

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

NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Composites

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Definition of the composite materials
- Lecture 2 - Composite materials and its applications
- Lecture 3 - Classification of the composite materials
- Lecture 4 - What Makes fiber so strong?
- Lecture 5 - Advantages and limitations of composite materials
- Lecture 6 - Properties of the composite materials.
- Lecture 7 - Different Types of Fiber
- Lecture 8 - Production process and different types of Glass Fiber
- Lecture 9 - Graphite Fibers
- Lecture 10 - Aramid and Boron Fibers
- Lecture 11 - Ceramic Fibers
- Lecture 12 - Matrix - Properties and classifications
- Lecture 13 - Polymers as matrix material and its classification
- Lecture 14 - Thermosets and thermoplastics
- Lecture 15 - Properties of thermosets and thermoplastics
- Lecture 16 - Thermoset materials and its production methods
- Lecture 17 - Thermoplastics and metals as matrix materials
- Lecture 18 - Ceramic and carbon matrices
- Lecture 19 - What is a good fabrication process of a composite?
- Lecture 20 - Fabrication of Thermoset Composites
- Lecture 21 - Hand Lay-Up Process
- Lecture 22 - Bag Molding Process
- Lecture 23 - Resin Transfer Molding Process
- Lecture 24 - Fabrication of Thermoplastic, Metal and Ceramic Matrix based Composites
- Lecture 25 - Terminologies and basic concepts
- Lecture 26 - Orthotropic material
- Lecture 27 - Modeling of unidirectional composites
- Lecture 28 - Composite density as a function of mass fraction and volume fraction
- Lecture 29 - Calculation of longitudinal modulus for unidirectional composites

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- Lecture 30 - Failure modes of unidirectional composite
- Lecture 31 - Failure of Unidirectional Lamina
- Lecture 32 - Minimum Volume Fraction and Critical Volume Fraction
- Lecture 33 - Example based on Failure of Composite Material
- Lecture 34 - Example based on Minimum and Critical Volume Fraction
- Lecture 35 - Transverse Modulus of Unidirectional Composite
- Lecture 36 - Halpin-Tsai Relation for Transverse Modulus
- Lecture 37 - Transverse modulus of unidirectional composites
- Lecture 38 - Transverse strength of unidirectional composites
- Lecture 39 - Poisson's ratio of unidirectional composites
- Lecture 40 - Failure modes of composite materials
- Lecture 41 - Failure modes of composite materials
- Lecture 42 - Other properties
- Lecture 43 - Concept of Tensor
- Lecture 44 - Stress Transformation (Two Dimensional)
- Lecture 45 - Analysis of Specially Orthotropic Lamina
- Lecture 46 - Analysis of Generally Orthotropic Lamina
- Lecture 47 - Transformation of Engineering Constants - Part I
- Lecture 48 - Transformation of Engineering Constants - Part II
- Lecture 49 - Variation of elastic constants with respect to fiber orientation for generally orthotropic lamina
- Lecture 50 - Generally orthotropic lamina
- Lecture 51 - Generalized Hooke's law for anisotropic materials
- Lecture 52 - Generalized Hooke's law for anisotropic materials
- Lecture 53 - Elastic constants for Specially orthotropic materials
- Lecture 54 - Elastic constants for Specially orthotropic materials in plane stress
- Lecture 55 - Relation Between Engineering Constants and Elements of Stiffness and Compliance Matrices - Part I
- Lecture 56 - Relation Between Engineering Constants and Elements of Stiffness and Compliance Matrices - Part II
- Lecture 57 - Stress Strain Relations for A Lamina With Arbitrary Orientation - Part I
- Lecture 58 - Stress- Strain Relation for A Lamina With Arbitrary Orientation - Part II
- Lecture 59 - Strength of An Orthotropic Lamina
- Lecture 60 - Importance of Sign of Shear Stress in context of Strength of A Unidirectional Lamina
- Lecture 61 - Strain displacement relations for a laminate
- Lecture 62 - Stress-strain relations for individual layers of a laminate
- Lecture 63 - Resultant forces and moments
- Lecture 64 - Relations between force and moment resultants and mid-plane strains and curvatures
- Lecture 65 - Physical significance of extensional stiffness matrix [A], coupling matrix [B] and bending stiffness matrix [D]
- Lecture 66 - Lamination sequence (standard laminate code)
- Lecture 67 - Calculation of A, B and D Matrices.
- Lecture 68 - Simplification of Stiffness Matrices - Part I

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- Lecture 69 - Simplification of Stiffness Matrices - Part II
- Lecture 70 - Quasi-Isotropic Laminates - Part I
- Lecture 71 - Quasi-Isotropic Laminates - Part II
- Lecture 72 - Failure of Composite Laminates