NPTEL : Convective Heat and Mass Transfer (Mechanical Engineering)

Co-ordinators : Prof. A.W. Date

NPTEL : Cryogenic Engineering (Mechanical Engineering)

Co-ordinators : Prof. M.D. Atrey

NPTEL : Advanced Strength of Materials (Mechanical Engineering)

Co-ordinators : Prof. S.K. Maiti

NPTEL : Heat and Mass Transfer (Mechanical Engineering)

Co-ordinators : Prof. S.P. Sukhatme, Prof. U.N. Gaitonde

NPTEL : Robotics (Mechanical Engineering)

Co-ordinators : Prof. P. Seshu, Prof. P.S. Gandhi, Prof. K. Kurien Issac, Prof. B. Seth, Prof. C. Amarnath

NPTEL : NOC:Optimization from Fundamentals (Mechanical Engineering)

Co-ordinators : Prof. Ankur A. Kulkarni

NPTEL : NOC:Design of Mechatronic Systems (Mechanical Engineering)

Co-ordinators : Prof. Prasanna Gandhi

NPTEL : NOC:Nonlinear Adaptive Control (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

NPTEL : NOC:Nonlinear Control Design (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

NPTEL : Tribology (Mechanical Engineering)

Co-ordinators : Dr. Harish Hirani

NPTEL : Computer Aided Design and Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. P.V. Madhusudan Rao, Prof. Anoop Chawla

Lecture 32 - Modeling of B-Spline Curves

Lecture 33 - Modeling of B-spline Curves

Lecture 34 - Surface Modeling

Lecture 35 - Surface Modeling

Lecture 36 - Display of Curves and Surfaces

Lecture 37 - Solid Modeling

Lecture 38 - Solid Modeling

Lecture 39 - Solid Modeling Using Octrees

Lecture 40 - (Lecture Missing)

Lecture 41 - Computer Aided Design

Lecture 42 - Computer Aided Manufacturing

Lecture 43 - What is CAD/CAM

Lecture 44 - An Overview of Geometric Modeling

Lecture 45 - Parametric Cubic Curve

Lecture 46 - Parametric Bezier Curve

Lecture 47 - B-Spline Curve

Lecture 48 - Parametric Surfaces - Part-1

Lecture 49 - Parametric Surfaces - Part-2

Lecture 50 - Solid Modeling

Lecture 51 - Geometric & Product Data Exchange

Lecture 52 - Reverse Engineering

NPTEL : Project and Production Management (Mechanical Engineering)

Co-ordinators : Prof. Arun Kanda

NPTEL : NOC:RAC Product Design (Mechanical Engineering)

Co-ordinators : Prof. Sanjeev Jain

NPTEL : NOC:Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.R kale

NPTEL : NOC:Solid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Ajeet Kumar

Lecture 32 - Theories of Failure (Continued...)

NPTEL : NOC:Introduction to Uncertainty Analysis and Experimentation (Mechanical Engineering)

Co-ordinators : Unknown

NPTEL : NOC:Engineering Graphics and Design (Mechanical Engineering)

Co-ordinators : Prof. Naresh Varma Datla and Prof. S.R Kale

NPTEL : NOC:Ideal Fluid Flows using Complex Analysis (Mechanical Engineering)

Co-ordinators : Prof. Amit Gupta

NPTEL : NOC:Experimental Modal Analysis (Mechanical Engineering)

Co-ordinators : Subodh V. Modak

NPTEL : NOC:Mechanical Behavior of Polymers and Composites (Mechanical Engineering)

Co-ordinators : Dr. Naresh V Datla

NPTEL : NOC:Data-Enabled Tribological Engineering: From Experiments to Predictive Models (Mechanical Engineering)

Co-ordinators : Prof. (HAG) Harish Hirani

NPTEL : Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S.K. Dwivedy

NPTEL : Theory and Practice of Rotor Dynamics (Mechanical Engineering)

Co-ordinators : Prof. Rajiv Tiwari

NPTEL : Engineering Mechanics (Mechanical Engineering)

Co-ordinators : Prof. U.S. Dixit, Dr. G. Saravana Kumar

NPTEL : Mechanical Vibrations (Mechanical Engineering)

Co-ordinators : Prof. S.K. Dwivedy, Prof. Rajiv Tiwari

NPTEL : NOC:Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Manas Das

NPTEL : NOC:Fundamentals of Nuclear Power Generation (Mechanical Engineering)

Co-ordinators : Prof. Dipankar N. Basu

NPTEL : NOC:Advances in Welding and Joining Technologies (Mechanical Engineering)

Co-ordinators : Prof. Swarup bag

NPTEL : NOC:Introduction to Machining and Machining Fluids (Mechanical Engineering)

Co-ordinators : Prof. Mamilla Ravi Sankar

NPTEL : NOC:Mechanics of Machining (Mechanical Engineering)

Co-ordinators : Dr. Uday S. Dixit

NPTEL : NOC:Principle of Hydraulic Machines and System Design (Mechanical Engineering)

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Introduction to Abrasive Machining and Finishing Processes (Mechanical Engineering)

Co-ordinators : Prof. Mamilla Ravi Sankar

NPTEL : NOC:Theory of Rectangular Plates - Part 1 (Mechanical Engineering)

Co-ordinators : Prof. Poonam Kumari

NPTEL : NOC:Principles of Mechanical Measurement (Mechanical Engineering)

Co-ordinators : Prof. Dipankar N. Basu

NPTEL : NOC:IC Engines and Gas Turbines (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni, Prof. Pranab K. Mondal

NPTEL : NOC:Fundamental of Welding Science and Technology (Mechanical Engineering)

Co-ordinators : Prof. Pankaj Biswas

NPTEL : NOC:Polymer Assisted Abrasive Finishing Processes (Mechanical Engineering)

Co-ordinators : Prof. Mamilla Ravi Sankar

NPTEL : NOC:Mathematical Modeling of Manufacturing Processes (Mechanical Engineering)

Co-ordinators : Prof. Swarup bag

Lecture 1 - Materials and manufacturing Processes - 1

Lecture 2 - Materials and manufacturing Processes - 2

Lecture 3 - Physics based modeling approach at different scale

Lecture 4 - Evaluation of properties and process modelling

Lecture 5 - Thermofluid and electromagnetic analysis

Lecture 6 - Solid-state deformation and residual stress - 1

Lecture 7 - Solid-state deformation and residual stress - 2

Lecture 8 - Meltiing, solidification and additive manufacturing

Lecture 9 - Force and velocity diagram - 1

Lecture 10 - Force and velocity diagram - 2

Lecture 11 - Heat transfer analysis

Lecture 12 - Principal and mechanism at different processes - 1

Lecture 13 - Principal and mechanism at different processes - 2

Lecture 14 - Mechanics of bulk metal forming

Lecture 15 - Mechanics of sheet metal forming - 1

Lecture 16 - Mechanics of sheet metal forming - 2

Lecture 17 - Heat transfer and thermomechanical processing

Lecture 18 - Fusion welding processes - 1

Lecture 19 - Fusion welding processes - 2

Lecture 20 - Physics of welding and metal transfer

Lecture 21 - Heat source model in fusion welding

Lecture 22 - Heat transfer and material flow

Lecture 23 - Solidification in welding - 1

Lecture 24 - Solidification in welding - 2

Lecture 25 - Solid state welding - 1

Lecture 26 - Solid state welding - 2

Lecture 27 - Hybrid welding, residual stress and distortion

Lecture 28 - Cooling and solidification at different casting processes

Lecture 29 - Powder metallurgy

Lecture 30 - Principle of surface and coating technologies

Lecture 31 - Principle and development of additive manufacturing technologies - 1

NPTEL : NOC:Two-Phase flow with phase change in Conventional and Miniature Channels (Mechanical Engineering)

Co-ordinators : Prof. Manmohan Pandey

NPTEL : NOC:Applied Thermodynamics for Engineers (Mechanical Engineering)

Co-ordinators : Prof. Dipankar N. Basu

NPTEL : NOC:Fundamentals of Conduction and Radiation (Mechanical Engineering)

Co-ordinators : Prof. Dipankar N. Basu

NPTEL : NOC:Steam Power Engineering (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni

NPTEL : NOC:Dynamic Behaviour of Materials (Mechanical Engineering)

Co-ordinators : Prof. Prasenjit Khanikar

NPTEL : NOC:Plastic Working of Metallic Materials (Mechanical Engineering)

Co-ordinators : Prof. P.S. Robi

NPTEL : NOC:Fundamentals of Artificial Intelligence (Mechanical Engineering)

Co-ordinators : Prof. Shyamanta M. Hazarika

NPTEL : NOC:Aircraft Propulsion (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni

NPTEL : NOC:Computational Fluid Dynamics for Incompressible Flows (Mechanical Engineering)

Co-ordinators : Prof. Amaresh Dalal

NPTEL : NOC:Experimental Methods in Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Automation in Manufacturing (Mechanical Engineering)

Co-ordinators : Dr. Shrikrishna N. Joshi

NPTEL : NOC:Fundamentals of Compressible Flow (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

NPTEL : NOC:Finite Element Method: Variational Methods to Computer Programming (Mechanical Engineering)

Co-ordinators : Prof. Arup Nandy, Prof. Atanu Banerjee

NPTEL : NOC:Computational Continuum Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Sachin Singh Gautam

NPTEL : NOC:Fundamentals of Convective Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Amaresh Dalal

NPTEL : NOC:Theory of Composite Shells (Mechanical Engineering)

Co-ordinators : Prof. Poonam Kumari

NPTEL : NOC:Finite Element Modeling of Welding Processes (Mechanical Engineering)

Co-ordinators : Prof. Swarup bag

NPTEL : NOC:Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S. K. Dwivedy

NPTEL : NOC:Evolutionary Computation for Single and Multi Objective Optimization (Mechanical Engineering)

Co-ordinators : Prof. Deepak Sharma

NPTEL : NOC:Viscous Fluid Flow (Mechanical Engineering)

Co-ordinators : Prof. Amaresh Dalal

NPTEL : NOC:Welding Application Technology (Mechanical Engineering)

Co-ordinators : Prof. Pankaj Biswas

NPTEL : NOC:Fundamentals of Additive Manufacturing Technologies (Mechanical Engineering)

Co-ordinators : Prof. Sajan Kapil

NPTEL : NOC:Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

NPTEL : NOC:Mechanics of Fiber Reinforced Polymer Composite Structures (Mechanical Engineering)

