NPTEL Video Course - Mechanical Engineering - NOC:Basics of Materials Engineering

Subject Co-ordinator - Prof. Ratna Kumar Annabattula

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Static Failure Theories (Introduction, Definition of Failure)
Lecture 31 - Static Failure Theories (General form of failure theory, Stress tensor, Principal stress)
Lecture 32 - Static Failure Theories (Distortion Energy Theory)
Lecture 33 - Static Failure Theories (Maximum Shear Stress Theory)
Lecture 34 - Static Failure Theories (Design Problems)
Lecture 35 - Static Failure Theories (Failure of Brittle Materials)
Lecture 36 - Static Failure Theories (Coulomb-Mohr and Modified Coulomb-Mohr)
Lecture 37 - Static Failure Theories (Notches and Stress Concentration)
Lecture 38 - Introduction to Fracture Mechanics, Griffith's Analysis of a Cracked Body
Lecture 39 - Fracture Mechanics (Energy Release Rate)
Lecture 40 - Fracture Mechanics (Crack Resistance, Stress Intensity Factor, Fracture Toughness)
Lecture 41 - Fatigue Failure of Materials (Introduction, Historical Events, S-N Diagram)
Lecture 42 - Fatigue Failure of Materials (S-N Diagram, Types of Time Varying Loads)
Lecture 43 - Fatigue Failure of Materials (High Cycle Fatigue, Low Cycle Fatigue, Stress Ratio, Amplitude Rat
Lecture 44 - Fatigue Failure of Materials (Rotating Beam Bending Test, Estimated S-N diagram)
Lecture 45 - Fatigue Failure Theories (Fatigue strength correction factors)
Lecture 46 - Problems on Fatigue Failure-1 (S-N diagram and Corrected endurance strength)
Lecture 47 - Fatigue Failure of Materials (Features of Fatigue Failure; Factor of Safety in Life and Stress)
Lecture 48 - Fatigue Failure of Materials (Effect of Mean Stress)
Lecture 49 - Fatigue Failure of Materials (Multiaxial Fatigue and Variable Amplitude Loading)
Lecture 50 - Fatigue Failure of Materials (Fatigue Stress Concentration Factor)
Lecture 51 - Fatigue Failure of Materials (Fatigue Crack Growth, Paris' law)
Lecture 52 - Problems on Fatigue Failure-2 (Effect of mean stress, Fatigue crack growth)
Lecture 53 - Problems on Fatigue Failure-3 (Effect of Notch, Multiaxial Loading)
Lecture 54 - Phase Diagrams (Introduction)
Lecture 55 - Phase Diagrams (Language of Phase Diagrams, Types of Binary Phase Alloys)
Lecture 56 - Phase Diagrams (Tie line, Lever Rule, Indentifcation of compositions and weight fractions in two
Lecture 57 - Phase Diagrams (Type 1
Lecture 58 - Phase Diagrams (Conguent Melting Alloys, Type II Alloys, Eutectic Reaction)
Lecture 59 - Phase Diagrams (Type III Alloys with Partial Solubility in Solid State)
Lecture 60 - Phase Diagrams (Conguent melting alloys, Peritectic Reaction, Monotectic Reaction)
Lecture 61 - Phase Diagrams (Allotropy, Eutectoid and Peritectoid Reactions)
Lecture 62 - Phase Diagrams (Iron-Iron Carbide Phase Diagram)
Lecture 63 - Kinetics of Phase Transformations (Homogeneous Nucleation)
Lecture 64 - Kinetics of Phase Transformations (Heterogeneous Nucleation)
Lecture 65 - Isothermal Transformation Diagram
Lecture 66 - Martensite Transformation, C-C-T Diagram
Lecture 67 - Heat Treatment of Steels (Annealing and Normalizing)