

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

NPTEL Video Course - Physics - NOC:Physics of Functional Materials and Devices

Subject Co-ordinator - Prof. Amreesh Chandra

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to solid state materials - From conventional to functional

Lecture 2 - Ceramics and Composites - I

Lecture 3 - Ceramics and Composites - II

Lecture 4 - Polymers

Lecture 5 - Introduction to Nanomaterials and functionality

Lecture 6 - Synthesis protocols - I

Lecture 7 - Synthesis protocols - II

Lecture 8 - Synthesis protocols - III

Lecture 9 - Crystal structure - I

Lecture 10 - Crystal structure - II

Lecture 11 - Crystal structure - III

Lecture 12 - Crystal imperfections

Lecture 13 - Alloys and Melts

Lecture 14 - Theory of Solids

Lecture 15 - Nearly free electron model

Lecture 16 - Bonds in molecules and solids

Lecture 17 - Transformations kinetics and reaction rates

Lecture 18 - Thermodynamics

Lecture 19 - Phase and phase transitions

Lecture 20 - Diffusion and various properties

Lecture 21 - Mechanical properties of solids

Lecture 22 - Thermal Properties of Solids

Lecture 23 - Negative and Zero Expansion Ceramics

Lecture 24 - Heat Capacity

Lecture 25 - Thermogravimetric (TGA) analysis

Lecture 26 - Introduction to magnetism and Magnetic properties of solids

Lecture 27 - From magnetic to multiferroic materials

Lecture 28 - Magnetic materials and their applications

Lecture 29 - Magnetism at nanoscale

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- Lecture 30 - GMR materials
- Lecture 31 - CMR materials
- Lecture 32 - Ferrofluids
- Lecture 33 - Spintronics and devices
- Lecture 34 - Introduction to the basic properties of liquids and melts
- Lecture 35 - Heat capacity and diffusion of liquids and melts
- Lecture 36 - Viscosity, electric and thermal conduction of liquids and melts
- Lecture 37 - Sensors
- Lecture 38 - Electrochemical Sensors
- Lecture 39 - Introduction to energy storage devices and basics of supercapacitors
- Lecture 40 - Supercapacitors - II
- Lecture 41 - Magnetic supercapacitors
- Lecture 42 - Battery - I
- Lecture 43 - Battery - II
- Lecture 44 - Solar Cells - I
- Lecture 45 - Solar Cells - II
- Lecture 46 - X-ray Diffraction (XRD)
- Lecture 47 - Fourier Transform Infrared Spectroscopy
- Lecture 48 - UV- Vis Spectroscopy
- Lecture 49 - Scanning and Transmission Electron Microscopy
- Lecture 50 - Summary