 - Feed Water Treatment
Lecture 14 - Steam Turbines
Lecture 15 - Impulse Steam Turbines
Lecture 16 - Impulse-Reaction Steam Turbines
Lecture 17 - Energy Losses in Steam Turbines
Lecture 18 - Steam Condensers
Lecture 19 - Gas Turbines
Lecture 20 - Problem Solving - II
Lecture 21 - Hydroelectric power plant
Lecture 22 - Hydro plants and forces on plates
Lecture 23 - Hydro Turbines - I
Lecture 24 - Hydro Turbines - II
Lecture 25 - Problem solving - III
Lecture 26 - Principles of nuclear energy
Lecture 27 - Nuclear power plants - I
Lecture 28 - Nuclear power plants - II
Lecture 29 - Combined operations

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Lecture 30 - Solar radiations
Lecture 31 - Solar thermal power
Lecture 32 - Wind energy
Lecture 33 - Wave and geothermal energy
Lecture 34 - Photo-voltaic conversion
Lecture 35 - Problem solving - IV
Lecture 36 - Direct energy conversion
Lecture 37 - Instrumentation in power plant
Lecture 38 - Economic of power generation
Lecture 39 - Environmental aspects of power generation
Lecture 40 - Problem solving - V
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Principles of Industrial Engineering

Subject Co-ordinator - Prof. D K Dwivedi
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Tool of IE and Organizational Structure
Lecture 5 - Organisational Structure
Lecture 6 - Organizational Structure
Lecture 7 - Organizational Structure
Lecture 8 - Organizational Structure
Lecture 9 - Organizational Structure
Lecture 10 - Organizational Structure and Culture
Lecture 11 - Organizational Structure
Lecture 12 - Plant Location and Layout
Lecture 13 - Plant Location and Layout
Lecture 14 - Plant Location and Layout
Lecture 15 - Plant Location and Layout
Lecture 16 - Plant Location and Layout
Lecture 17 - Plant Location and Layout
Lecture 18 - Plant Layout
Lecture 19 - Plant Layout
Lecture 20 - Plant Layout
Lecture 21 - Plant Layout
Lecture 22 - Plant Layout
Lecture 23 - Plant Layout
Lecture 24 - Organization of Facility
Lecture 25 - Organization of Facility and Material Handling
Lecture 26 - Material Handling
Lecture 27 - Production Planning and Control
Lecture 28 - Production Planning and Control
Lecture 29 - Production Planning and Control

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Lecture 30 - Production Planning and Control
Lecture 31 - Production Planning and Control
Lecture 32 - Production Planning and Control
Lecture 33 - Production Planning and Control
Lecture 34 - Production Planning and Control
Lecture 35 - Production Planning and Control
Lecture 36 - Inventory
Lecture 37 - Inventory
Lecture 38 - Inventory
Lecture 39 - Inventory
Lecture 40 - Inventory
Lecture 41 - Project Management and Network Modelling
Lecture 42 - Network Modelling
Lecture 43 - Network Analysis
Lecture 44 - Network Analysis
Lecture 45 - Network Analysis
Lecture 46 - Network Analysis
Lecture 47 - Forecasting
Lecture 48 - Forecasting
Lecture 49 - Forecasting
Lecture 50 - Forecasting
Lecture 51 - Forecasting
Lecture 52 - Forecasting
Lecture 53 - Quality Control
Lecture 54 - Quality Control
Lecture 55 - Quality Control
Lecture 56 - Quality Control
Lecture 57 - Quality Control
Lecture 58 - Quality Control
Lecture 59 - Quality Control
Lecture 60 - Productivity and Work Study
Lecture 30 - Finite Element for Structures with Piezoelectric Materials
Lecture 31 - Semiconductor Device Physics
Lecture 32 - BJT and MOSFET Characteristics and Op-Amps
Lecture 33 - Op-Amp Circuits and Signal conditioning for Microsystems Devices
Lecture 34 - Control and Microsystems
Lecture 35 - Vibration Control of a Beam
Lecture 36 - Signal Conditioning Circuits and Integration of Microsystems and Microelectronics
Lecture 37 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 38 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 39 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 40 - Capacitive Micro-accelerometer
Lecture 30 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdmann corner conditions - Part I
Lecture 31 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdmann corner conditions - Part II
Lecture 32 - Variational (energy) methods in statics; principles of minimum potential energy and virtual work
Lecture 33 - General framework of optimal structural designs - Part I
Lecture 34 - General framework of optimal structural designs - Part II
Lecture 35 - Optimal structural design of bars and beams using the optimality criteria method
Lecture 36 - Invariants of Euler-Lagrange equations and canonical forms
Lecture 37 - Noether's theorem
Lecture 38 - Minimum characterization of Sturm-Liouville problems
Lecture 39 - Rayleigh quotient for natural frequencies and mode shapes of elastic systems
Lecture 40 - Stability analysis and buckling using calculus of variations
Lecture 41 - Strongest (most stable) column
Lecture 42 - Dynamic compliance optimization
Lecture 43 - Electro-thermal-elastic structural optimization
Lecture 44 - Formulating the extremization problem starting from the differential equation, self-adjointness
NPTEL Video Course - Mechanical Engineering - NOC:Compliant Mechanisms: Principles and Design