Co-ordinators : Prof. Debabrata Chakraborty

Lecture 1 - Composite Materials - Introduction

Lecture 2 - Composite Materials - Classification

Lecture 3 - Anisotropic Elasticity

Lecture 4 - Orthotropic Materials

Lecture 5 - Hookeâ€™s Law for 2D Lamina

Lecture 6 - Engineering Constants for 2D Lamina

Lecture 7 - Strength Failure Criteria - Part I

Lecture 8 - Strength Failure Criteria - Part II

Lecture 9 - Hygrothermal Behavior of Lamina

Lecture 10 - Introduction and Terminologies

Lecture 11 - Evaluation of Elastic Moduli

Lecture 12 - Evaluation of Longitudinal Strength

Lecture 13 - Evaluation of Transverse and Shear Strengths

Lecture 14 - Evaluation of Hygrothermal Properties

Lecture 15 - Elasticity Approach

Lecture 16 - Experimental Evaluation

Lecture 17 - Laminate - Introduction

Lecture 18 - Classical Lamination Theory - Part I

Lecture 19 - Classical Lamination Theory - Part II

Lecture 20 - Response of Laminate - Significance of ABBD

Lecture 21 - Special Classes of Laminates

Lecture 22 - Engineering Constants of Laminates

Lecture 23 - Hygrothermal Behaviour of Laminates

Lecture 24 - Analysis of Laminates

Lecture 25 - Failure of Laminates

Lecture 26 - Failure Analysis under Combined Loading

Lecture 27 - Design Example - I

Lecture 28 - Design Example - II

Lecture 29 - Interlaminar Stresses- Delamination

Lecture 30 - Prediction of Delamination

Lecture 31 - Transverse Deflection

Lecture 32 - Buckling and Free Vibration

NPTEL : NOC:Laser Based Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. Shrikrishna N. Joshi

NPTEL : NOC:Advanced Thermodynamics and Combustion (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

Lecture 32 - Engine Combustion and Pollution

NPTEL : NOC:Thermal Engineering: Basic and Applied (Mechanical Engineering)

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Mechanics of Sheet Metal Forming (Mechanical Engineering)

Co-ordinators : Prof. R Ganesh Narayanan

NPTEL : NOC:Power Plant System Engineering (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

NPTEL : NOC:Introduction to Solidification Processing (Mechanical Engineering)

Co-ordinators : Prof. Swarup Bag

NPTEL : NOC:Materials Processing (Casting, Forming and Welding) (Mechanical Engineering)

Co-ordinators : Prof. Swarup Bag

NPTEL : Acoustics (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Vijay K. Jain

Lecture 1 - Advanced Machining Processes

Lecture 2 - Advanced Machining Processes

Lecture 3 - Advanced Machining Processes

Lecture 4 - Advanced Machining Processes

Lecture 5 - Advanced Machining Processes

Lecture 6 - Advanced Machining Processes

Lecture 7 - Advanced Machining Processes

Lecture 8 - Advanced Machining Processes

Lecture 9 - Advanced Machining Processes

Lecture 10 - Advanced Machining Processes

Lecture 11 - Advanced Machining Processes

Lecture 12 - Advanced Machining Processes

Lecture 13 - Advanced Machining Processes

Lecture 14 - Advanced Machining Processes

Lecture 15 - Advanced Machining Processes

Lecture 16 - Advanced Machining Processes

Lecture 17 - Advanced Machining Processes

Lecture 18 - Advanced Machining Processes

Lecture 19 - Advanced Machining Processes

Lecture 20 - Advanced Machining Processes

Lecture 21 - Advanced Machining Processes

Lecture 22 - Advanced Machining Processes

Lecture 23 - Advanced Machining Processes

Lecture 24 - Advanced Machining Processes

Lecture 25 - Advanced Machining Processes

Lecture 26 - Advanced Machining Processes

Lecture 27 - Advanced Machining Processes

Lecture 28 - Advanced Machining Processes

Lecture 29 - Advanced Machining Processes

Lecture 30 - Advanced Machining Processes

Lecture 31 - Advanced Machining Processes

NPTEL : Biomicroelectromechanical systems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : Computer Aided Engineering Design (Mechanical Engineering)

Co-ordinators : Dr. Anupam Saxena

NPTEL : Mathematical Methods in Engineering and Science (Mechanical Engineering)

Co-ordinators : Dr. Bhaskar Dasgupta

Lecture 32 - Sturm-Liouville Theory

Lecture 33 - Approximation Theory and Fourier Series

Lecture 34 - Fourier Integral to Fourier Transform, Minimax Approximation

Lecture 35 - Separation of Variables in PDE's, Hyperbolic Equations

Lecture 36 - Parabolic and Elliptic Equations, Membrane Equation

Lecture 37 - Analytic Functions

Lecture 38 - Integration of Complex Functions

Lecture 39 - Singularities and Residues

Lecture 40 - Calculus of Variations

NPTEL : Dynamics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Amitabha Ghosh

NPTEL : Finite Element Method (Mechanical Engineering)

Co-ordinators : Prof. C.S. Upadhyay

NPTEL : Kinematics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Ashok K Mallik

NPTEL : Advanced manufacturing process for micro sytem fabrication (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : Engineering Drawing (Dr. Anupam Saxena) (Mechanical Engineering)

Co-ordinators : Dr. Anupam Saxena

NPTEL : NOC:BioMEMS and Microsystems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Manufacturing Systems Technology (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Manufacturing Systems Technology - Part II (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Basics of Finite Element Analysis (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Basics of Noise and Its Measurements (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Manufacturing Process Technology - Part I (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : Manufacturing Systems Technology - I and II (Mechanical Engineering)

Co-ordinators : Prof. Shantanu Bhattacharya

Lecture 65 - Ultrasonic Machining Process

Lecture 66 - Determination of MRR of Ultrasonic Machining Process

Lecture 67 - Mechanics of Ultrasonic Machining (USM)

Lecture 68 - Effect of Process parameters of USM

Lecture 69 - Ultrasonic Machining Unit

Lecture 70 - Introductions of Electro-chemical Drilling Process

Lecture 71 - Electric Discharge Machining Process

Lecture 72 - EDM - Part 2

Lecture 73 - Effect of various process parameters on EDM process

Lecture 74 - Analysis of RC circuit for EDM

Lecture 75 - Electrodischarge machining sytem

Lecture 76 - Effect of various parameters on EDM Process

Lecture 77 - Tool Electrodes and Dielectric fluids and Electron Beam Machining

Lecture 78 - Introduction to Finishing Process

Lecture 79 - Electrochemical Machining Processes (ECM)

Lecture 80 - Material Removal Rate of ECM

Lecture 81 - Electrode Double Layer

Lecture 82 - Material removal rate of an alloy in ECM

Lecture 83 - Kinematics and Dynamics of ECM

Lecture 84 - Temperature and Pressure rise during ECM

Lecture 85 - Determination of Electrolyte flow velocity in ECM

Lecture 86 - Theoretical determination of Tool shape

Lecture 87 - Design for Electrolyte flow in ECM

Lecture 88 - Mechanics of Electron Beam Machining Process

Lecture 89 - Functional Characteristics of EBM Process Edit Lesson

Lecture 90 - Introduction of Laser Beam Machining Process

Lecture 91 - Material removal rate of LBM

Lecture 92 - Heat conduction and Temperature rise during LBM

Lecture 93 - Modelling of LBM processes

Lecture 94 - Introduction of Additive Techniques

Lecture 95 - Additive Manufacturing Processes

Lecture 96 - Fused Deposition Modeling Process

NPTEL : NOC:Nature and Property of Materials (Mechanical Engineering)

Co-ordinators : Prof. Bishakh Bhattacharya

NPTEL : NOC:Manufacturing Process Technology - Part II (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Basics of Finite Element Analysis - II (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Principles of Vibration Control (Mechanical Engineering)

Co-ordinators : Prof. Bishakh Bhattacharya

NPTEL : NOC:Fundamentals of Acoustics (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Heat Treatment and Surface Hardening - II (Mechanical Engineering)

Co-ordinators : Dr. Kallol Mondal

NPTEL : NOC:Phase Transformation in Materials (Mechanical Engineering)

Co-ordinators : Dr. Krishanu Biswas

NPTEL : NOC:Manufacturing of Composites (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar

NPTEL : NOC:Applied Ergonomics (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Sustainability through Green Manufacturing Systems - An Applied Approach (Mechanical Engineering)

Co-ordinators : Dr. Deepu Philip, Dr. Amandeep Singh

NPTEL : NOC:Noise Management and Control (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Design Practice (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 32 - Failure Mode Effect Analysis

NPTEL : NOC:Introduction to Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

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 - Poissonâ€™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 Hookeâ€™s law for anisotropic materials

Lecture 52 - Generalized Hookeâ€™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 Betweeen Engineering Constants and Elements of Stiffness and Compliance Matrices - Part I

Lecture 56 - Relation Betweeen 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

NPTEL : NOC:Product Design and Manufacturing (Mechanical Engineering)

Co-ordinators : Dr. Amandeep Singh, Prof. J. Ramkumar

NPTEL : NOC:Phase Equilibria in Materials - Nature and Properties of Materials-II (Mechanical Engineering)

Co-ordinators : Dr. Ashish Garg

NPTEL : NOC:Advanced Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Engineering Metrology (Mechanical Engineering)

Co-ordinators : Dr. Amandeep Singh, Prof. J. Ramkumar

NPTEL : NOC:Smart Materials and Intelligent System Design (Mechanical Engineering)

Co-ordinators : Prof. Bisakh Bhattacharya

NPTEL : NOC:Design Practice-II (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Rapid Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar

Lecture 1 - Introduction to Rapid Manufacturing - Part 1

Lecture 2 - Introduction to Rapid Manufacturing - Part 2

Lecture 3 - Introduction to Rapid Manufacturing - Part 3

Lecture 4 - Product Development Process - Part 1

Lecture 5 - Product Development Process - Part 2

Lecture 6 - Product Development Process - Part 3

Lecture 7 - Design for Modularity (Manufacturing)

Lecture 8 - Design for Modularity (Assembly; Part 1)

Lecture 9 - Design for Modularity (Assembly; Part 2)

Lecture 10 - Design for Modularity

Lecture 11 - Subtractive versus Rapid Manufacturing

Lecture 12 - Reverse Engineering - Part 1

Lecture 13 - Reverse Engineering - Part 2

Lecture 14 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 1

Lecture 15 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 2

Lecture 16 - Laboratory Demonstration, 3D scanners - Part 1

Lecture 17 - Laboratory Demonstration, 3D scanners - Part 2

Lecture 18 - Polymerization Processes - Part 1

Lecture 19 - Polymerization Processes - Part 2

Lecture 20 - Powder based processes - Part 1

Lecture 21 - Powder based processes - Part 2

Lecture 22 - Powder based processes - Part 3

Lecture 23 - Extrusion based processes - Part 1

Lecture 24 - Extrusion based processes - Part 2

Lecture 25 - Sheet Stacking processes

Lecture 26 - 3D printing processes

Lecture 27 - Laboratory Demonstration, 3D printing - Part 1

Lecture 28 - Laboratory Demonstration, 3D printing - Part 2

Lecture 29 - Laboratory Demonstration, 3D printing - Part 3

Lecture 30 - Beam Deposition processes

Lecture 31 - Materials in Rapid Manufacturing - Part 1

NPTEL : NOC:Turbulent Combustion: Theory and Modelling (Mechanical Engineering)

Co-ordinators : Prof. Ashoke De

Lecture 32 - Turbulence : Energy cascade, length scales and Statistical description

Lecture 33 - Turbulence : Statistical analysis and free shear flows

Lecture 34 - Turbulence : Free shear and wall bounded shear flows

Lecture 35 - Turbulence : Turbulent boundary layer

Lecture 36 - Turbulence

Lecture 37 - Turbulence : Temperature effects and Modelling

Lecture 38 - Turbulence : Modelling and statistics

Lecture 39 - Turbulence : Modelling (Continued...)

