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

Lecture 65 - Principle of optimality in dynamic programming

Lecture 66 - Principle of optimality applied to inventory control problem

Lecture 67 - Optimal control for a system with linear state dynamics and quadratic cost

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 : Tribology (Mechanical Engineering)

Co-ordinators : Dr. Harish Hirani

Lecture 1 - Introduction

Lecture 2 - Interdisciplinary Approach and Economic Benefits

Lecture 3 - Friction

Lecture 4 - Friction Estimation

Lecture 5 - Friction Instability

Lecture 6 - Wear

Lecture 7 - Adhesive Wear

Lecture 8 - Wear Mechanisms

Lecture 9 - Wear Mechanisms - 2

Lecture 10 - Wear Analysis

Lecture 11 - Lubrication and Lubricants

Lecture 12 - Boundary Lubrication

Lecture 13 - Lubrication Mechanisms

Lecture 14 - Hydrodynamic Lubrication

Lecture 15 - Lubricant Classifications

Lecture 16 - Solid and Semi Solid Lubricants

Lecture 17 - Liquid Lubricants

Lecture 18 - Lubricant Additives

Lecture 19 - Fluid Film Lubrication

Lecture 20 - Reynolds Equation

Lecture 21 - Solution of Reynolds Equation

Lecture 22 - Hybrid Solution Approach (to solve Reynolds Equation)

Lecture 23 - Finite Difference Method to Solve Reynolds Equation

Lecture 24 - Viscosity Variation

Lecture 25 - Estimating Elastic Deformation

Lecture 26 - Thermo Hydrodynamic Lubrication

Lecture 27 - Application of Tribology

Lecture 28 - Rolling Element Bearings

Lecture 29 - Rolling Element Bearings (Continued...)

Lecture 30 - Rolling Element Bearings (Continued...)

Lecture 31 - Selection of Rolling Element Bearings

NPTEL : Computer Aided Design and Manufacturing (Mechanical Engineering)

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

NPTEL : Project and Production Management (Mechanical Engineering)

Co-ordinators : Prof. Arun Kanda

NPTEL : NOC:RAC Product Design (Mechanical Engineering)

Co-ordinators : Prof. Sanjeev Jain

Lecture 1 - Introduction to Design

Lecture 2 - Design Considerations

Lecture 3 - Basic Concepts Psychrometry and Air-Conditioning

Lecture 4 - Refrigerants

Lecture 5 - Refrigerant Properties and Applications

Lecture 6 - Refrigeration Cycle and Components

Lecture 7 - Compressor Selection

Lecture 8 - Expansion Devices

Lecture 9 - Condensers and Evaporators

Lecture 10 - Types of Heat Exchangers and Air Conditioning Systems

Lecture 11 - Selection of Air Conditioning Systems for Hostels

Lecture 12 - Case Study on a Railway Air Conditioning System

Lecture 13 - Vibration and noise issues in railway AC systems

Lecture 14 - New product launch process

Lecture 15 - Case study on a telecom cooling system and Emerging technologies

NPTEL : NOC:Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.R kale

Lecture 1 - Thermodynamic Concepts: Applications of thermodynamics

Lecture 2 - Thermodynamic Concepts: System definition,Heat, Work and Mass Flow

Lecture 3 - Thermodynamic Concepts: Questions and Answers

Lecture 4 - Thermodynamic Concepts: Properties,State and Equilibrium

Lecture 5 - Thermodynamic Concepts: Process, Cycles and Applications

Lecture 6 - Thermodynamic Concepts: Steady state, Reversible and Irreversible processes

Lecture 7 - Thermodynamic Concepts: Causes of irreversibility

Lecture 8 - Thermodynamic Concepts: Thermal reservoirs

Lecture 9 - Thermodynamic Concepts: Pressure and temperature

Lecture 10 - Thermodynamic Concepts: Revision and Summary

Lecture 11 - Laws Of Thermodynamics: Mass flow rate, Conservation of mass, Flow work

Lecture 12 - Laws Of Thermodynamics: Zeroth Law

Lecture 13 - Laws Of Thermodynamics: First Laws Of Thermodynamics, 1st law for Control Mass, Internal Energy, enthalpy

Lecture 14 - Laws Of Thermodynamics: 1st law for Control Volume

Lecture 15 - Laws Of Thermodynamics: Revision, Cycles, Second Law statements, Clausius inequality

Lecture 16 - Laws Of Thermodynamics: Introduction to carnot Cycle

Lecture 17 - Laws Of Thermodynamics: Entropy,Entropy change for a system

Lecture 18 - Laws Of Thermodynamics: Thermodynamics relations,Bernoulli's equation

