NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Field Modelling: The Materials Science, Math

Subject Co-ordinator - Dr. M.P. Gururajan

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Module 5
Lecture 31 - Module 5
Lecture 32 - Module 6
Lecture 33 - Module 6
Lecture 34 - Module 6
Lecture 35 - Module 6
Lecture 36 - Module 7
Lecture 37 - Module 7
Lecture 38 - Module 8
Lecture 39 - Module 8
Lecture 40 - Module 8
Lecture 41 - Module 8
Lecture 42 - Module 9
Lecture 43 - Module 9
Lecture 44 - Module 9
Lecture 45 - Module 9
Lecture 46 - Module 10
Lecture 47 - Module 10
Lecture 48 - Module 10
Lecture 49 - Module 10
Lecture 50 - Module 10
Lecture 51 - Module 11
Lecture 52 - Module 11
Lecture 53 - Module 11
Lecture 54 - Module 11
Lecture 55 - Module 12
Lecture 56 - Module 12
Lecture 57 - Module 12
Lecture 58 - Module 12
Lecture 59 - Module 12
Lecture 60 - Module 13
Lecture 61 - Module 13
Lecture 62 - Module 13
Lecture 63 - Module 13
Lecture 64 - Module 13
Lecture 65 - Module 14
Lecture 66 - Module 14
Lecture 67 - Module 14
Lecture 68 - Module 14

Lecture 69 - Module 15
Lecture 70 - Module 15
Lecture 71 - Module 16
Lecture 72 - Module 16
Lecture 73 - Module 16
Lecture 74 - Module 16
Lecture 75 - Module 17
Lecture 76 - Module 17
Lecture 77 - Module 18
Lecture 78 - Module 18
Lecture 79 - Module 18
Lecture 80 - Module 18
Lecture 81 - Module 19
Lecture 82 - Module 19
Lecture 83 - Module 20
Lecture 84 - Module 20
Lecture 85 - Module 21
Lecture 86 - Module 21
Lecture 87 - Module 22

NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Materials Science and Engineering

Subject Co-ordinator - Prof. Rajesh Prasad

Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Intoduction
Lecture 2 - Crystal geometry
Lecture 3 - Unit cell
Lecture 4 - Classification of lattices
Lecture 5 - Gaps in Bravais lattice list
Lecture 6 - Symmetry - I
Lecture 7 - Symmetry - II
Lecture 8 - Classification of lattices on the basis of symmetry
Lecture 9 - A symmetry based approach to Bravais lattices
Lecture 10 - Miller indices of directions
Lecture 11 - Miller indices for planes
Lecture 12 - Miller indices for plane and its normal in Cubic Crystal
Lecture 13 - Weiss Zone law and its applications
Lecture 14 - Inter-planar spacing
Lecture 15 - Braggâ s Law
Lecture 16 - Close-packing of hard spheres
Lecture 17 - Hexagonal Close-Packed (HCP) structure
Lecture 18 - Lattice and motif of HCP crystals
Lecture 19 - c/a ratio of an ideal HCP crystal
Lecture 20 - ABCABC stacking of close-packed spheres
Lecture 21 - Voids in close-packed structures
Lecture 22 - Solid solutions - I
Lecture 23 - Solid solutions - II
Lecture 24 - Hume-Rothery rules
Lecture 25 - Ordered and disordered solid solutions
Lecture 26 - Graphene
Lecture 27 - Structure of graphite
Lecture 28 - Structure of diamond
Lecture 29 - Carbon nanotubes (CNT)