Lecture 40 - Turbulence : Modelling (Continued...)

Lecture 41 - Turbulence : Chemistry Interaction

Lecture 42 - Turbulence : Chemistry Interaction (Continued...)

Lecture 43 - Turbulence : Chemistry Interaction (Continued...)

Lecture 44 - Turbulence : Chemistry Interaction (Continued...)

Lecture 45 - Turbulence : Chemistry Interaction (Continued...)

Lecture 46 - Turbulent Combustion : Stochastic method of solution

Lecture 47 - Turbulent Combustion : Transported scalar PDF model

Lecture 48 - Turbulent Combustion : Transported joint velocity - scalar PDF model

Lecture 49 - Turbulent Combustion : Modelling Turbulent Premixed Combustion

Lecture 50 - Turbulent Combustion : Modelling Turbulent Premixed Combustion (Continued...)

Lecture 51 - Turbulent Combustion : Modelling Turbulent Premixed Combustion (Continued...)

Lecture 52 - Turbulent Combustion : Modelling Turbulent Premixed Combustion (Continued...)

Lecture 53 - Turbulent Combustion : Modelling Turbulent Non-Premixed Combustion

Lecture 54 - Turbulent Combustion : Modelling Turbulent Non-Premixed Combustion (Continued...)

Lecture 55 - Turbulent Combustion : Modelling Turbulent Non-Premixed Combustion (Continued...)

Lecture 56 - Turbulent Combustion : Modelling Turbulent Non-Premixed Combustion

Lecture 57 - Turbulent Combustion : Modelling Turbulent Non-Premixed Combustion (Continued...)

Lecture 58 - Multiphase Combustion : Introduction + Droplet Evaporation

Lecture 59 - Multiphase Combustion : Droplet Combustion

Lecture 60 - Multiphase Combustion : Spray Combustion

NPTEL : NOC:Manufacturing Automation (Mechanical Engineering)

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Computer Integrated Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar, Prof. Amandeep Singh

NPTEL : NOC:Machining Science (Mechanical Engineering)

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Foundations of Cognitive Robotics (Mechanical Engineering)

Co-ordinators : Prof. Bishakh Bhattacharya

Lecture 1 - Introduction to Cognitive Robotics (Private)

Lecture 2 - Smart Materials - I (Private)

Lecture 3 - Smart Materials - II (Private)

Lecture 4 - Smart Materials - III (Private)

Lecture 5 - Architecture of the Brain

Lecture 6 - Architecture of the Brain (Continued...)

Lecture 7 - Nerve Cells

Lecture 8 - Introduction to Synchronisation Models

Lecture 9 - Synchronisation models (Continued...)

Lecture 10 - Introduction to EEG

Lecture 11 - Theories of Intelligence - I

Lecture 12 - Theories of Intelligence - II

Lecture 13 - Kuramoto Model

Lecture 14 - Child Robot Interaction

NPTEL : NOC:Introduction to Robotics (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Muffler Acoustics - Application to Automotive Exhaust Noise Control (Mechanical Engineering)

Co-ordinators : Prof. Akhilesh Mimani

NPTEL : NOC:Elements of Solar Energy Conversion (Mechanical Engineering)

Co-ordinators : Prof. Jishnu Bhattacharya

NPTEL : NOC:Manufacturing Processes - Casting and Joining (Mechanical Engineering)

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Computational Fluid Dynamics and Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Gautam Biswas

NPTEL : NOC:Production Technology: Theory and Practice (Mechanical Engineering)

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Introduction to Turbomachinery (Mechanical Engineering)

Co-ordinators : Prof. Subrata Sarkar

Lecture 1 - Introduction and Classification

Lecture 2 - Introduction and Classification (Continued...)

Lecture 3 - Review of the Fundamental Laws

Lecture 4 - Equation of Motion in Rotating Frame

Lecture 5 - Euler Equation for Turbomachinery

Lecture 6 - Euler Equation for Turbomachinery: Illustration

Lecture 7 - Problem Session - Chapter-1: Applications of Euler Equation

Lecture 8 - Similarity Analysis - I

Lecture 9 - Similarity Analysis - II

Lecture 10 - Similarity Analysis - III

Lecture 11 - Problem Session - II

Lecture 12 - Cassade Analysis - I

Lecture 13 - Cassade Analysis - II

Lecture 14 - Cassade Analysis - III

Lecture 15 - Cassade Analysis - IV

Lecture 16 - Cassade Analysis (Problem Session)

Lecture 17 - Gas Turbine Cycle Analysis - I

Lecture 18 - Gas Turbine Cycle Analysis - II

Lecture 19 - Gas Turbine Cycle Analysis - III

Lecture 20 - Gas Turbine Cycle Analysis - IV

Lecture 21 - Gas Turbine Cycle Analysis - V

Lecture 22 - Illustrative Examples Gas Turbine Cycle

Lecture 23 - Illustrative Examples Jet Propulsion

Lecture 24 - Axial Flow Compressor - I

Lecture 25 - Axial Flow Compressor - II

Lecture 26 - Axial Flow Compressor - III

Lecture 27 - Axial Flow Compressor - IV

Lecture 28 - Illustrative Examples Axial Flow Compressor

Lecture 29 - Centrifugal Compressor - I

Lecture 30 - Centrifugal Compressor - II

Lecture 31 - Centrifugal Compressor - III

NPTEL : NOC:Robot Motion Planning (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Metal Additive Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. Amandeep Singh Oberoi, Prof. Janakranjan Ramkumar

NPTEL : NOC:Conduction and Convection: Fundamentals and Applications (Mechanical Engineering)

Co-ordinators : Prof. Gautam Biswas

NPTEL : NOC:Advanced Robotics (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Applied Numerical Methods (Mechanical Engineering)

Co-ordinators : Prof. Malay K. Das

Lecture 65

Lecture 66

Lecture 67

Lecture 68

Lecture 69

Lecture 70

Lecture 71

Lecture 72

Lecture 73

Lecture 74

Lecture 75

Lecture 76

Lecture 77

Lecture 78

Lecture 79

Lecture 80

Lecture 81

Lecture 82

Lecture 83

Lecture 84

Lecture 85

Lecture 86

Lecture 87

Lecture 88

Lecture 89

Lecture 90

Lecture 91

Lecture 92

Lecture 93

Lecture 94

Lecture 95

Lecture 96

Lecture 97

NPTEL : NOC:Social Innovation in Industry 4.0 (Mechanical Engineering)

Co-ordinators : Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

NPTEL : NOC:Engineering Thermodynamics in Hindi (Mechanical Engineering)

Co-ordinators : Prof. Jayant K. Singh

NPTEL : NOC:Advanced Machining Processes (2024) (Mechanical Engineering)

Co-ordinators : Prof. Shantanu Bhattacharya

NPTEL : NOC:Basics of Mechanical Engineering - 1 (Mechanical Engineering)

Co-ordinators : Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

NPTEL : Computational Fluid Dynamics (Prof. S. Chakraborty) (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : Fundamentals of Industrial Oil Hydraulics and Pneumatics (Mechanical Engineering)

Co-ordinators : Prof. R.N. Maiti

NPTEL : Machinery fault diagnosis and signal processing (Mechanical Engineering)

Co-ordinators : Prof. A.R. Mohanty

NPTEL : Solar Energy Technology (Mechanical Engineering)

Co-ordinators : Prof. V.V. Satyamurty

NPTEL : Technology of Surface Coating (Mechanical Engineering)

Co-ordinators : Prof. A.K. Chattopadhyay

NPTEL : Vibration of Structures (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : Basic Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

Lecture 32 - Thermodynamics of Multi Component System - III

NPTEL : Design of Machine Elements I (Mechanical Engineering)

Co-ordinators : Prof. G. Chakraborty, Prof. B. Maiti, Prof. S.K. Roychowdhury

NPTEL : Manufacturing Processes II (Mechanical Engineering)

Co-ordinators : Prof. S. Paul, Prof. A.B. Chattopadhyay, Prof. A.K. Chattopadhyay

NPTEL : Refrigeration and Air Conditioning (Mechanical Engineering)

Co-ordinators : Prof. M. Ramgopal, Prof. R.C. Arora

NPTEL : Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

NPTEL : Introduction to Fluid Machines and Compressible Flow (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

NPTEL : Introduction to Fluid Mechanics and Fluid Engineering (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : Micro fluidics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : NOC:Conduction and Convection Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som, Prof. S. Chakraborty

NPTEL : NOC:Vibrations of Structures (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : NOC:Fluid Machines (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

Lecture 32 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part III

Lecture 33 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part IV and Losses in Centrifugal Compressors

Lecture 34 - Performance Characteristics of Centrifugal Compressors - Part I

Lecture 35 - Performance Characteristics of Centrifugal Compressors - Part II

Lecture 36 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part I

Lecture 37 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part II

Lecture 38 - Fans and Blowers - Part I

Lecture 39 - Fans and Blowers - Part II

NPTEL : NOC:Computer numerical control (CNC) of machine tools and processes (Mechanical Engineering)

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Non Traditional Abrasive Machining Processes - Ultrasonic, Abrasive Jet and Abrasive Water Jet Machining (Mechanical Engineering)

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Introduction to Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Dr. Suman Chakraborty

NPTEL : NOC:Spur and Helical Gear Cutting (Mechanical Engineering)

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Laws of Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Suman Chakraborty, Prof. S.K. Som

NPTEL : NOC:Energy Conservation and Waste Heat Recovery (Mechanical Engineering)

Co-ordinators : Prof. PK Das

NPTEL : NOC:Introduction to Mechanical Micro Machining (Mechanical Engineering)

Co-ordinators : Prof. Ajay M Sidpara

NPTEL : NOC:Machinery Fault Diagnosis and Signal Processing (Mechanical Engineering)