Subject Co-ordinator - Prof. G. K. Ananthasuresh
Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Overview
Lecture 2 - Spirit of compliant design
Lecture 3 - A glimpse of applications
Lecture 4 - Mobility and degrees of freedom in compliant mechanisms
Lecture 5 - Maxwell’s rule and Grübler’s formula
Lecture 6 - Using compatibility and force equilibrium matrices to identify degrees of freedom and states of stress
Lecture 7 - Empirical formula for flexure joints
Lecture 8 - Types of elastic pairs (flexures)
Lecture 9 - Linear finite element analysis of compliant mechanisms with beam elements
Lecture 10 - A compliant mechanism kit
Lecture 11 - Linear and nonlinear finite element analyses using continuum elements
Lecture 12 - Subtleties in finite element analysis: geometric nonlinearity and contact
Lecture 13 - Deformation of a cantilever under a tip-load, using elliptic integrals
Lecture 14 - Elliptic integrals and their use in elastica analysis
Lecture 15 - Frisch-Fay’s approach to large deformation of beam
Lecture 16 - Burns-Crossley’s kinematic model
Lecture 17 - Howell-Midha’s elastic model
Lecture 18 - Putting together the pseudo rigid-body model
Lecture 19 - Modeling a partially compliant mechanism
Lecture 20 - Kinematic coefficients of a four-bar linkage with and without springs
Lecture 21 - Solving equations of PRB modeling and comparing with finite element analysis
Lecture 22 - Loop-closure equations for PRB models of compliant mechanisms
Lecture 23 - Burmester theory for compliant mechanisms
Lecture 24 - PRB-based Synthesis Examples
Lecture 25 - Structural optimization approach
Lecture 26 - Early works on design for compliance
Lecture 27 - Design for deflection of trusses
Lecture 28 - Design for deflection of beams and frames
Lecture 29 - Design of elastic continua for desired deflection

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Lecture 30 - Continuum element-based topology optimization of compliant mechanisms
Lecture 31 - YinSyn; synthesis of nonlinear responses with compliant mechanisms
Lecture 32 - Five different formulations for compliant mechanism design and some benchmark problems
Lecture 33 - Distributed compliance
Lecture 34 - How to achieve distributed compliance
Lecture 35 - Shape optimization
Lecture 36 - Cam-flexure clamp-case-study
Lecture 37 - SL model for compliant mechanisms
Lecture 38 - Feasibility maps for compliant mechanisms
Lecture 39 - Selection of compliant mechanisms for given user-specifications
Lecture 40 - Two case-studies using feasibility maps technique
Lecture 41 - SML model for compliant mechanisms for dynamic response
Lecture 42 - Re-design of compliant mechanisms; Matlab and Java codes
Lecture 43 - Non-dimensional analysis of beams
Lecture 44 - Deformation index and slenderness ratio of compliant mechanisms
Lecture 45 - Kinetoelastostatic maps
Lecture 46 - Designing with kinetoelastic maps
Lecture 47 - Non-dimensionalization of stress, frequency, and other measures
Lecture 48 - Designing compliant suspensions using kinetoelastic maps
Lecture 49 - Instant centre method for designing compliant mechanisms
Lecture 50 - Stiffness and compliance ellipsoids
Lecture 51 - Building block method of designing compliant mechanisms
Lecture 52 - Comparative analysis of different methods for designing compliant mechanisms
Lecture 53 - Aspects of Mechanical advantage of compliant mechanisms
Lecture 54 - Mechanical advantage of rigid-body and compliant mechanisms
Lecture 55 - Bistability in elastic systems
Lecture 56 - Bistability in elastic systems
Lecture 57 - Analysis of bistable arches
Lecture 58 - Compliant mechanisms with bistable arches
Lecture 59 - Static balancing and zero-free-length springs
Lecture 60 - Static balance of a compliant mechanism using a linkage
Lecture 61 - Static balancing method for compliant mechanisms
Lecture 62 - A catalogue of compliant mechanisms
Lecture 63 - Compliant suspension mechanism in microsystems (MEMS)
Lecture 64 - Micromechanical signal processors using compliant mechanisms
Lecture 65 - A few special concepts of compliant mechanisms
Lecture 66 - Materials and prototyping of compliant mechanisms
Lecture 67 - Static balancing method for compliant mechanisms
Lecture 68 - Summary of the course
Lecture 69 - Micromachined accelerometers with Displacement-amplifying Compliant Mechanisms (DaCMs)
Lecture 70 - Miniature compliant mechanisms as cell-manipulation tools