Lecture 69 - Phases present in the system
Lecture 70 - Composition of phases present in the system
Lecture 71 - Proportion of phases present in the system
Lecture 72 - Microstructure evolution during solidification in isomorphous systems
Lecture 73 - Eutectic system
Lecture 74 - Eutectic reaction
Lecture 75 - Eutectic, hypoeutectic and hypereutectic alloys
Lecture 76 - Gibbsâ phase rule
Lecture 77 - Fe-C phase diagram
Lecture 78 - Eutectoid, hypoeutectoid and hypereutectoid steels
Lecture 79 - Microstructure of a hypoeutectoid steel
Lecture 80 - Microstructure of a hypereutectoid steel
Lecture 81 - Diffusion
Lecture 82 - Fickâ s first law
Lecture 83 - Fickâ s second law
Lecture 84 - Error function solution of Fickâ s second law
Lecture 85 - Atomic mechanisms of diffusion
Lecture 86 - Substitutional diffusion revisited
Lecture 87 - Diffusion paths
Lecture 88 - Steady and unsteady state diffusion
Lecture 89 - Phase Transformation
Lecture 90 - Nucleation
Lecture 91 - Nucleation and capillary rise
Lecture 92 - Nucleation, growth and overall transformation
Lecture 93 - Time-temperature-transformation (TTT) diagram
Lecture 94 - Homogeneus and heterogeneous nucleation
Lecture 95 - Heat treatment of steels
Lecture 96 - TTT diagram of Eutectoid Steels
Lecture 97 - Quenching and martensite
Lecture 98 - Austempering and bainite
Lecture 99 - Tempering
Lecture 100 - Residual stresses and Quench cracks
Lecture 101 - Marquenching and martempering
Lecture 102 - TTT diagram of hypoeutectoid and hypereutectoid steels
Lecture 103 - TTT diagram of alloy steel
Lecture 104 - hardenability of steels
Lecture 105 - Glass Ceramics
Lecture 106 - Tensile test
Lecture 107 - Plastic deformation and crystal structure

Lecture 147 - Sub-Critical crack growth

NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Crystal Elasticity and Crystal Pla

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

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

NPTEL Video Course - Metallurgy and Material Science - Advanced Characterization Techniques

Subject Co-ordinator - Dr. Krishanu Biswas, Prof.N.P.Gurao

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Advanced Characterization Techniques
Lecture 31 - Advanced Characterization Techniques
Lecture 32 - Advanced Characterization Techniques
Lecture 33 - Advanced Characterization Techniques

NPTEL Video Course - Metallurgy and Material Science - Electroceramics

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41

NPTEL Video Course - Metallurgy and Material Science - Fuels Refractory and Furnaces

Subject Co-ordinator - Prof. Satish Ch. Koria

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Transport Phenomena in Furnaces
Lecture 31 - Transport Phenomena in Furnaces
Lecture 32 - Steady Heat flows in Furnace and Heat Exchanger
Lecture 33 - Exercises on Heat Flow in Furnaces and Heat Exchangers
Lecture 34 - Exercises on Heat Flow in Furnaces and Heat Exchangers
Lecture 35 - Miscellaneous Topics
Lecture 36 - Miscellaneous Topics
Lecture 37 - Miscellaneous Topics
Lecture 38 - Miscellaneous topics
Lecture 39 - Furnace efficiency, Fuel Saving, Carbon Offset
Lecture 40 - Furnace efficiency, Fuel Saving, Carbon Offset

NPTEL Video Course - Metallurgy and Material Science - Introduction to Biomaterials

Subject Co-ordinator - Dr. Kantesh Balani, Dr. Birkamjit Basu

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Metallurgy and Material Science - Materials and Energy balance in Metallurgical Processe

Subject Co-ordinator - Prof. Satish Ch. Koria

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Metallurgy and Material Science - Optoelectronic Materials and Devices