Lecture 19 - Laws Of Thermodynamics: Devices, Cycles

Lecture 20 - Properties of a Pure Substance: Thermodynamic behaviour of a pure substance

Lecture 21 - Properties of a Pure Substance: Saturated states, Subcooled liquid, Superheated vapour

Lecture 22 - Properties of a Pure Substance: Vapour pressure curve, Reference state

Lecture 23 - Properties of a Pure Substance: Saturated states

Lecture 24 - Properties of a Pure Substance: p-h diagram

Lecture 25 - Properties of a Pure Substance: T-s diagram, h-s diagram

Lecture 26 - Properties of a Pure Substance: Critical state, Compressibility factor

Lecture 27 - Properties of a Pure Substance: Ideal gas behaviour, Equations of state, Specific heat

Lecture 28 - Properties of a Pure Substance: Ideal gas processes

Lecture 29 - Properties of a Pure Substance: Gibbs energy, Helmholtz function, Property relations

Lecture 30 - Properties of a Pure Substance: Process analysis, Summary

Lecture 31 - Laws of Thermodynamics: Carnot Cycle Realization

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 : Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S.K. Dwivedy

Lecture 32 - Free Vibration of Single degree of freedom Nonlinear systems with Cubic and quadratic nonlinearities: effect of damping

Lecture 33 - Free Vibration of multi- degree of freedom Nonlinear systems with Cubic and quadratic nonlinearities

Lecture 34 - Forced nonlinear Vibration Single degree of freedom Nonlinear systems with Cubic nonlinearities:

Lecture 35 - Forced nonlinear Vibration Single and multi- degree of freedom Nonlinear systems

Lecture 36 - Nonlinear Forced-Vibration of Single and Multi Degree-of-Freedom System

Lecture 37 - Analysis of Multi- degree of freedom system

Lecture 38 - Nonlinear Vibration of Parametrically excited system: Axially loaded sandwich beam

Lecture 39 - Nonlinear Vibration of Parametrically excited system: Elastic and Magneto-elastic beam

Lecture 40 - Nonlinear Vibration of Parametrically excited system with internal resonance

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

Lecture 1 - Deformation of Metals

Lecture 2 - Mechanism of Plastic Deformation

Lecture 3 - Machining Processes: Single Edge Tool, Types of Chips

Lecture 4 - Tool Geometry: Single Point Cutting Tool Specifications

Lecture 5 - Tool Specifications, Conversion Of Tool Angles, Multi-Point Cutting Tools

Lecture 6 - Mechanics of Orthogonal Cutting, Force Relationships

Lecture 7 - Determination of Stress, Strain, and Strain Rate

Lecture 8 - Measurement of Shear Angle

Lecture 9 - Other Analysis for Force Relationships

Lecture 10 - Mechanics of Oblique Cutting

Lecture 11 - Measurement of Cutting Forces

Lecture 12 - Thermal Aspects Of Machining: Temperatures in Orthogonal Cutting

Lecture 13 - Tool Wear and Tool Life and Tool Life Equations

Lecture 14 - Economics in Machining

Lecture 15 - Practical Machining Operations: Turning And Shaping and Planning Operation

Lecture 16 - Practical Machining Operations: Milling And Drilling

Lecture 17 - Grinding of Metals and Mechanics of Grinding Process

Lecture 18 - Abrasive Machining and Finishing Operations

Lecture 19 - CNC Machines and CNC Programming

Lecture 20 - Introduction to Advanced Machining Processes

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

Lecture 32 - Closed Cycle, Multi-Spool Arrangement, Steam Power Plant

Lecture 33 - Basic Thermodynamics

Lecture 34 - Brayton Cycle: Introducton and General Relationships

Lecture 35 - Brayton Cycle: Efficiency, Work Ratio and Optimum Work Output Condition

Lecture 36 - Brayton Cycle with Heat Exchanger/Reheater

Lecture 37 - Brayton Cycle with Intercooler

Lecture 38 - Real Brayton Cycle, Solved Example for Ideal Cycle

Lecture 39 - Solved Examples for Real Brayton Cycle

Lecture 40 - Introduction and Performance Parameters of Propulsion System

Lecture 41 - Basics of Various Aircraft Engine

Lecture 42 - Eular Turbomachinary Equation

Lecture 43 - Introduction and Flow Analysis of Centrifugal Compressors

Lecture 44 - Thermodynamics Analysis of Centrifugal Compressors

Lecture 45 - Axial Compressor: Basics, Velocity triangles, T-S diagram and Work Intraction