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Lecture 69 - Micro-newton force sensor
Lecture 70 - Compliant tissue cutting mechanism
Lecture 71 - A compliant pipe-crawling robots
Lecture 72 - A compliant easy-chair for the elderly
Lecture 30 - Heat transfer and transport processes in sessile droplets
Lecture 31 - Introduction to atomization
Lecture 32 - Atomization principles and governing parameters
Lecture 33 - Spray / droplet breakup models I (TAB model)
Lecture 34 - Spray / droplet breakup models II (WAVE model)
Lecture 35 - Droplet combustion I
Lecture 36 - Droplet combustion II
Lecture 37 - Regimes in spray combustion
Lecture 38 - Boiling I
Lecture 39 - Boiling II (Bubble dynamics)
Lecture 40 - Boiling II (Bubble dynamics and critical heat flux)
Lecture 1 - Introduction to convective heat transfer
Lecture 2 - Governing equations I - Momentum Conservation
Lecture 3 - Governing equations II - Energy Conservation
Lecture 4 - Introduction to external forced convection
Lecture 5 - Scaling Analysis - Momentum
Lecture 6 - Scaling Analysis - Energy I
Lecture 7 - Scaling Analysis - Energy II
Lecture 8 - Similarity solution - Momentum
Lecture 9 - Similarity solution - Energy
Lecture 10 - Integral solutions - Momentum
Lecture 11 - Integral solutions - Energy
Lecture 12 - Suction and Blowing
Lecture 13 - Falkner-Skan solution
Lecture 14 - Arbitrary Wall temperature
Lecture 15 - Internal forced convection - Developing flow
Lecture 16 - Hydrodynamic fully developed flow
Lecture 17 - Mean temperature in fully developed flow
Lecture 18 - Uniform heat flux
Lecture 19 - Uniform wall temperature
Lecture 20 - Tube surrounded by isothermal flow
Lecture 21 - Heat transfer to fully developed flow - I
Lecture 22 - Heat transfer to fully developed flow - II
Lecture 23 - Laminar slug flow
Lecture 24 - Power law fluids
Lecture 25 - Forced convection - Tutorial I
Lecture 26 - Forced convection - Tutorial II
Lecture 27 - Forced convection - Tutorial III
Lecture 28 - Introduction to external natural convection
Lecture 29 - Scaling analysis - I
Lecture 30 - Scaling analysis - II
Lecture 31 - Integral solution
Lecture 32 - Similarity solution
Lecture 33 - Uniform wall heat flux
Lecture 34 - Thermal stratification
Lecture 35 - Mixed convection
Lecture 36 - Internal natural convection - Scaling analysis
Lecture 37 - Heat transfer regimes
Lecture 38 - Regime III
Lecture 39 - Regime IV - Shallow enclosure limit - I
Lecture 40 - Regime IV - Shallow enclosure limit - II
Lecture 41 - Partially divided enclosures
Lecture 42 - Inclined enclosures
Lecture 43 - Natural convection - Tutorial I
Lecture 44 - Natural convection - Tutorial II
Lecture 45 - Introduction to Turbulence
Lecture 46 - Reynold's Averaged Navier Stokes equation - I
Lecture 47 - Reynold's Averaged Navier Stokes equation - II
Lecture 48 - Turbulent boundary layer - Viscous sub layer
Lecture 49 - Turbulent boundary layer - Fully turbulent sub layer
Lecture 50 - Heat transfer in turbulent boundary layer
Lecture 51 - Turbulent internal flow - I
Lecture 52 - Turbulent internal flow - II
Lecture 53 - Turbulent internal flow - III
Lecture 54 - K - Îµ model
Lecture 55 - Turbulence - Tutorial
Lecture 56 - Experimental techniques - Thermochromic liquid crystals
Lecture 57 - Experimental techniques - IR thermography
Lecture 58 - Droplet evaporation - Sessile I
Lecture 59 - Droplet evaporation - Sessile II
Lecture 60 - Droplet evaporation - Contact free
NPTEL Video Course - Mechanical Engineering - NOC:A Short Lecture series on Contour Integration in the Complex Plane