Subject Co-ordinator - Prof. Deepak Gupta, Prof. Monica Katiyar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Conductivity of materials, Drudeâ s theory and its failures
Lecture 2 - Free electron theory
Lecture 3 - Free electron theory
Lecture 4 - Crystal structure, Reciprocal lattice I
Lecture 5 - Reciprocal lattice II, Brillouin zone and Braggâ s diffraction condition
Lecture 6 - Electrons in a crystal, Blochâ s electron
Lecture 7 - Free electron band diagrams in an empty lattice
Lecture 8 - Effect of periodic potential, Origin of band-gap through Kronig-Penny model
Lecture 9 - Electron dynamics
Lecture 10 - Conduction in relation to band diagrams
Lecture 11 - Semiconductor E-k diagrams and their material properties
Lecture 12 - Equilibrium carrier statistics in semiconductors
Lecture 13 - Equilibrium carrier statistics in semiconductors
Lecture 14 - Equilibrium carrier statistics in semiconductors
Lecture 15 - Doping in semiconductors
Lecture 16 - Equilibrium carrier statistics in semiconductors
Lecture 17 - Equilibrium carrier statistics in semiconductors
Lecture 18 - Semiconductor junctions in band-diagrams
Lecture 19 - Linear dielectric behavior
Lecture 20 - Non-linear dielectric behavior
Lecture 21 - Carrier recombination-generation - I
Lecture 22 - Carrier recombination-generation - II
Lecture 23 - R-G statistics via R-G centers
Lecture 24 - Optoelectronic materials and bandgap engineering
Lecture 25 - Optical properties of materials
Lecture 26 - Optical properties of single interfaces
Lecture 27 - Optical Properties of two interfaces
Lecture 28 - Drift
Lecture 29 - Diffusion

NPTEL Video Course - Metallurgy and Material Science - Steel Making

Subject Co-ordinator - Prof. Satish Ch. Koria, Prof. Dipak Mazumdar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41
Lecture 42

NPTEL Video Course - Metallurgy and Material Science - Structure of Materials

Subject Co-ordinator - Dr. Anandh Subramaniam

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Diffusion in Solids
Lecture 31 - Diffusion in Solids
Lecture 32 - Phase Diagrams
Lecture 33 - Phase Diagrams
Lecture 34 - Phase Diagrams
Lecture 35 - Phase Diagrams
Lecture 36 - Phase Diagrams
Lecture 37 - Phase Transformations
Lecture 38 - Phase Transformations
Lecture 39 - Phase Transformations
Lecture 40 - Phase Transformations
Lecture 41 - Phase Transformations
Lecture 42 - Phase Transformations
Lecture 43 - Phase Transformations
Lecture 44 - Phase Transformations
Lecture 45 - Phase Transformations

NPTEL Video Course - Metallurgy and Material Science - Environmental Degradation of Materials

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Erosion corrosion, Cavitation
Lecture 31 - Cavitation, Fretting corrosion, corrosion cracking
Lecture 32 - Stress corrosion cracking
Lecture 33 - Stress corrosion cracking
Lecture 34 - Biologically influenced corrosion, liquid metal attack
Lecture 35 - Corrosion protection, change of materials, effect of design of component
Lecture 36 - Corrosion protection, change of environment, Inhibitors, coatings
Lecture 37 - Oxidation and hot corrosion, pitting Bedworth ratio, thermodynamics of oxidation
Lecture 38 - Thermodynamics of oxidation, Ellingham diagram, oxidation kinetics and laws
Lecture 39 - Oxide structure and Oxidation
Lecture 40 - Hot corrosion, corrosion testing and failure analysis, linear polarization
Lecture 41 - Degradation of composites, polymers and ceramics, corrosion and society

NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Diagrams in Materials Science and Engineerir