Lecture 46 - Axial Compressor: Different factors, Degree of Reaction and Free Vortex Condition

Lecture 47 - Complete Analysis of Axial Flow Gas Turbine

Lecture 48 - Solved Examples for Axial Compressors,Centrifugal Compressors and Turbine

Lecture 49 - Radial Flow Turbine, Solved Example of Free vortex Condition

Lecture 50 - Nozzles and Diffuers: Introduction, Intake efficiency,Nozzle efficiency

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

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

Lecture 1 - Introduction to Plastic Working of Metals

Lecture 2 - Uniaxial Tension Test Analysis

Lecture 3 - Temperature effects in metal forming

Lecture 4 - Friction and Lubrication

Lecture 5 - Friction and Lubrication (Continued...)

Lecture 6 - Deformation zone + worked examples

Lecture 7 - Stresses at point and Theory of Plasticity

Lecture 8 - Slab Analysis

Lecture 9 - Slip Line Field Theory - Part 1

Lecture 10 - Slip Line Field Theory - Part 2

Lecture 11 - Upper Bound Theorem

Lecture 12 - Plasticity equations

Lecture 13 - Forging

Lecture 14 - Analysis of Forging

Lecture 15 - Analysis of Forging (Continued...)

Lecture 16 - Forging Die Design consideration

Lecture 17 - Forging Load

Lecture 18 - Rolling of Metals

Lecture 19 - Analysis of Rolling

Lecture 20 - Analysis of Rolling (Continued...)

Lecture 21 - Strain rate in the deformation zone

Lecture 22 - Rolling mills

Lecture 23 - Prblem on rolling

Lecture 24 - Drawing of Rods, Wires and Tubes

Lecture 25 - Drawing of Rods, Wires and Tubes (Continued...)

Lecture 26 - Analysis of Wire Drawing

Lecture 27 - Wire Drawing: Tutorial Problems

Lecture 28 - Extrusion Process

Lecture 29 - Analysis of Extrusion

Lecture 30 - Introduction

Lecture 31 - Sheet deformation process

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

Lecture 32 - Graphical representation of hydraulic system elements

Lecture 33 - Basic concepts and air compressors

Lecture 34 - Air treatment and pressure regulation

Lecture 35 - Graphical representation and pneumatic circuits

Lecture 36 - Computer aided manufacturing and process planning

Lecture 37 - CNC machines and interpolation

Lecture 38 - CNC Programming

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

Co-ordinators : Prof. Niranjan Sahoo

Lecture 1 - Review Concepts of Fluid Mechanics and Thermodynamics - I

Lecture 2 - Review Concepts of Fluid Mechanics and Thermodynamics - II

Lecture 3 - Review Concepts of Fluid Mechanics and Thermodynamics - III

Lecture 4 - Wave Propagation in Compressible Medium - I

Lecture 5 - Wave Propagation in Compressible Medium - II

Lecture 6 - Wave Propagation in Compressible Medium - III

Lecture 7 - Quasi-One Dimensional Isentropic Flow - I

Lecture 8 - Quasi-One Dimensional Isentropic Flow - II

Lecture 9 - Quasi-One Dimensional Isentropic Flow - III

Lecture 10 - Normal Shock Waves - I

Lecture 11 - Normal Shock Waves - II

Lecture 12 - Normal Shock Waves - III

Lecture 13 - Normal Shock Waves - IV

Lecture 14 - Expansion Waves and Oblique Shocks - I

Lecture 15 - Expansion Waves and Oblique Shocks - II

Lecture 16 - Expansion Waves and Oblique Shocks - III

Lecture 17 - Expansion Waves and Oblique Shocks - IV

Lecture 18 - Expansion Waves and Oblique Shocks - V

Lecture 19 - Expansion Waves and Oblique Shocks - VI

Lecture 20 - Supersonic Nozzles and Diffusers - I

Lecture 21 - Supersonic Nozzles and Diffusers - II

Lecture 22 - Supersonic Nozzles and Diffusers - III

Lecture 23 - Measurement Diagnostics and Experimental Facilitates for Compressible Flow - II