Co-ordinators : Prof. Amiya Ranjan Mohanty

NPTEL : NOC:Metal Cutting and Machine Tools (Mechanical Engineering)

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Gear and Gear Unit Design - Theory and Practice (Mechanical Engineering)

Co-ordinators : Prof. Rathindranath Maiti

NPTEL : NOC:Traditional and Non-Traditional Optimization Tools (Mechanical Engineering)

Co-ordinators : Prof. Dilip Kumar Pratihar

NPTEL : NOC:Mechanism and Robot Kinematics (Mechanical Engineering)

Co-ordinators : Dr. Anirvan Das Gupta

NPTEL : NOC:Heat Exchangers: Fundamentals and Design Analysis (Mechanical Engineering)

Co-ordinators : Prof. Prasanta Kr Das, Prof. Somnath Roy

NPTEL : NOC:Robotics (Mechanical Engineering)

Co-ordinators : Prof. Dilip Kumar Pratihar

NPTEL : NOC:Computational Fluid Dynamics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : NOC:Concepts of Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Aditya Bandopadhyay, Prof. Suman Chakraborty

NPTEL : NOC:Electronic Packaging and Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. A Bhattacharya

NPTEL : NOC:Kinematics of Mechanisms and Machines (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : NOC:Introduction to Fluid Mechanics (2019) (Mechanical Engineering)

Co-ordinators : Prof. Suman Chakraborty

Lecture 1 - Motivations of studying fluid mechanics

Lecture 2 - Macroscopic and microscopic point of views

Lecture 3 - Concept of traction vector

Lecture 4 - Cauchy's theorem

Lecture 5 - Concept of pressure in a fluid

Lecture 6 - Density, Bulk Modulus, Viscosity

Lecture 7 - Viscosity, Newtonian fluid

Lecture 8 - Kinematic viscosity, Reynolds number

Lecture 9 - Non-Newtonian fluids

Lecture 10 - Some illustrative examples solved

Lecture 11 - Problems and Solutions

Lecture 12 - Surface Tension - Part I

Lecture 13 - Surface Tension - Part II

Lecture 14 - Governing equation of fluid statics

Lecture 15 - Manometers

Lecture 16 - Force on a surface immersed in fluid - Part I

Lecture 17 - Force on a surface immersed in fluid - Part II

Lecture 18 - Force on a surface immersed in fluid - Part III, Stability of solid bodies in fluid - Part I

Lecture 19 - Stability of solid bodies in fluid - Part II

Lecture 20 - Fluid under rigid body motion

Lecture 21 - Lagrangian and Eulerian approaches

Lecture 22 - Concept of different flow lines

Lecture 23 - Acceleration of fluid flow

Lecture 24 - Deformation of fluid elements - Part I

Lecture 25 - Derivation of continuity equation

Lecture 26 - Problems and Solutions

Lecture 27 - Deformation of fluid elements - Part II

Lecture 28 - Deformation of fluid elements - Part III

Lecture 29 - Stream Function

Lecture 30 - Circulation, Velocity Potential

Lecture 31 - Euler's equation

NPTEL : NOC:Conduction and Convection Heat Transfer (Prof. S. Chakraborty) (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

Lecture 32 - Introduction to Convection

Lecture 33 - Review of Fluid Mechanics - I

Lecture 34 - Review of Fluid Mechanics - II

Lecture 35 - Review of Fluid Mechanics - III

Lecture 36 - Review of Fluid Mechanics - IV

Lecture 37 - Review of Fluid Mechanics - V

Lecture 38 - Energy Conservation Equation - I

Lecture 39 - Energy Conservation Equation - II

Lecture 40 - Energy Conservation Equation - III

Lecture 41 - Thermal Boundary Layer - I

Lecture 42 - Thermal Boundary Layer - II

Lecture 43 - Energy Integral Equation - I

Lecture 44 - Energy Integral Equation - II

Lecture 45 - Internal Forced Convection - 1

Lecture 46 - Internal Forced Convection - 2

Lecture 47 - Internal Forced Convection - 3

Lecture 48 - Internal Forced Convection - 4

Lecture 49 - Internal Forced Convection - 5

Lecture 50 - Internal Forced Convection - 6

Lecture 51 - Viscous Dissipation - 1

Lecture 52 - Viscous Dissipation - 2

Lecture 53 - Natural Convection - 1

Lecture 54 - Natural Convection - 2

Lecture 55 - Natural Convection - 3

Lecture 56 - Natural Convection - 4

Lecture 57 - Condensation - I

Lecture 58 - Condensation - II

Lecture 59 - Boiling

Lecture 60 - Heat Exchangers - I

Lecture 61 - Heat Exchangers - II

Lecture 62 - Heat Exchangers - III

Lecture 63 - Heat Exchangers - IV

Lecture 64 - Heat Exchangers - V

Lecture 65 - Problems on Heat Exchangers

NPTEL : NOC:Advanced Concepts in Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Aditya Bandopadhyay

Lecture 1 - Eulerian and Lagrangian Description of Fluid Motion

Lecture 2 - Lines of Flow Visualization and Acceleration of Flow

Lecture 3 - Angular Deformation of Fluid Elements

Lecture 4 - Linear and Volumetric Deformation; Perspectives from Mass Conservation

Lecture 5 - Continuity Education in Integral Form : Stream Function and Velocity Potential

Lecture 6 - Euler Equation for Inviscid Flow

Lecture 7 - Bernoulli's Equation

Lecture 8 - Examples of Bernoulli's Equation

Lecture 9 - Reynolds Transport Equation

Lecture 10 - Reynolds Transport Theorem : Mass and Linear Momentum Conservation

Lecture 11 - Reynolds transport theorem : arbitrarily moving control volume

Lecture 12 - Reynolds transport theorem : angular momentum conservation

Lecture 13 - Introduction to traction vector and stress tensor

Lecture 14 - Cauchy/Navier equation

Lecture 15 - Navier Stokes equation

Lecture 16 - Navier Stokes equation (Continued...)

Lecture 17 - Some exact solutions of the Navier Stokes equation

Lecture 18 - Interfacial boundary conditions and example of thin film flows

Lecture 19 - Exact solutions of the Navier Stokes equations in cylindrical polar coordinates

Lecture 20 - Exact solutions of the Navier Stokes equation for some unsteady flows

Lecture 21 - Confined oscillatory flows

Lecture 22 - Introduction to Turbulence

Lecture 23 - Statistical Treatment of Turbulence and Near - Wall Velocity Profiles

Lecture 24 - Introduction to Boundary Layer Theory

Lecture 25 - Similarity Solution of Boundary Layer Equation

Lecture 26 - Momentum Integral Method

Lecture 27 - Application of Momentum Integral Method and Boundary Layer Separation

Lecture 28 - Potential Flow

Lecture 29 - Potential Flow (Continued...)

Lecture 30 - Potential Flow (Continued...)

Lecture 31 - Potential Flow (Continued...)

NPTEL : NOC:High Performance Computing for Scientists and Engineers (Mechanical Engineering)

Co-ordinators : Prof. Somnath Roy

NPTEL : NOC:Engineering Drawing and Computer Graphics (Mechanical Engineering)

Co-ordinators : Prof. Rajaram Lakkaraju

Lecture 32 - Orthographic Projections II - Part 2

Lecture 33 - Orthographic Projections II - Part 3

Lecture 34 - Orthographic Projections II - Part 4

Lecture 35 - Orthographic Projections II - Part 5

Lecture 36 - Orthographic Projections II - Part 6

Lecture 37 - Orthographic Projections II - Part 7

Lecture 38 - Orthographic Projections II - Part 8

Lecture 39 - Orthographic Projections II - Part 9

Lecture 40 - Orthographic Projections II - Part 10

Lecture 41 - Orthographic Projections II - Part 11

Lecture 42 - Projection of Solids - I

Lecture 43 - Projection of Solids - II

Lecture 44 - Projection of Solids - III

Lecture 45 - Sections and Sectional Views

Lecture 46 - Sections and Sectional Views (Continued...)

Lecture 47 - Sections and Sectional Views (Continued...)

Lecture 48 - Isometric Projections

Lecture 49 - Isometric Projections (Continued...)

Lecture 50 - Isometric Projections (Continued...)

Lecture 51 - Overview of Computer Graphics - I

Lecture 52 - Overview of Computer Graphics - II

Lecture 53 - Overview of Computer Graphics - III

Lecture 54 - Overview of Computer Graphics - IV

Lecture 55 - Solidworks

Lecture 56 - Solidworks (Continued...)

Lecture 57 - Solidworks (Continued...)

Lecture 58 - Solidworks (Continued...)

Lecture 59 - Solidworks (Continued...)

Lecture 60 - Solidworks (Continued...)

Lecture 61 - Assembly Drawing

Lecture 62 - Assembly Drawing (Continued...)

Lecture 63 - Assembly Drawing (Continued...)

Lecture 64 - Assembly Drawing (Continued...)

Lecture 65 - Assembly Drawing (Continued...)

NPTEL : NOC:Tools in Scientific Computing (Mechanical Engineering)

Co-ordinators : Prof. Aditya Bandopadhyay

NPTEL : NOC:Advanced Dynamics (Mechanical Engineering)

Co-ordinators : Prof. Anirvan DasGupta

Lecture 32 - Planar kinetics: impulse-momentum relations - II

Lecture 33 - Spatial kinematics of rigid bodies - I

Lecture 34 - Spatial kinematics of rigid bodies - II

Lecture 35 - Spatial kinetics of rigid bodies - I

Lecture 36 - Spatial kinetics of rigid bodies - II

Lecture 37 - Spatial kinetics of rigid bodies - III

Lecture 38 - Gyroscopic motion - I

Lecture 39 - Gyroscopic motion - II

Lecture 40 - Gyroscopic motion - III

Lecture 41 - Kinematics of rotation - I

Lecture 42 - Kinematics of rotation - II

Lecture 43 - Kinematics of rotation - III

Lecture 44 - Kinematics of rotation - IV

Lecture 45 - Kinematics of rotation - V

Lecture 46 - Introduction to Analytical Dynamics: generalized coordinates - I

Lecture 47 - Introduction to Analytical Dynamics: generalized coordinates - II

Lecture 48 - Hamilton's principle and Lagrange's equation of motion - I

Lecture 49 - Hamilton's principle and Lagrange's equation of motion - II

Lecture 50 - Hamilton's principle and Lagrange's equation of motion - III

Lecture 51 - Hamilton's principle and Lagrange's equation of motion - IV

Lecture 52 - Systems with constraints - I

Lecture 53 - Systems with constraints - II

Lecture 54 - Systems with constraints - III

Lecture 55 - Systems with constraints - IV

Lecture 56 - Symmetries and conservation laws - I

Lecture 57 - Symmetries and conservation laws - II

Lecture 58 - Symmetries and conservation laws - III

Lecture 59 - Symmetries and conservation laws - IV

Lecture 60 - Intermediate axis theorem

NPTEL : NOC:Biomechanics of Joints and Orthopaedic Implants (Mechanical Engineering)

Co-ordinators : Prof. Sanjay Gupta

NPTEL : NOC:Elements of Metal Cutting, Machine tools, Gear Cutting and CNC Machining (Mechanical Engineering)

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Finite Element Method (Mechanical Engineering)

Co-ordinators : Prof. Biswanath Banerjee, Prof. Amit Shaw

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Introduction (Continued...)

