

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

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

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Introduction to the Course
- Lecture 2 - Basic Material Properties - Stress and Strain Tensor
- Lecture 3 - Normal and Shear Stress and Transformation of Axes
- Lecture 4 - Transformation of Axes and Principle Stresses
- Lecture 5 - True and Engineering Stress and Strain
- Lecture 6 - Illustration to True and Engineering Stress and Strain
- Lecture 7 - Tensor Notation of Strain
- Lecture 8 - Introduction to Elasticity and Elastic Properties
- Lecture 9 - Theory of Elasticity
- Lecture 10 - Atomic Basis of Elasticity
- Lecture 11 - Elasticity of Different Materials, Design of Composites
- Lecture 12 - Composites, Anelastic Behaviour
- Lecture 13 - Stress-Strain Curve and Anelasticity
- Lecture 14 - Mechanism of Anelasticity
- Lecture 15 - Relaxation Time and Damping Capacity
- Lecture 16 - Plastic Deformation of Materials
- Lecture 17 - True and Engineering Stress-Strain Curves
- Lecture 18 - Necking Phenomenon During Tension Test
- Lecture 19 - Microscopic Mechanism of Plastic Deformation
- Lecture 20 - Introduction to Slip
- Lecture 21 - Slip Systems
- Lecture 22 - Resolved Shear Stress
- Lecture 23 - Critical Resolved Shear Stress
- Lecture 24 - Theoretical Strength and Role of Dislocations
- Lecture 25 - Dislocations and Slip - I
- Lecture 26 - Dislocations and Slip - II
- Lecture 27 - Dislocations and Peirells Nabarro Stress
- Lecture 28 - Dislocation Generation
- Lecture 29 - Dislocations and Strengthening

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- Lecture 30 - Strain Hardening
- Lecture 31 - Grain Boundary Strengthening
- Lecture 32 - Solid Solution Strengthening
- Lecture 33 - Precipitation Hardening
- Lecture 34 - Electrical Conduction in Metals
- Lecture 35 - Free Electron Theory
- Lecture 36 - Fermi-Dirac Statistics and Electronic conductivity of Metals
- Lecture 37 - Fundamental of Semiconductors
- Lecture 38 - Band Theory
- Lecture 39 - Intrinsic Semiconductors
- Lecture 40 - Extrinsic Semiconductors