Lecture 24 - Compressible Flow with Friction and Heat Transfer - II

Lecture 25 - Compressible Flow with Friction and Heat Transfer - III

Lecture 26 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - I

Lecture 27 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - II

Lecture 28 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - III

Lecture 29 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - IV

Lecture 30 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - V

Lecture 31 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - VI

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

Lecture 1 - Introduction to composite materials

Lecture 2 - Basic terminology in Shell

Lecture 3 - Derivation of fundamental theorem of surfaces

Lecture 4 - Derivative of unit vectors and various theorems

Lecture 5 - Classification of shells

Lecture 6 - Derivation of strain-displacement relation

Lecture 7 - Derivation of shell governing equations - 1

Lecture 8 - Derivation of shell governing equations - 2

Lecture 9 - Derivation of shell governing equations - 3

Lecture 10 - Derivation of special cases

Lecture 11 - Derivation of shell constitutive relations

Lecture 12 - Solved examples on membrane theory and moment shell theory

Lecture 13 - Shell of revolution problems

Lecture 14 - Derivation of Navier solution for infinite shell panel

Lecture 15 - Basics of MATLAB coding

Lecture 16 - Derivation of Navier solution for finite shell panel

Lecture 17 - ABAQUS Modelling

Lecture 18 - Extended Kanatrovich method for shell panel

Lecture 19 - Free Vibration solution of shell panels under Navier and Levy supports - 1

Lecture 20 - Free Vibration solution of shell panels under Navier and Levy supports - 2

Lecture 21 - Basics of Buckling of shells

Lecture 22 - Buckling of cylindrical shells

Lecture 23 - Buckling of Levy-type cylindrical shells

Lecture 24 - 3D Bending

Lecture 25 - 3D Free vibration

Lecture 26 - 3D Buckling

Lecture 27 - Advanced Material

Lecture 28 - Free vibration of a composite cylindrical shell

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

Lecture 32 - Gas Turbine Performance Cycle - I

Lecture 33 - Gas Turbine Performance Cycle - II

Lecture 34 - Real Gas Turbine Performance Cycle

Lecture 35 - Aircraft Propulsion Cycle - I

Lecture 36 - Aircraft Propulsion Cycle - II

Lecture 37 - Vapour Compression Refrigeration System - I

Lecture 38 - Vapour Compression Refrigeration System - II

Lecture 39 - Absorption Refrigeration and Refrigerants

Lecture 40 - Fundamentals of Psychrometrics

Lecture 41 - Air-Conditioning Processes

Lecture 42 - Cooling Tower and Air Washers

Lecture 43 - Reciprocating Compressor - Analysis and Modelling

Lecture 44 - Multistage Compression - Analysis and Modelling

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

Co-ordinators : Prof. Debabrata Chakraborty

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 : 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

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10 (same as 9)

Lecture 11

Lecture 12 (Lecture Missing)

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

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

NPTEL : Dynamics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Amitabha Ghosh

Lecture 32 - Systems with two degree of freedom

Lecture 33 - Tuned Vibration Absorber

Lecture 34 - Design of Vibration Absorbers

Lecture 35 - Flexibility Matrix Influence Coeff

Lecture 36 - Forced Vibration of multiple

Lecture 37 - Forced Vibration of Multiple degrees

Lecture 38 - Vibration of Continuous Systems

Lecture 39 - Vibration of Continuous Systems

Lecture 40 - Vibration of Beams

Lecture 41 - Rayleigh's method

Lecture 42 - Rayleigh-Ritz Method

Lecture 43 - Vibration Measurement

Lecture 44 - Vibration Measurement Types of Pickups

NPTEL : Finite Element Method (Mechanical Engineering)