Subject Co-ordinator - Dr. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Pearlite Transformation
Lecture 31 - Martensite Transformation - I
Lecture 32 - Martensite Transformation - II
Lecture 33 - Tempering of Martensite
Lecture 34 - Bainite Transformation
Lecture 35 - TTT curves for Steel
Lecture 36 - Cast Iron - I
Lecture 37 - Cast Iron - II
Lecture 38 - Ductile Iron and Nodular Iron
Lecture 39 - Malleable Iron
Lecture 40 - Alloyed Cast Iron
Lecture 41 - Phase Diagram for different Solid State Reaction
Lecture 42 - Phase Diagram of Ceramic
Lecture 43 - Ternary Phase Diagram - I
Lecture 44 - Ternary Phase Diagram - II
Lecture 45 - Ternary Phase Diagram and Tie Line Construction - I
Lecture 46 - Ternary Phase Diagram and Tie Line Construction - II
Lecture 47 - Ternary Phase Diagram and Tie Line Construction - III
Lecture 48 - Ternary Isomorphous Phase Diagram
Lecture 49 - Ternary Three Phase Equilibria
Lecture 50 - Three Phase Equilibria in Ternary Systems - I
Lecture 51 - Three Phase Equilibria in Ternary Systems - II
Lecture 52 - Solidification Behaviour of Ternary Alloy
Lecture 53 - Three Phase Equilibria
Lecture 54 - Ternary Four Phase Equilibria - I
Lecture 55 - Ternary Four Phase Equilibria - II
Lecture 56 - Solidification Behaviour of Ternary Eutectic Alloys
Lecture 57 - Phase Diagram of Ternary Eutectic with Terminal Solid Solution
Lecture 58 - Ternary Peritectic Reaction
Lecture 59 - Quasi-peritectic Reaction
Lecture 60 - Case Studies on Ternary Phase Diagrams - I
Lecture 61 - Case Studies on Ternary Phase Diagrams - II

NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of Material Processing - I

Subject Co-ordinator - Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Heat Treatment and Surface Hardening - I

Subject Co-ordinator - Dr. Kallol Mondal, Prof. Sandeep Sangal

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Interface controlled growth
Lecture 31 - Diffusion controlled growth
Lecture 32 - Avrami Kinetics - I
Lecture 33 - Avrami Kinetics - II
Lecture 34 - Avrami Kinetics - III
Lecture 35 - Time-Temperature-Transformation (TTT) diagram
Lecture 36 - Diffusion in Solids - I
Lecture 37 - Diffusion in Solids - II
Lecture 38 - Diffusion in Solids - III
Lecture 39 - Diffusion in Solids - IV
Lecture 40 - Applications of heat treatment

NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of Material Processing - Part 2

Subject Co-ordinator - Prof. Shashank Shekhar, Prof. Jitesh J Thakkar

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Nature and Properties of Materials - An Introducto

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Defects in Crystalline Solids - Part I

Subject Co-ordinator - Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Glide+Kinks
Lecture 31 - Cross-slip+Climb
Lecture 32 - Climb+Jogs
Lecture 33 - Examples on Jogs+Dislocation Intersection
Lecture 34 - Dislocation Intersection and step characteristics+Superjogs
Lecture 35 - Strain and strain-rate due to dislocation motion+Velocity of dislocations+Observation of disloca
Lecture 36 - Observation of dislocation (Continued...) + Dislocation Dynamics
Lecture 37 - Dislocations in FCC+Partial dislocations
Lecture 38 - Partial dislocations (Continued...) +Stacking Fault
Lecture 39 - Thompson's Tetrahedron+Examples
Lecture 40 - Dislocations in BCC+Asymmetry of Slip

NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion - Part I

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction to corrosion - I
Lecture 2 - Introduction to corrosion - II
Lecture 3 - Types and forms of corrosion
Lecture 4 - Uniform and Galvanic corrosion
Lecture 5 - Crevice and Pitting corrosion
Lecture 6 - Forms of corrosion
Lecture 7 - Electrochemical Nature of Corrosion and its Thermodynamics
Lecture 8 - Thermodynamics aspects of corrosion - I
Lecture 9 - Thermodynamics aspects of corrosion - II
Lecture 10 - Thermodynamics aspects ofcorrosion - III
Lecture 11 - Relation Between Free Energy and Equilibrium Constant
Lecture 12 - Derivation of Nernst Equation
Lecture 13 - Standard Reduction Potential Series for Pure Metals
Lecture 14 - Reduction Potentials in Acidic and Neutral Solutions
Lecture 15 - Nernst equation in terms of pH
Lecture 16 - Limitations of Standard Reduction Potential Series of Pure Metals
Lecture 17 - Concentration Cell Formation and Galvanic Series
Lecture 18 - Examples of Concentration cell and Spontaneity of Corrosion Process
Lecture 19 - Spontaneity of Corrosion Process and Introduction to Pourbaix Diagram
Lecture 20 - Construction of Pourbaix Diagram
Lecture 21 - Construction of Pourbaix diagram for Ni-H2O system - I
Lecture 22 - Construction of Pourbaix diagram for Ni-H2O system - II
Lecture 23 - Construction of Pourbaix diagram for Ni-H2O system - III
Lecture 24 - Pourbaix diagram of Ni-H2O and AI-H2O
Lecture 25 - Inferences from Pourbaix diagram of Fe-H2O and AI-H2O
Lecture 26 - Estimation of Corrosion Rate - I
Lecture 27 - Estimation of Corrosion Rate - II
Lecture 28 - Estimation of Corrosion Rate - III
Lecture 29 - Exchange Current Density

NPTEL Video Course - Metallurgy and Material Science - Advanced ceramics for strategic applications

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

Co-ordinating Institute - Central Glass and Ceramic Research Institute

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

NPTEL Video Course - Metallurgy and Material Science - Non-ferrous Extractive Metallurgy

Subject Co-ordinator - Prof. H.S. Ray, Mr. L. Pugazhenthy

Co-ordinating Institute - IIT - Kharagpur | India Lead Zine Development Association

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

NPTEL Video Course - Metallurgy and Material Science - Principles of Physical Metallurgy

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

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Metallurgy and Material Science - Processing of Semiconducting Materials

Subject Co-ordinator - Dr. Pallab Banerji

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Metal-Semiconductor Contact - II
Lecture 31 - Applications of Metal-Semiconductor Contact
Lecture 32 - Oxidation - I
Lecture 33 - Oxidation - II
Lecture 34 - Different Types of Semiconductor - I
Lecture 35 - Oxidation - I
Lecture 36 - Oxidation - II
Lecture 37 - Dielectric Films
Lecture 38 - Low - K and High - K materials
Lecture 39 - Metallization
Lecture 40 - Materials for Photovoltaics

NPTEL Video Course - Metallurgy and Material Science - Science and Technology of Polymers

Subject Co-ordinator - Prof. B. Adhikari

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Metallurgy and Material Science - Advanced Materials and Processes

Subject Co-ordinator - Prof. B.S. Murty

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Principles of Polymer Synthesis

Subject Co-ordinator - Prof. Rajat K Das

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Historical development of polymer science
Lecture 2 - Molecular Weight Determination Of Polymers
Lecture 3 - Molecular Weight Determination Of Polymers (Continued...)
Lecture 4 - Molecular Weight Determination of Polymers (Continued...)
Lecture 5 - Molecular Weight Determination of Polymers (Continued...)
Lecture 6 - Principles of step growth polymerization
Lecture 7 - Principles of step growth polymerization (Continued...)
Lecture 8 - Principles of step growth polymerization (Continued...)
Lecture 9 - Principles of step growth polymerization (Continued...)
Lecture 10 - Principles of step growth polymerization (Continued...)
Lecture 11 - Principles of radical chain polymerization
Lecture 12 - Principles of radical chain polymerization (Continued...)
Lecture 13 - Principles of radical chain polymerization (Continued...)
Lecture 14 - Principles of radical chain polymerization (Continued...)
Lecture 15 - Principles of radical chain polymerization (Continued...)
Lecture 16 - Principles of radical chain polymerization (Continued...)
Lecture 17 - Principles of Chain Copolymerization
Lecture 18 - Principles of Chain Copolymerization (Continued...)
Lecture 19 - Principles of Chain Copolymerization (Continued...)
Lecture 20 - Principles of Living Chain polymerization
Lecture 21 - Principles of Living Chain polymerization (Continued...)
Lecture 22 - Design of Chemical Reactors
Lecture 23 - Design of Chemical Reactors (Continued...)
Lecture 24 - Design of Chemical Reactors (Continued...)
Lecture 25 - Design of Chemical Reactors (Continued...)
Lecture 26 - Design of Chemical Reactors (Continued...)
Lecture 27 - Design of Chemical Reactors (Continued...)
Lecture 28 - Design of Chemical Reactors (Continued...)
Lecture 29 - Design of Chemical Reactors (Continued...)