Subject Co-ordinator - Prof. Venkata Sonti

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Introduction to complex variables
Lecture 2 - Cauchy Riemann Equations
Lecture 3 - Analytic Functions
Lecture 4 - Simple definitions
Lecture 5 - Definition of sets, domains, theorem on antiderivative
Lecture 6 - Cauchy Goursat Theorem
Lecture 7 - Implications of Cauchy Goursat Theorem, Cauchy Integral Formula
Lecture 8 - Implications of CIF, converse of CG theorem
Lecture 9 - Examples in contour integrals, ratios of polynomials
Lecture 10 - Contour integration of sinc function
Lecture 11 - Method of path deformation
Lecture 12 - Method of path deformation (Continued...)
Lecture 13 - Infinite and finite branch cuts
Lecture 14 - Finite Branch Cut
Lecture 15 - Infinite branch cut example
Lecture 16 - Contour integration
Lecture 17 - Finite square root branch cut
Lecture 18 - Example on finite branch cut
Lecture 19 - Pole on a branch cut
Lecture 20 - L shaped branch cut
Lecture 21 - L shaped branch cut continued
Lecture 22 - Inverse Laplace Transform
Lecture 23 - Inverse Laplace Transform (Continued...)
Lecture 24 - Additional material or corrections to lectures
Lecture 25 - Summary of the total course
NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Soft Matter

Subject Co-ordinator - Prof. Alok Kumar
Co-ordinating Institute - IISc - Bangalore

Lecture 1 - Introduction
Lecture 2 - Deborah number
Lecture 3 - Response of Elastic solid
Lecture 4 - Response of Viscous fluid
Lecture 5 - Viscoelastic material
Lecture 6 - Creep and stress relaxation
Lecture 7 - Creep and stress relaxation functions
Lecture 8 - Linearity
Lecture 9 - Mechanical Analogues
Lecture 10 - Tutorial
Lecture 11 - Atoms and bonds
Lecture 12 - Interatomic bonds
Lecture 13 - Polymers
Lecture 14 - Polymers (Continued...)
Lecture 15 - Polymers (Continued...)
Lecture 16 - Freely jointed model
Lecture 17 - Constitutive equations
Lecture 18 - Constitutive equations (Continued...)
Lecture 19 - Constitutive equations (Continued...)
Lecture 20 - Viscoelastic effects
Lecture 21 - Lab Session
Lecture 22 - Polymer concentrations
Lecture 23 - Lagrangian and Eulerian perspectives
Lecture 24 - Maxwell model
Lecture 25 - Maxwell model (Continued...)
Lecture 26 - Kelvin-Meyer-Voigt model
Lecture 27 - Three parameter model
Lecture 28 - Three parameter model (Continued...)
Lecture 29 - Three parameter model (Continued...)

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Lecture 30 - Jeffrey's model
Lecture 31 - Two Maxwell model
Lecture 32 - N-Maxwell model
Lecture 33 - N-Maxwell model (Continued...)
Lecture 34 - N-Kelvin Meyer Voigt model
Lecture 35 - Constitutive modelling
Lecture 36 - Objectivity
Lecture 37 - Objectivity
Lecture 38 - Sinusoidal oscillations
Lecture 39 - Sinusoidal oscillations (Continued...)
Lecture 40 - Sinusoidal oscillations (Continued...)
Lecture 41 - Summary
Lecture 42 - Tutorial
Lecture 43 - Tutorial (Continued...)