Lecture 4 - Introduction (Continued...)

Lecture 5 - Introduction (Continued...)

Lecture 6 - Elements of Calculation of Variations - I

Lecture 7 - Elements of Calculation of Variations - II

Lecture 8 - Elements of Calculation of Variations - III

Lecture 9 - Strong Form and Weak Form

Lecture 10 - Rayleigh - Ritz Method - I

Lecture 11 - Rayleigh - Ritz Method - II

Lecture 12 - Weighted Residual Method

Lecture 13 - Weighted Residual Method - Example

Lecture 14 - Concepts of Element and Axial Bar Problem

Lecture 15 - Axial Bar Problem

Lecture 16 - Axial Bar - II

Lecture 17 - Beam Formulation

Lecture 18 - Beam Stiffness Matrix

Lecture 19 - Problems

Lecture 20 - Beam Column

Lecture 21 - Problem

Lecture 22 - Share Deformable Beam Theory

Lecture 23 - Weak Form and Discretization

Lecture 24 - Reduced Integration Based Stiffness Matrix

Lecture 25 - Problem

Lecture 26 - Problem (Continued...)

Lecture 27 - Element of Formulation

Lecture 28 - Analysis of Plane Truss

Lecture 29 - Analysis of Plane Truss (Computer Implementation)

Lecture 30 - Analysis of Euler-Bernoulli Beam (Computer Implementation)

Lecture 31 - Analysis of Plane Frame (Computer Implementation)

NPTEL : NOC:Product Engineering and Design Thinking (Mechanical Engineering)

Co-ordinators : Prof. Pranab K Dan, Prof. Prabir Sarkar

NPTEL : NOC:Microfluidics and Nanofluidics (Mechanical Engineering)

Co-ordinators : Prof. Suman Chakraborty

Lecture 32 - Fluid Flow through Deformable Microchanels (Continued...)

Lecture 33 - Lubrication Theory

Lecture 34 - Lubrication Theory (Continued...)

Lecture 35 - Lubrication Theory (Continued...)

Lecture 36 - Lubrication Theory (Continued...)

Lecture 37 - Lubrication Theory (Continued...)

Lecture 38 - Lubrication Theory - 2 Dimensional Problems

Lecture 39 - Unsteady Flows

Lecture 40 - Unsteady Flows (Continued...)

Lecture 41 - Unsteady Flows: Stoke's 1st problem (Continued...)

Lecture 42 - Unsteady Flows: Stoke's 1st problem (Continued...)

Lecture 43 - Unsteady Flows: Stoke's 2nd Problem

Lecture 44 - Unsteady Flows: Stoke's 2nd Problem (Continued...)

Lecture 45 - Unsteady Flows: Stoke's 2nd Problem (Continued...)

Lecture 46 - Stokes Flow Past a Sphere

Lecture 47 - Stokes Flow Past a Sphere

Lecture 48 - Stokes Flow Past a Sphere - The Drag Force

Lecture 49 - Surface Tension and Its Implications in Mircrofluidics

Lecture 50 - Equilibrium of a Droplet

Lecture 51 - Equilibrium of a Droplet (Continued...)

Lecture 52 - Capillary Rise

Lecture 53 - Capillary Filling Dynamics

Lecture 54 - Capillary Filling Dynamics (Continued...)

Lecture 55 - Capillary Filling Dynamics (Continued...)

Lecture 56 - Capillary Filling Dynamics (Continued...)

Lecture 57 - Factors affecting Capillary and Wetting

Lecture 58 - Electrowetting

Lecture 59 - Slip Boundary Condition

Lecture 60 - Apparent Slip

Lecture 61 - Thin Film Flows

Lecture 62 - Thin Film Flows (Continued...)

Lecture 63 - Electrokinetics and Electric Double Layer

Lecture 64 - Equilibrium within Electrical Double Layer Poisson Boltzmann model

NPTEL : NOC:Industrial Robotics: Theories for Implementation (Mechanical Engineering)

Co-ordinators : Dr. Arun Dayal Udai

NPTEL : NOC:Cryogenic Hydrogen Technology (Mechanical Engineering)

Co-ordinators : Prof. Indranil Ghosh

NPTEL : NOC:Industrial Hydraulics and Automation (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Kumar, Prof. Ajit Kumar

NPTEL : Advanced Gas Dynamics (Mechanical Engineering)

Co-ordinators : Dr. Rinku Mukherjee

NPTEL : Design and Optimization of Energy systems (Mechanical Engineering)

Co-ordinators : Prof. C. Balaji

NPTEL : Engineering Fracture Mechanics (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

Lecture 1 - EFM Course Outline

Lecture 2 - Spectacular Failures

Lecture 3 - Lessons from Spectacular Failures

Lecture 4 - LEFM and EPFM

Lecture 5 - Fracture Mechanics is Holistic

Lecture 6 - Fatigue Crack Growth Model

Lecture 7 - Crack Growth and Fracture Mechanisms

Lecture 8 - Elastic Strain Energy

Lecture 9 - Fracture Strength by Griffith

Lecture 10 - Energy Release Rate

Lecture 11 - Utility of Energy Release Rate

Lecture 12 - Pop-in Phenomenon

Lecture 13 - Displacement and Stress Formulations

Lecture 14 - Forms of Stress Functions

Lecture 15 - Airyâ€™s Stress Function for Mode-I

Lecture 16 - Westergaard Solution of Stress Field for Mode-I

Lecture 17 - Displacement Field for Mode-I

Lecture 18 - Relation between KI and GI

Lecture 19 - Stress Field in Mode-II

Lecture 20 - Generalised Westergaard Approach

Lecture 21 - Williamâ€™s Eigen Function Approach

Lecture 22 - Multi-parameter Stress Field Equations

Lecture 23 - Validation of Multi-parameter Field Equations

Lecture 24 - Discussion Session - I

Lecture 25 - Evaluation of SIF for Various Geometries

Lecture 26 - SIF for Embedded Cracks

Lecture 27 - SIF for Surface Cracks

Lecture 28 - Modeling of Plastic Deformation

Lecture 29 - Irwinâ€™s Model

Lecture 30 - Dugdale Model

Lecture 31 - Fracture Toughness Testing

NPTEL : Experimental Stress Analysis (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

Lecture 1 - Overview of Experimental Stress Analysis

Lecture 2 - Optical Methods Work as Optical Computers

Lecture 3 - Stress, Strain and Displacement Fields

Lecture 4 - Physical Principle of Strain Gauges, Photoelasticity and MoirÃ©

Lecture 5 - Introduction to MoirÃ©, Brittle Coatings and Holography

Lecture 6 - Hologram Interferometry, Speckle Methods

Lecture 7 - Introduction to Shearography, TSA, DIC and Caustics

Lecture 8 - Fringe Patterns â€“ Richness of Qualitative Information

Lecture 9 - Multi-Scale Analysis in Experimental Mechanics

Lecture 10 - Selection of an Experimental Technique

Lecture 11 - Introduction to Transmission Photoelasticity

Lecture 12 - Ordinary and Extraordinary Rays

Lecture 13 - Light Ellipse, Passage of Light Through a Crystal Plate

Lecture 14 - Retardation Plates, Stress-optic Law

Lecture 15 - Plane Polariscope

Lecture 16 - Jones Calculus

Lecture 17 - Circular Polariscope

Lecture 18 - Determination of Photoelastic Parameters at an Arbitrary Point

Lecture 19 - Tardyâ€™s Method of Compensation

Lecture 20 - Calibration of Photo elastic Materials

Lecture 21 - Fringe Thinning Methodologies

Lecture 22 - Fringe Ordering in Photoelasticity

Lecture 23 - Miscellaneous Topics in Transmission Photoelasticity

Lecture 24 - Three Dimensional Photoelasticity

Lecture 25 - Overview of Digital Photoelasticity

Lecture 26 - Introduction to Photoelastic Coatings

Lecture 27 - Correction Factors for Photoelastic Coatings

Lecture 28 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatings

Lecture 29 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings

Lecture 30 - Analysis of Brittle Coatings

Lecture 31 - Introduction to Strain Gauges

NPTEL : Rocket Propulsion (Mechanical Engineering)

Co-ordinators : Prof. K. Ramamurthi

NPTEL : Advanced Finite Elements Analysis (Mechanical Engineering)

Co-ordinators : Dr. R. Krishnakumar

NPTEL : Advanced Operations Research (Mechanical Engineering)

Co-ordinators : Prof. G. Srinivasan

NPTEL : Fundamentals of Operations Research (Mechanical Engineering)

Co-ordinators : Prof. G. Srinivasan

NPTEL : Introduction to Finite Element Method (Mechanical Engineering)

Co-ordinators : Dr. R. Krishnakumar

NPTEL : Mechanical Measurements and Metrology (Mechanical Engineering)

Co-ordinators : Prof. Shunmugam M. S, Prof. S.P. Venkateshan

NPTEL : Principles of Mechanical Measurements (Mechanical Engineering)

Co-ordinators : Prof. R. Raman

NPTEL : Spray Theory and Applications (Mechanical Engineering)

Co-ordinators : Prof. Mahesh Panchagnula, Dr. Paul E. Sojka

NPTEL : Conduction And Radiation (Mechanical Engineering)

Co-ordinators : Prof. C. Balaji

NPTEL : Gas Dynamics and Propulsion (Mechanical Engineering)

Co-ordinators : Prof. V. Babu

NPTEL : Microfluidics (Mechanical Engineering)

Co-ordinators : Dr. Ashis Kumar Sen

NPTEL : Convective Heat Transfer (Mechanical Engineering)

Co-ordinators : Dr. Arvind Pattamatta, Prof. Ajit K. Kolar

NPTEL : Introduction to Explosions and Explosion Safety (Mechanical Engineering)

Co-ordinators : Prof. K. Ramamurthi

NPTEL : Metrology (Mechanical Engineering)

Co-ordinators : Dr. K. Sadashivappa

Lecture 32 - Introduction to comparators, Mechanical comparators

Lecture 33 - Electrical and electronic comparators, Optical comparators

Lecture 34 - Pneumatic comparators

Lecture 35 - Geometrical tests on lathe

Lecture 36 - Geometrical tests on pillar type drilling machine

Lecture 37 - Universal measuring machine (UMM) and Coordinate measuring machine (CMM)

Lecture 38 - CMM probes and CMM software

Lecture 39 - Feature measurement using CMM, Laser vision

Lecture 40 - In-process gauging and control

Lecture 41 - Stage position metrology

Lecture 42 - Micro and Nano stages, Nano technology instrumentation

Lecture 43 - Optical system design

Lecture 44 - Complex opto- mechanical assemblies, Metrology testing and certification services

NPTEL : NOC:Engineering Mechanics Statics and Dynamics (Mechanical Engineering)

Co-ordinators : Prof. Mahesh Panchagnula

NPTEL : NOC:Foundation of Computational Fluid Dynamics (Mechanical Engineering)

Co-ordinators : Dr.S.Vengadesan

NPTEL : NOC:Introduction to Boundary Layers (Mechanical Engineering)

Co-ordinators : Dr. Rinku Mukherjee

Lecture 1 - Review of fundamentals of fluid mechanics - I

Lecture 2 - Review of fundamentals of fluid mechanics - II

Lecture 3 - Concept of a Boundary Layer (BL) - I

Lecture 4 - Concept of a Boundary Layer (BL) - II

Lecture 5 - Concepts of BL thickness (?)