NPTEL Video Course - Metallurgy and Material Science - NOC:Advanced Materials and Processes

Subject Co-ordinator - Prof. Jayanta Das

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 - Bulk Metallic Glass, Glassy and Amorphous Materials
Lecture 7 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 8 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 9 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 10 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 11 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 12 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 13 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 14 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 15 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 16 - Shape Memory Alloys
Lecture 17 - Shape Memory Alloys (Continued...)
Lecture 18 - Shape Memory Alloys (Continued...)
Lecture 19 - Shape Memory Alloys (Continued...)
Lecture 20 - Shape Memory Alloys (Continued...)
Lecture 21 - Shape Memory Alloys
Lecture 22 - Shape Memory Alloys
Lecture 23 - Shape Memory Alloys
Lecture 24 - Shape Memory Alloys
Lecture 25 - Shape Memory Alloys
Lecture 26 - Introduction of High Temperature Materials
Lecture 27 - Introduction of High Temperature Materials (Continued...)
Lecture 28 - Introduction of High Temperature Materials (Continued...)
Lecture 29 - Introduction of High Temperature Materials (Continued...)

NPTEL Video Course - Metallurgy and Material Science - Advanced Metallurgical Thermodynamics

Subject Co-ordinator - Prof. B.S. Murty

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Thermodynamics of heterogeneous systems
Lecture 31 - Thermodynamics of heterogeneous systems (Continued...)

NPTEL Video Course - Metallurgy and Material Science - Materials Characterization

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

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

Lecture 29 - Effect of crystallite size and strain on intensity of X-rays
Lecture 30 - Profile fit, Factors affecting peak brodening
Lecture 31 - Indexing of diffraction pattern, Quantitative analysis
Lecture 32 - Indexing, Quantitative analysis-continuation, Residual stress measurements
Lecture 33 - XRD and Residual stress measurement- lab demonstration
Lecture 34 - Introduction to Transmission Electron Microscopy (TEM)
Lecture 35 - Fundementals of Transmission Electron Microscopy (TEM)
Lecture 36 - Basics of Diffraction-1
Lecture 37 - Basics of Diffraction-2
Lecture 38 - TEM imaging-1
Lecture 39 - TEM imaging-2
Lecture 40 - TEM instrument demonstration
Lecture 41 - TEM sample preparation-1
Lecture 42 - TEM sample preparation-2
Lecture 43 - XRD Tutorial - 1
Lecture 44 - XRD tutorial - 2
Lecture 45 - TEM Tutorial - 1
Lecture 46 - TEM Tutorial - 2
Lecture 47 - Quantitative metallography - Tutorial 1
Lecture 48 - Quantitative metallography - Tutorial 2
Lecture 49 - Quantitative metallography - Tutorial 3
Lecture 50 - Quantitative metallography - Tutorial 4
Lecture 51 - Quantitative metallography - Tutorial 5
Lecture 52 - Quantitative metallography - Tutorial 6
Lecture 53 - Quantitative metallography - Tutorial 7

NPTEL Video Course - Metallurgy and Material Science - Physics of Materials

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Metallurgy and Material Science - Electronic materials, devices, and fabrication

Subject Co-ordinator - Prof. Parasuraman S

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - IC device manufacturing
Lecture 31 - Layering
Lecture 32 - Doping
Lecture 33 - Lithography
Lecture 34 - Etching and deposition (growth)
Lecture 35 - Metallization and polishing
Lecture 36 - Process and device evaluation
Lecture 37 - Productivity and process yield
Lecture 38 - Clean room design and contamination control
Lecture 39 - Devices and IC formation
Lecture 40 - IC circuit logic and packaging

NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of optical and scanning electron micr

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Properties of light, Image formation
Lecture 2 - Magnification and resolution
Lecture 3 - Depth of field, focus and field of view
Lecture 4 - Lens defects, filters and light microscopy introduction
Lecture 5 - Optical microscope demo., Bright field imaging, opaque specimen illumination
Lecture 6 - Opaque stop microscopy, Phase contrast microscopy
Lecture 7 - Dark field microscopy, Polarization microscopy
Lecture 8 - Differential interference contrast and fluorescence microscopy
Lecture 9 - Sample preparation techniques for optical microscopy
Lecture 10 - Tutorial problems
Lecture 11 - Tutorial problems (Continued...)
Lecture 12 - Introduction to scanning electron Microscopy
Lecture 13 - Lens aberrations, Object resolution, Image quality
Lecture 14 - Interaction between electrons and sample, Imaging capabilities, Structural analysis, Elemental a
Lecture 15 - SEM and its mode of operation, Effect of aperture size,Working distance,condenser lens strength
Lecture 16 - SEM and its mode of operation- continuation, Relation between probe current and probe diameter,
Lecture 17 - Factors affecting Interaction volume, Demonstration of SEM
Lecture 18 - Image formation and interpretation
Lecture 19 - Image formation and interpretation continued, EDS, WDS
Lecture 20 - Special contrast mechanisms, Monte Carlo simulations of Interaction volume
Lecture 21 - Electron channeling contrast imaging (ECCI), Electron back scattered diffraction (EBSD)-Theory &
Lecture 22 - Tutorial Problems on SEM

NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of electronic materials and devices

Subject Co-ordinator - Prof. Parasuraman S

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Electronic Materials
Lecture 2 - Semiconductors - Introduction
Lecture 3 - Electron statistics in a solid
Lecture 4 - Worked numericals on week 1 lessons
Lecture 5 - Intrinsic semiconductors
Lecture 6 - Intrinsic semiconductors - conductivity
Lecture 7 - Optional - worked assignment on intrinsic semiconductors
Lecture 8 - Extrinsic semiconductors - Introduction
Lecture 9 - Extrinsic semiconductors - Fermi level
Lecture 10 - Extrinsic semiconductors - Mobility
Lecture 11 - Worked assignment on extrinsic semiconductors
Lecture 12 - Metal-semiconductor junctions
Lecture 13 - pn junctions in equilibrium
Lecture 14 - Optional - worked assignment on metal-semiconductor junctions
Lecture 15 - pn junctions under bias
Lecture 16 - Junction breakdown and heterojunctions
Lecture 17 - Worked assignment on pn junctions
Lecture 18 - Transistors - overview
Lecture 19 - MOSFETs
Lecture 20 - Worked assignment on transistors
Lecture 21 - Optoelectronic devices - Introduction
Lecture 22 - Light emitting diodes
Lecture 23 - Solid state semiconductor lasers
Lecture 24 - Optional - worked assignment on optical properties
Lecture 25 - Photodetectors
Lecture 26 - Solar cells
Lecture 27 - Worked assignment on optoelectronic devices

NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Reciprocal Space and its use in Sc

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Analysis and Modeling of Welding

Subject Co-ordinator - Dr. G. Phanikumar

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Theory and Practice of Non Destructive Testing

