

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Mechanical Behavior of Materials (Hindi)

Subject Co-ordinator - Prof. Niraj Mohan Chawake

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Elasticity: Introduction Definition and Units
- Lecture 2 - Engineering Stress Strain Curve and Measures of Strength
- Lecture 3 - Measures of Ductility, UTS and Necking
- Lecture 4 - True Stress - True Strain Curve and Necking Criterion
- Lecture 5 - Atomistic Basis of Elasticity
- Lecture 6 - Stress at a point and Poisson's Ratio
- Lecture 7 - Normal Stresses and Shear Stresses
- Lecture 8 - Independence of stress components
- Lecture 9 - Plane stress transformation equations in 2D
- Lecture 10 - Mohr's Circle of stress
- Lecture 11 - Principal stresses and Principal planes
- Lecture 12 - Principal stresses in 3D and stress invariants
- Lecture 13 - Stress Tensor: Transformation and Hydrostatic and Deviatoric stress state
- Lecture 14 - Concept of Strain - Normal strain and shear strain
- Lecture 15 - State of Strain at a Point - Displacement, Rotation and Strain Tensors
- Lecture 16 - Elastic Constants and Elastic Stress - Strain Relations
- Lecture 17 - Anisotropy of Elastic Behavior
- Lecture 18 - Elastic Constants and Symmetry
- Lecture 19 - Yielding Criteria
- Lecture 20 - Atomistic Mechanisms of Yielding and Slip
- Lecture 21 - Resolved Shear Stress and Schmid's law
- Lecture 22 - Maximum Shear Strength of Crystalline Materials
- Lecture 23 - Dislocations: Edge and Screw
- Lecture 24 - Mixed Dislocation and Burgers Circuit
- Lecture 25 - Peierls-Nabarro Stress
- Lecture 26 - Geometrical Properties of Dislocations
- Lecture 27 - Dislocation Motions: Glide, Cross-Slip and Climb
- Lecture 28 - Plastic Strain and Dislocation Motion
- Lecture 29 - Forces on dislocations: Peach Kohler Equation

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- Lecture 30 - Stress Field around a Screw Dislocations
- Lecture 31 - Stress Field around an Edge Dislocation
- Lecture 32 - Strain Energy of a Dislocation
- Lecture 33 - Dislocation Dissociation and Dislocation Line Tension
- Lecture 34 - Strain Hardening and Dislocations Interactions
- Lecture 35 - Dislocation Interaction: Stable Configurations and Strain Hardening
- Lecture 36 - Dislocation: Nucleation and Frank Read Source
- Lecture 37 - Partial Dislocations and Stacking Faults in FCC
- Lecture 38 - Dislocation Locks: Lomer-Cottrell Lock
- Lecture 39 - Ordered Structures: Superlattice Dislocations and APBs
- Lecture 40 - Dislocation and Stacking Sequence in BCC
- Lecture 41 - Intersection of Dislocations: Jogs and Kinks
- Lecture 42 - Strain Hardening stages in an FCC Single Crystal
- Lecture 43 - Independent Slip Systems: Von Mises Criterion for Plasticity
- Lecture 44 - Solid Solutions Strengthening (SSS)
- Lecture 45 - Solid Solutions Strengthening: Interaction of Solutes and Defects
- Lecture 46 - Cottrell Atmosphere and Yield Point Phenomenon
- Lecture 47 - Precipitation Hardening and Dispersion Strengthening
- Lecture 48 - Grain Size Strengthening
- Lecture 49 - Dislocation model for grain boundaries
- Lecture 50 - Twinning in Crystalline Materials
- Lecture 51 - Fracture and Theoretical Cohesive Strength of Materials
- Lecture 52 - Fracture and Theoretical Cohesive Strength of Materials
- Lecture 53 - Fracture modes and Stress Concentration
- Lecture 54 - Fracture Mechanics - LEFM vs EPFM and J-Integral
- Lecture 55 - Creep Deformation of Materials
- Lecture 56 - Deformation Mechanics Map and Superplasticity
- Lecture 57 - Fatigue of Materials: Introduction and SN Curve
- Lecture 58 - Fatigue Stages and Paris Law
- Lecture 59 - Cyclic Stress-Strain Curve and Strain Life Curve
- Lecture 60 - Effect of Mean Stress and Stress Amplitude
- Lecture 61 - Hardness of Materials
- Lecture 62 - Impact Testing of Materials
- Lecture 63 - Anelastic Behaviour and Composite Materials