Lecture 6 - Concepts of BL displacement thickness (?*) and BL momentum thickness (?)

Lecture 7 - Control Volume approach to derive expressions for ?* over a flat plate

Lecture 8 - Control Volume approach to derive expressions for ? over a flat plate

Lecture 9 - Concept of wall friction

Lecture 10 - Concept of friction drag

Lecture 11 - Skin Friction Coefficient - I

Lecture 12 - Skin Friction Coefficient - II

Lecture 13 - Derivation of Prandtls Laminar BL Equations - I

Lecture 14 - Derivation of Prandtls Laminar BL Equations - II

Lecture 15 - Derivation of Prandtls Laminar BL Equations - III

Lecture 16 - Derivation of Prandtls Laminar BL Equations - IV

Lecture 17 - Similarity Solutions to the BL Equations Applied to a Flat Plate - I

Lecture 18 - Similarity Solutions to the BL Equations Applied to a Flat Plate - II

Lecture 19 - Similarity Solutions to the BL Equations Applied to a Flat Plate - III

Lecture 20 - Runge-Kutta Method to Numerically Solve the BL Equations Applied to a Flat Plate

Lecture 21 - Description of the Numerical Code to Solve the BL Equations Applied to a Flat Plate

Lecture 22 - Similarity Solutions to the BL Equations (other than flat plate) - I

Lecture 23 - Similarity Solutions to the BL Equations (other than flat plate) - II

Lecture 24 - Similarity Solutions to the BL Equations (other than flat plate) - III

Lecture 25 - Similarity Solutions to the BL Equations (other than flat plate) - IV

Lecture 26 - Description of the Numerical Code to Solve the BL Equations (other than flat plate)

Lecture 27 - The Energy Equation - I

Lecture 28 - The Energy Equation - II

Lecture 29 - Similarity Solutions to Thermal BL - I

Lecture 30 - Similarity Solutions to Thermal BL - II

Lecture 31 - Similarity Solutions to Thermal BL - III

NPTEL : NOC:Fundamentals of Gas Dynamics (Mechanical Engineering)

Co-ordinators : Prof.A. Sameen

NPTEL : NOC:Experimental Stress Analysis - An Overview (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

Lecture 32 - Selection of an experimental technique - Part 2

NPTEL : NOC:Fluid Dynamics and Turbomachines (Mechanical Engineering)

Co-ordinators : Prof. Dhiman Chatterjee, Prof. Shamit Bakshi

NPTEL : NOC:Micro and Nano Scale Energy Transport (Mechanical Engineering)

Co-ordinators : Dr. Arvind Pattamatta

NPTEL : NOC:Electron Diffraction and Imaging (Mechanical Engineering)

Co-ordinators : Prof. Sundararaman M

NPTEL : NOC:Acoustic and Noise Control (Mechanical Engineering)

Co-ordinators : Prof. Abijith Sarkar

Lecture 1 - Module 1 - Introduction - 1

Lecture 2 - Module 1 - Introduction - 2

Lecture 3 - Module 2 - Governing Equation - 1

Lecture 4 - Module 2 - Governing Equation - 2

Lecture 5 - Module 3 - Plane Wave - 1

Lecture 6 - Module 3 - Plane Wave - 2

Lecture 7 - Module 4 - Reflection Of Plane Waves - 1

Lecture 8 - Module 4 - Reflection Of Plane Waves - 2

Lecture 9 - Module 5 - Frequence Analysis - 1

Lecture 10 - Module 5 - Frequence Analysis - 2

Lecture 11 - Module 6 - Harmonic Plane Waves

Lecture 12 - Module 7 - Travelling And Standing Waves

Lecture 13 - Module 8 - Acoustic Mode Shapes, Reflection

Lecture 14 - Module 9 - Plane Waves : Reflection and Intermission

Lecture 15 - Module 10 - Flexural Waves, evanescent Waves

Lecture 16 - Module 11 - Near Field Acoustic Waves

Lecture 17 - Module 12 - cuton Waves in duct

Lecture 18 - Module 13 - Power Calculation

Lecture 19 - Module 14 - Decibel Scale

Lecture 20 - Module 15 - Db Arithmetic

Lecture 21 - Module 16 - Sound Power Level

Lecture 22 - Module 17 - Human factors in Acoustic Engineering

Lecture 23 - Module 18 - Microphone

Lecture 24 - Module 19 - Acoustic Measurements

Lecture 25 - Module 20 - Muffler Analysis

Lecture 26 - Module 21 - Transfer Matrix Method

Lecture 27 - Module 22 - Electro Mechanical Analogies - Part 1

Lecture 28 - Module 23 - Electro Mechanical Analogies Simple Example

Lecture 29 - Module 24 - Electro Mechanical Analogies Example

Lecture 30 - Module 25 - Helmholtz Resonator

Lecture 31 - Module 26 - Source Impedance

NPTEL : NOC:Steel Quality - Role of Secondary Refining and Continuous Casting (Mechanical Engineering)

Co-ordinators : Prof. Santanu Kr. Ray

NPTEL : NOC:X-ray Crystallography and Diffraction (Mechanical Engineering)

Co-ordinators : Prof. Ranjit Kumar Ray

NPTEL : NOC:Transport Phenomena in Materials (Mechanical Engineering)

Co-ordinators : Dr. G. Phanikumar

NPTEL : NOC:Experimental Stress Analysis - An Overview (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : NOC:Mechanics of Human Movement (Mechanical Engineering)

Co-ordinators : Prof. Sujatha Srinivasan

NPTEL : NOC:Design for Quality, Manufacturing and Assembly (Mechanical Engineering)

Co-ordinators : Prof. Palaniappaan Ramu

NPTEL : NOC:Surrogates and Approximations in Engineering Design (Mechanical Engineering)

Co-ordinators : Prof. Palaniappaan Ramu

NPTEL : NOC:Steel Quality: Role of Secondary Refining and Continuous Casting (Mechanical Engineering)

Co-ordinators : Prof. Santanu Kr. Ray

NPTEL : Theory of Mechanism (Mechanical Engineering)

Co-ordinators : Prof. Sujatha Srinivasan

NPTEL : NOC:Engineering Mechanics (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : NOC:Foundations of Computational Materials Modelling (Mechanical Engineering)

Co-ordinators : Dr.Narasimhan Swaminathan

Lecture 1 - Introduction to the course

Lecture 2 - Some applications of MD simulations

Lecture 3 - Introduction to Bravais lattices and constructing simple crystals with MATLAB

Lecture 4 - Introduction to symmetry - 1

Lecture 5 - Symmetry Elements - 1

Lecture 6 - Symmetry elements - 2

Lecture 7 - Plane groups and their Hermann-Maugin (HM) symbols

Lecture 8 - Glide reflection; Examples of writing point group symbols; Wyckoff positions

Lecture 9 - Generating 2D crystal with MATLAB using Bilbao crystallography website

Lecture 10 - Symmetry of space groups

Lecture 11 - Hernann maugin symbols of space groups

Lecture 12 - Translational symmetry operators

Lecture 13 - The Space groups

Lecture 14 - Generation of crystals

Lecture 15 - Generation of monoclinic lattice

Lecture 16 - Introduction to Statistical Mechanica - 1

Lecture 17 - Introduction to Statistical Mechanica - 2

Lecture 18 - Introduction to Statistical Mechanics - 3

Lecture 19 - Statistical mechanics - 1

Lecture 20 - Statistical mechanics - 2

Lecture 21 - Basic introduction to mechanics

Lecture 22 - Introduction to phase space

Lecture 23 - Introduction to phase average and time average

Lecture 24 - Canonical ensemble; Partition function

Lecture 25 - Basic introduction to MD

Lecture 26 - Input script for LAMMPS - 1

Lecture 27 - Input script for LAMMPS - 2

Lecture 28 - Input script for LAMMPS - 3

Lecture 29 - Input script for LAMMPS - 4

Lecture 30 - LAMMPS exercises - 1

Lecture 31 - LAMMPS exercises - 2

NPTEL : NOC:Fundamentals of Combustion for Propulsion (Mechanical Engineering)

Co-ordinators : Prof. S Varunkumar, Prof. H S Mukunda

NPTEL : NOC:Basics of Materials Engineering (Mechanical Engineering)

Co-ordinators : Prof. Ratna Kumar Annabattula

NPTEL : NOC:Computational Fluid Dynamics using Finite Volume Method (Mechanical Engineering)

Co-ordinators : Prof. Kameswararao Anupindi

Lecture 1 - Review of governing equations: Conservation of mass

Lecture 2 - Review of governing equations: Conservation of momentum

Lecture 3 - Review of governing equations: Conservation of energy

Lecture 4 - Review of governing equations: Navier-Stokes equations and energy equation

Lecture 5 - Review of governing equations: General scalar transport equation

Lecture 6 - Review of governing equations: classification of PDEs

Lecture 7 - Overview of Numerical Methods: Finite Difference Method

Lecture 8 - Overview of Numerical Methods: Finite Volume Method

Lecture 9 - Overview of Numerical Methods: Solution of linear algebraic equations

Lecture 10 - Finite Volume Method for Diffusion Equation: Discretization of 1D diffusion equation

Lecture 11 - Finite Volume Method for Diffusion Equation: Discretization of 2D diffusion equation

Lecture 12 - Finite Volume Method for Diffusion Equation: Boundary conditions for 2D diffusion equation

Lecture 13 - Finite Volume Method for Diffusion Equation: Discretization of 3D diffusion equation, mixed boundary conditions

Lecture 14 - Finite Volume Method for Diffusion Equation: Tri-Diagonal Matrix Algorithm

Lecture 15 - Finite Volume Method for Diffusion Equation: Linearization of source term, line-by-line TDMA

Lecture 16 - Finite Volume Method for Diffusion Equation: Problem solving using TDMA

Lecture 17 - Finite Volume Method for Diffusion Equation: Problem solving using line-by-line TDMA

Lecture 18 - Finite Volume Method for Diffusion Equation: Steady diffusion in polar and axisymmetric coordinates

Lecture 19 - Finite Volume Method for Diffusion Equation: Discretization of unsteady diffusion equation

Lecture 20 - Finite Volume Method for Diffusion Equation: Unsteady diffusion time-stepping schemes

Lecture 21 - Finite Volume Method for Diffusion Equation: Unsteady diffusion time-stepping schemes and Truncation errors of the FV schemes

Lecture 22 - Finite Volume Method for Diffusion Equation: Truncation errors and stability analysis

Lecture 23 - Finite Volume Method for Diffusion Equation: Stability analysis and steady diffusion in unstructured meshes.