Subject Co-ordinator - Dr. Ranjit Bauri

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Visual optical method
Lecture 2 - Dye Penetrant Testing - 1
Lecture 3 - Dye Penetrant Testing - 2
Lecture 4 - Dye Penetrant Testing - 3
Lecture 5 - Dye Penetrant Testing - 4
Lecture 6 - Magnetic particle testing - 1
Lecture 7 - Magnetic particle testing - 2
Lecture 8 - Magnetic particle testing - 3
Lecture 9 - Magnetic particle testing - 4
Lecture 10 - Magnetic particle testing - 5
Lecture 11 - Eddy current testing - 1
Lecture 12 - Eddy current testing - 2
Lecture 13 - Eddy current testing - 3
Lecture 14 - Eddy current testing - 4
Lecture 15 - Eddy current testing - 5
Lecture 16 - Ultrasonic testing - 1
Lecture 17 - Ultrasonic testing - 2
Lecture 18 - Ultrasonic testing - 3
Lecture 19 - Ultrasonic testing - 4
Lecture 20 - Ultrasonic testing - 5
Lecture 21 - Ultrasonic testing - 6
Lecture 22 - Ultrasonic testing - 7
Lecture 23 - Ultrasonic testing - 8
Lecture 24 - Ultrasonic testing - 9
Lecture 25 - Ultrasonic testing - 10
Lecture 26 - Acoustic Emission Testing - 1
Lecture 27 - Acoustic Emission Testing - 2
Lecture 28 - Acoustic Emission Testing - 3
Lecture 29 - Acoustic Emission Testing - 4

Lecture 30 - Acoustic Emission Testing - 5
Lecture 31 - Radiography - 1
Lecture 32 - Radiography - 2
Lecture 33 - Radiography - 3
Lecture 34 - Radiography - 4
Lecture 35 - Radiography - 5
Lecture 36 - Radiography - 6
Lecture 37 - Radiography - 7
Lecture 38 - Radiography - 8
Lecture 39 - Radiography - 9
Lecture 40 - Radiography - 10

NPTEL Video Course - Metallurgy and Material Science - NOC:Defects in Materials

Subject Co-ordinator - Prof. Sundararaman M

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Twinning - 2
Lecture 31 - Martensitic Transformation - 1
Lecture 32 - Martensitic Transformation - 2
Lecture 33 - Interfaces - 1
Lecture 34 - Interfaces - 2
Lecture 35 - Defect Interaction and Strength

NPTEL Video Course - Metallurgy and Material Science - NOC:Elementary Stereology for Quantitative Metallograp

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Welding of Advanced High Strength Steels for Autom

Subject Co-ordinator - Prof. Murugaiyan Amirthalingam

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Surface Engineering of Nanomaterials

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Material Science and Engineering

Subject Co-ordinator - Dr. Vivek Pancholi

Co-ordinating Institute - IIT - Roorkee

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

Lecture 30 - Strengthening mechanism - 2
Lecture 31 - Strengthening mechanism - 3
Lecture 32 - Strengthening mechanism - 4
Lecture 33 - Fracture
Lecture 34 - Fracture
Lecture 35 - Fatigue
Lecture 36 - Creep
Lecture 37 - NDT
Lecture 38 - Ceramics, polymers, composites
Lecture 39 - Electrical and magnetic properties
Lecture 40 - Alloy designation and properties

NPTEL Video Course - Metallurgy and Material Science - NOC:Structural Analysis of Nanomaterials

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Biomaterials for Bone Tissue Engineering Applicati

Subject Co-ordinator - Prof. Bikramjit Basu

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Polymers manufacturing
Lecture 31 - Additive manufacturing
Lecture 32 - HA-Ti-Toughness, Cell functionality
Lecture 33 - HA-CaTiO 3 development
Lecture 34 - HA- BaTiO 3 Functional Prop
Lecture 35 - HA-Ag antimicrob and cell viability
Lecture 36 - HA-ZnO, Cell fate and antimicrobial
Lecture 37 - Dental ceramics processing
Lecture 38 - Sr-based glass Ceramics
Lecture 39 - Acetabular socket (Compression mold)
Lecture 40 - ZTA femoral ball head fabrication

NPTEL Video Course - Metallurgy and Material Science - NOC:Iron Making

Subject Co-ordinator - Prof Govind S Gupta

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39 - Live Session