Lecture 24 - Finite Volume Method for Diffusion Equation: Steady diffusion in unstructured meshes - Part 1

Lecture 25 - Finite Volume Method for Diffusion Equation: Steady diffusion in unstructured meshes - Part 2

Lecture 26 - Finite Volume Method for Diffusion Equation: Steady diffusion in unstructured meshes - Part 3

Lecture 27 - Finite Volume Method for Diffusion Equation: Steady diffusion in unstructured meshes - Part 4

Lecture 28 - Finite Volume Method for Diffusion Equation: Steady diffusion in unstructured meshes - Part 5

Lecture 29 - Finite Volume Method for Convection and Diffusion: Discretization of steady convection equation

Lecture 30 - Finite Volume Method for Convection and Diffusion: Discretization of steady convection equation

NPTEL : NOC:Wheeled Mobile Robots (Mechanical Engineering)

Co-ordinators : Prof. Asokan Thondiyath, Prof. Santhakumar Mohan

NPTEL : NOC:Fundamentals of Combustion (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

Lecture 31 - Characteristics of combustion flame and detonation - Part 3 - Rankine-Hugoniot relation

Lecture 32 - Characteristics of combustion flame and detonation - Part 4 - Estimation of detonation velocity and Worked examples

Lecture 33 - Laminar Premixed Flames - Part 1 - Laminar flame propagation

Lecture 34 - Laminar Premixed Flames - Part 2 - Laminar flame speed variation and Structure of premixed flames

Lecture 35 - Laminar Premixed Flames - Part 3 - Flammability limits and Premixed flame theory

Lecture 36 - Laminar Premixed Flames - Part 4 - Estimation of laminar flame speed

Lecture 37 - Laminar Premixed Flames - Part 5 - Ignition of premixed mixture (Semenov's Analysis)

Lecture 38 - Laminar Premixed Flames - Part 6 - Piloted ignition and Flame quenching

Lecture 39 - Laminar Premixed Flames - Part 7 - Premixed flame stability

Lecture 40 - Laminar Premixed Flames - Part 8 - Stability Maps and Worked examples

Lecture 41 - Laminar Diffusion Flames - Part 1 - Theory of gas jets

Lecture 42 - Laminar Diffusion Flames - Part 2 - Analysis of gas jets and jet diffusion flames

Lecture 43 - Laminar Diffusion Flames - Part 3 - Diffusion flame characteristics and flame structure

Lecture 44 - Laminar Diffusion Flames - Part 4 - Diffusion flame structure and Flame regimes

Lecture 45 - Laminar Diffusion Flames - Part 5 - Diffusion flame regimes and Flame height correlations

Lecture 46 - Laminar Diffusion Flames - Part 6 - Diffusion flame control

Lecture 47 - Laminar Diffusion Flames - Part 7 - Diffusion flame configurations (coflow, crossflow and opposed flow flames)

Lecture 48 - Laminar Diffusion Flames - Part 8 - Diffusion flame stability and Worked examples

Lecture 49 - Turbulent Flames - Part 1 - Characteristics of turbulence

Lecture 50 - Turbulent Flames - Part 2 - Turbulent length scales and turbulent stresses

Lecture 51 - Turbulent Flames - Part 3 - Axisymmetric turbulent jet

Lecture 52 - Turbulent Flames - Part 4 - Turbulent premixed flames and flame regimes

Lecture 53 - Turbulent Flames - Part 5 - Turbulent diffusion flames

Lecture 54 - Droplet evaporation and combustion - Part 1 - Steady evaporation of liquid droplet

Lecture 55 - Droplet evaporation and combustion - Part 2 - Equilibrium under steady evaporation of liquid droplet and droplet combustion

Lecture 56 - Droplet evaporation and combustion - Part 3 - Droplet combustion (simplified analysis)

Lecture 57 - Droplet evaporation and combustion - Part 4 - Species and temperature profiles

Lecture 58 - Droplet evaporation and combustion - Part 5 - Evaluation of mass burning rate and worked examples

Lecture 59 - Combustion of carbon particle - Part 1 - Coal combustion

Lecture 60 - Combustion of carbon particle - Part 2 - One film model

Lecture 61 - Combustion of carbon particle - Part 3 - Two film model and worked examples

NPTEL : NOC:Oil Hydraulics and Pneumatics (Mechanical Engineering)

Co-ordinators : Prof. Somashekhar S

NPTEL : Introduction to Turbomachines (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

NPTEL : NOC:Mechanics and Control of Robotic Manipulators (Mechanical Engineering)

Co-ordinators : Prof. Santhakumar Mohan

NPTEL : Inverse Methods in Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. C.Balaji, Prof.S. Balaji

NPTEL : Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

NPTEL : Applied Mechanics - Fluid Mechanics Laboratory (Mechanical Engineering)

Co-ordinators : Unknown

NPTEL : NOC:Interfacial Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Harish N Dixit

NPTEL : Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Dr. Babu Viswanathan

NPTEL : Heat Transfer (Prof .Dr.C. Balaji) (Mechanical Engineering)

Co-ordinators : Prof .Dr.C. Balaji

NPTEL : NOC:Inverse Methods in Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Balaji Srinivasan

NPTEL : NOC:Sustainable Energy Technology (Mechanical Engineering)

Co-ordinators : Dr. Sayak Banerjee

NPTEL : NOC:Strength of Materials - IITM (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : NOC:Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

NPTEL : NOC:Theory of Fire Propagation (Fire Dynamics) (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

NPTEL : Data-Driven Models for Unsteady Fluid Flow (Mechanical Engineering)

Co-ordinators : Prof. Aditya G. Nair

NPTEL : NOC:Applied Thermodynamics (2024) (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

NPTEL : NOC:Design of Mechanical Transmission Systems (Mechanical Engineering)

Co-ordinators : Prof. Ramkumar

NPTEL : NOC:Turbulence Modeling (Mechanical Engineering)

Co-ordinators : Prof. Vagesh D. Narasimhamurthy

Lecture 1 - Introduction to turbulence

Lecture 2 - Statistical Analysis: An approach of modelling turbulence - I

Lecture 3 - Statistical Analysis: An approach of modelling turbulence - II

Lecture 4 - Statistical Analysis and Cartesian tensors - I

Lecture 5 - Statistical Analysis and Cartesian tensors - II

Lecture 6 - Navier Stokes: the governing equations - 1

Lecture 7 - Navier Stokes: the governing equations - 2

Lecture 8 - RANS equations I - 1

Lecture 9 - RANS equations I - 2

Lecture 10 - RANS equations II - 1

Lecture 11 - RANS equations II - 2

Lecture 12 - Reynold's stress: governing equations - I

Lecture 13 - Reynold's stress: governing equations - II

Lecture 14 - Statistical Stationarity and Homogenity in Plane Couttee Flows - I

Lecture 15 - Statistical Stationarity and Homogenity in Plane Couttee Flows - II

Lecture 16 - Pressure-strain-rate and redistribution of turbulence in flows - I

Lecture 17 - Pressure-strain-rate and redistribution of turbulence in flows - II

Lecture 18 - Turbulence Kinetic Energy and it's dissipation rate - I

Lecture 19 - Turbulence Kinetic Energy and it's dissipation rate - II

Lecture 20 - Production rate of TKE and Mean TKE - I

Lecture 21 - Production rate of TKE and Mean TKE - II

Lecture 22 - Turbulent Boundary Layer: Order of Magnitude analysis - I

Lecture 23 - Turbulent Boundary Layer: Order of Magnitude analysis - II

Lecture 24 - Inner and Outer TBL: Order of magnitude analysis - I

Lecture 25 - Inner and Outer TBL: Order of magnitude analysis - II

Lecture 26 - Inner layer equation, constant stress layer, and inner velocity scaling - I

Lecture 27 - Inner layer equation, constant stress layer, and inner velocity scaling - II

Lecture 28 - Reynold's Averaged Navier-Stokes (RANS) models - I

Lecture 29 - Reynold's Averaged Navier-Stokes (RANS) models - II

Lecture 30 - Different approaches to solve turbulence closure problem - I

Lecture 31 - Different approaches to solve turbulence closure problem - II

NPTEL : Advanced Manufacturing Processes (Mechanical Engineering)

Co-ordinators : Dr. A.K. Sharma

NPTEL : Computational Fluid Dynamics (Dr. K.M. Singh) (Mechanical Engineering)

Co-ordinators : Dr. K.M. Singh

Lecture 1 - General Introduction: Historical Background and Spectrum of Applications

Lecture 2 - CFD: Simulation Process and Course Outline

Lecture 3 - Conservation Laws and Mathematical Preliminaries

Lecture 4 - Mass Conservation: Continuity Equation

Lecture 5 - Momentum Equation: Newtonâ€™s 2nd Law

Lecture 6 - Momentum Equation: Navier-Stokes Equations

Lecture 7 - Navier-Stokes Equation and its Simplified Forms

Lecture 8 - Energy and Scalar Transport Equations

Lecture 9 - Scalar Transport, Mathematical Classification and Boundary Conditions

Lecture 10 - Finite Difference Method: Methodology and Grid Notation

Lecture 11 - Finite Difference Approximation of First Order Derivatives

Lecture 12 - Finite Difference Approximation of Second Order Derivatives - 1

Lecture 13 - Finite Difference Approximation of Second Order Derivatives - 2

Lecture 14 - Approximation of Mixed Derivatives and Multi-Dimensional F.D. Formulae

Lecture 15 - Implementation of Boundary Conditions and Finite Difference Algebraic System

Lecture 16 - Applications of FDM to Scalar Transport Problems - 1

Lecture 17 - Applications of FDM to Scalar Transport Problems - 2

Lecture 18 - Application of FDM to Advection-Diffusion and Computer Implementation Aspects

Lecture 19 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 1

Lecture 20 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 2

Lecture 21 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 3

Lecture 22 - Solution of Discrete Algebraic Systems

Lecture 23 - Direct and Basic Iterative Methods for Linear Systems

Lecture 24 - Accelerated Iterative Methods for Linear Systems

Lecture 25 - Two Level and Multi-Level Methods for First Order IVPs - 1

Lecture 26 - Two Level and Multi-Level Methods for First Order IVPs - 2

Lecture 27 - Application to Unsteady Transport Problems

Lecture 28 - Introduction to Finite Volume Method

Lecture 29 - Finite Volume Interpolation Schemes

Lecture 30 - Application of FVM to Scalar Transport

Lecture 31 - Introduction to Finite Element Method

NPTEL : Metal Casting (Mechanical Engineering)

Co-ordinators : Dr. D. B. Karunakar

NPTEL : Processing of non metals (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : Vibration control (Mechanical Engineering)

Co-ordinators : Dr. S. P. Harsha

NPTEL : Welding Engineering (Mechanical Engineering)

Co-ordinators : Dr. D.K. Dwivedi

NPTEL : Industrial Engineering (Mechanical Engineering)

Co-ordinators : Prof. P.K. Jain, Dr. Pradeep Kumar, Dr. Inderdeep Singh, Dr. D.K. Dwivedi

NPTEL : Manufacturing Processes I (Mechanical Engineering)

Co-ordinators : Dr. D.B. Karunakar, Dr. Inderdeep Singh. Dr. D.K. Dwivedi

NPTEL : Strength of Materials (Mechanical Engineering)

Co-ordinators : Dr. S.P. Harsha

NPTEL : NOC:Two Phase Flow and Heat Transfer (Mechanical Engineering)

Co-ordinators : Dr. Arup Kumar Das

NPTEL : NOC:Refrigeration and Air-Conditioning (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Engineering Economic Analysis (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Convective Heat Transfer (Mechanical Engineering)

Co-ordinators : Dr. Arup Kumar Das

NPTEL : NOC:Introduction to Mechanical Vibration (Mechanical Engineering)

Co-ordinators : Prof. Anil Kumar

NPTEL : NOC:Joining Technologies for Metals (Mechanical Engineering)

Co-ordinators : Prof. Dheerendra Kumar Dwivedi

NPTEL : NOC:Modelling and Simulation of Dynamic Systems (Mechanical Engineering)

Co-ordinators : Prof. Pushparaj Mani Pathak

NPTEL : NOC:Principles of Casting Technology (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Steam and Gas Power Systems (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Product Design and Development (Mechanical Engineering)

Co-ordinators : Prof. Indradeep Singh

NPTEL : NOC:Fundamentals of Manufacturing Processes (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Modelling and Simulation of Discrete Event System (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Processing of Polymers and Polymer Composites (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Operations Management (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Theory of Production Processes (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Automatic Control (Mechanical Engineering)

Co-ordinators : Dr. Anil Kumar

NPTEL : NOC:Failure Analysis and Prevention (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Mechanical Measurement System (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Fundamentals of Surface Engineering: Mechanisms, Processes and Characterizations (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Work System Design (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Principles of Metal Forming Technology (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Radiative Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Ankit Bansal

NPTEL : NOC:Weldability of Metals (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Manufacturing Guidelines for Product Design (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Inspection and Quality Control in Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. Kaushik Pal

NPTEL : NOC:Financial Mathematics (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Product Design Using Value Engineering (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Selection of Nanomaterials for Energy Harvesting and Storage Application (Mechanical Engineering)

Co-ordinators : Prof. Kaushik Pal

NPTEL : NOC:Robotics and Control: Theory and Practice (Mechanical Engineering)

Co-ordinators : Prof. N. Sukavanam, Prof. M. Felix Orlando

NPTEL : NOC:Acoustic Metamaterials (Mechanical Engineering)

Co-ordinators : Prof. Sneha Singh

NPTEL : NOC:Power Plant Engineering (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Principles of Industrial Engineering (Mechanical Engineering)

Co-ordinators : Prof. D K Dwivedi

NPTEL : NOC:Mechatronics (Mechanical Engineering)

Co-ordinators : Prof. Pushparaj Mani Pathak

NPTEL : NOC:Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Anjani Kumar Tiwari

Lecture 32 - Coordinate systems: cylindrical coordinates

Lecture 33 - Cartesian and planar polar coordinates: examples

Lecture 34 - Spherical and cylindrical coordinates: examples

Lecture 35 - Equation of motion in different coordinate systems

Lecture 36 - Equation of motion: examples

Lecture 37 - Work energy method

Lecture 38 - Work energy method: examples

Lecture 39 - Impulse momentum relation

Lecture 40 - Variable mass

Lecture 41 - Direct central impact

Lecture 42 - Oblique central impact

Lecture 43 - Moment of inertia

Lecture 44 - Moment of inertia: examples

Lecture 45 - Moment of inertia of composite bodies

Lecture 46 - Product of inertia and principal axes of inertia

Lecture 47 - Principal axes of inertia: examples - I

Lecture 48 - Principal axes of inertia: examples - II

Lecture 49 - Harmonic oscillator: simple harmonic motion

Lecture 50 - Simple harmonic motion: examples

Lecture 51 - Damped harmonic oscillator

Lecture 52 - Translation and rotation of rigid bodies

Lecture 53 - Translation and rotation of rigid bodies: examples

Lecture 54 - Plane motion of a rigid body

Lecture 55 - Plane motion of a rigid body: work energy equation

Lecture 56 - Plane motion of a rigid body: impulse-momentum equation

Lecture 57 - Three-dimensional dynamics of rigid bodies: angular momentum

Lecture 58 - Eulerâ€™s equations of motion

Lecture 59 - Eulerâ€™s equations of motion: examples

Lecture 60 - Revision: Dynamics

NPTEL : Micro and Smart Systems (Mechanical Engineering)

Co-ordinators : Dr. K.J. Vinoy, Prof. S. Gopalakrishnan, Prof. K.N. Bhat, Prof. G.K. Anathasuresh

NPTEL : NOC:Variational Methods in Mechanics (Mechanical Engineering)

Co-ordinators : Prof. G.K. Anathasuresh

Lecture 1 - Classification of optimization problems and the place of Calculus of Variations in it - Part I

Lecture 2 - Classification of optimization problems and the place of Calculus of Variations in it - Part II

Lecture 3 - Genesis of Calculus of Variations - Part I

Lecture 4 - Genesis of Calculus of Variations - Part II

Lecture 5 - Formulation of Calculus of Variations problems in geometry and mechanics and design - Part I

Lecture 6 - Formulation of Calculus of Variations problems in geometry and mechanics and design - Part II

Lecture 7 - Unconstrained minimization in one and many variables - Part I

Lecture 8 - Unconstrained minimization in one and many variables - Part II

Lecture 9 - Constrained minimization KKT conditions - Part I

Lecture 10 - Constrained minimization KKT conditions - Part II

Lecture 11 - Sufficient conditions for constrained minimization - Part I

Lecture 12 - Sufficient conditions for constrained minimization - Part II

Lecture 13 - Mathematical preliminaries function, functional, metrics and metric space, norm and vector spaces - Part I

Lecture 14 - Mathematical preliminaries function, functional, metrics and metric space, norm and vector spaces - Part II

Lecture 15 - Function spaces and Gateaux variation

Lecture 16 - First variation of a functional Freche?t differential and variational derivative

Lecture 17 - Fundamental lemma of calculus of variations and Euler Lagrange equations - Part I

Lecture 18 - Fundamental lemma of calculus of variations and Euler Lagrange equations - Part II

Lecture 19 - Extension of Euler-Lagrange equations to multiple derivatives

Lecture 20 - Extension of Euler-Lagrange equations to multiple functions in a functional

Lecture 21 - Global Constraints in calculus of variations - Part I

Lecture 22 - Global Constraints in calculus of variations - Part II

Lecture 23 - Local (finite subsidiary) constrains in calculus of variations - Part I

Lecture 24 - Local (finite subsidiary) constrains in calculus of variations - Part II

Lecture 25 - Size optimization of a bar for maximum stiffness for given volume - Part I

Lecture 26 - Size optimization of a bar for maximum stiffness for given volume - Part II

Lecture 27 - Size optimization of a bar for maximum stiffness for given volume - Part III

Lecture 28 - Calculus of variations in functionals involving two and three independent variables - Part I

Lecture 29 - Calculus of variations in functionals involving two and three independent variables - Part II

Lecture 30 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdmann corner conditions - Part I

NPTEL : NOC:Compliant Mechanisms: Principles and Design (Mechanical Engineering)

Co-ordinators : Prof. G. K. Ananthasuresh

NPTEL : NOC:Heat Transfer and Combustion in Multiphase Systems (Mechanical Engineering)

Co-ordinators : Prof. Saptarshi Basu

NPTEL : NOC:Convective Heat Transfer (2018) (Mechanical Engineering)

Co-ordinators : Prof. Saptarshi Basu

NPTEL : NOC:A Short Lecture series on Contour Integration in the Complex Plane (Mechanical Engineering)

Co-ordinators : Prof. Venkata Sonti

NPTEL : NOC:Introduction to Soft Matter (Mechanical Engineering)

Co-ordinators : Prof. Aloke Kumar

NPTEL : NOC:Robotics: Basics and Selected Advanced Concepts (Mechanical Engineering)

Co-ordinators : Prof. Ashitava Ghosal

NPTEL : NOC:Sound and Structural Vibration (Mechanical Engineering)

Co-ordinators : Prof. Venkata R. Sonti

NPTEL : NOC:Vibrations of Plates and Shells (Mechanical Engineering)

Co-ordinators : Prof. Venkata R. Sonti

NPTEL : NOC:Dynamics and Control of Mechanical Systems (Mechanical Engineering)

Co-ordinators : Prof. Ashitava Ghosal

Lecture 32 - 3 Case Studies

NPTEL : NOC:Optical Methods for Solid and Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Aloke Kumar, Prof. Koushik Viswanathan

NPTEL : NOC:Statistical Thermodynamics for Engineers (Mechanical Engineering)

Co-ordinators : Prof. Saptarshi Basu

NPTEL : NOC:Fundamentals of Acoustics (2024) (Mechanical Engineering)

Co-ordinators : Prof. Venkata R. Sonti