Co-ordinators : Prof. C.S. Upadhyay

Module 1 - Lecture 1

Module 1 - Lecture 2

Module 1 - Lecture 3

Module 2 - Lecture 1

Module 2 - Lecture 2

Module 2 - Lecture 3

Module 2 - Lecture 4

Module 3 - Lecture 1

Module 3 - Lecture 2

Module 3 - Lecture 3

Module 4 - Lecture 1

Module 4 - Lecture 2

Module 4 - Lecture 3

Module 5 - Lecture 1

Module 5 - Lecture 2

Module 5 - Lecture 3

Module 6 - Lecture 1

Module 6 - Lecture 2

Module 6 - Lecture 3

Module 7 - Lecture 1

Module 7 - Lecture 2

Module 7 - Lecture 3

Module 7 - Lecture 4

Module 8 - Lecture 1

Module 8 - Lecture 2

Module 8 - Lecture 3

Module 9 - Lecture 1

Module 9 - Lecture 2

Module 9 - Lecture 3

Module 10 - Lecture 1

Module 10 - Lecture 2

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

Lab session 4 - Laser Machening Process

Lab session 5 - Vaccume Assisted Forming

Lab session 6 - Vaccume Forming

Lab session 7 - Photolithiography

Lab session 8 - Replication part 1

Lab session 9 - Replication part 2

Lab session 10 - PCB Making

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

Co-ordinators : Dr. Anupam Saxena

Lecture 1 - Technical Arts 101

Lecture 2 - Technical Arts 101

Lecture 3 - Technical Arts 101

Lecture 4 - Technical Arts 101

Lecture 5 - Technical Arts 101

Lecture 6 - Technical Arts 101

Lecture 7 - Technical Arts 101

Lecture 8 - Technical Arts 101

Lecture 9 - Technical Arts 101

Lecture 10 - Technical Arts 101

Lecture 11 - Technical Arts 101

Lecture 12 - Technical Arts 101

Lecture 13 - Technical Arts 101

Lecture 14 - Technical Arts 101

Lecture 15 - Technical Arts 101

Lecture 16 - Technical Arts 101

Lecture 17 - Technical Arts 101

Lecture 18 - Technical Arts 101

Lecture 19 - Technical Arts 101

Lecture 20 - Technical Arts 101

Lecture 21 - Technical Arts 101

Lecture 22 - Technical Arts 101

Lecture 23 - Technical Arts 101

Lecture 24 - Technical Arts 101

Lecture 25 - Technical Arts 101

Lecture 26 - Technical Arts 101

Lecture 27 - Technical Arts 101

Lecture 28 - Technical Arts 101

Lab Session 1

Lab Session 2

Lab Session 3

NPTEL : NOC:BioMEMS and Microsystems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 1 - Lecture 1

Lecture 2 - Lecture 2

Lecture 3 - Lecture 3

Lecture 4 - Review Lecture 1,2,3

Lecture 5 - Lecture 4

Lecture 6 - Lecture 5

Lecture 7 - Lecture 6

Lecture 8 - Review Lecture 4,5,6

Lecture 9 - Lecture 7

Lecture 10 - Lecture 8

Lecture 11 - Lecture 9-10

Lecture 12 - Lecture-11

Lecture 13 - Lecture-12

Lecture 14 - Lecture-13

Lecture 15 - Lecture-14

Lecture 16 - Lecture-15

Lecture 17 - Lecture-16

Lecture 18 - Lecture-17

Lecture 19 - Lecture-18

Lecture 20 - Lecture-19

Lecture 21 - Review Lecture 7 to 10

Lecture 22 - Review Lecture 11 to 13

Lecture 23 - Review Lecture 14 to 16

Lecture 24 - Lecture-20

Lecture 25 - Lecture-21

Lecture 26 - Lecture-22

Lecture 27 - Lecture-23

Lecture 28 - Lecture-24

Lecture 29 - Lecture-25

Lecture 30 - Review Lecture 17,18,19

Lecture 31 - Review Lecture 20,21,22

NPTEL : NOC:Manufacturing Systems Technology (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 32

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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

Lecture 32 - Riser Design and Placement - Part 3

Lecture 33 - Introduction of Machining Processes

Lecture 34 - Review of Basic Machining Processes and the Mechanics of Chip Formation

Lecture 35 - Estimation of Cutting Ratio and Shear Angle

Lecture 36 - Merchant's Force Analysis

Lecture 37 - Merchant Theory (Cutting Forces Analysis)

Lecture 38 - Merchant Theory (Force analysis) Part-2

Lecture 39 - Lee Shaffer's Solution

Lecture 40 - Specific Energy Model for Cutting

Lecture 41 - Modeling of Heat Generation and Cutting Tool Temperature

Lecture 42 - Temperature in Cutting and Builtup Edge Formation

Lecture 43 - Metal Cutting Operation

Lecture 44 - Tool life and Tool wear

Lecture 45 - Economics of Machining

Lecture 46 - Joining Process

Lecture 47 - Principle of Solid State Welding

Lecture 48 - Numerical Design of Welding Power Sources in Arc Welding

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

Lecture 32 - Electrodischarge machining sytem

Lecture 33 - Effect of various parameters on EDM Process

Lecture 34 - Tool Electrodes and Dielectric fluids and Electron Beam Machining

Lecture 35 - Mechanics of Electron Beam Machining Process

Lecture 36 - Functional Characteristics of EBM Process Edit Lesson

Lecture 37 - Introduction of Laser Beam Machining Process

Lecture 38 - Material removal rate of LBM

Lecture 39 - Heat conduction and Temperature rise during LBM

Lecture 40 - Modelling of LBM processes

Lecture 41 - Metal forming Processes Edit Lesson

Lecture 42 - Yield Criterion used in Metal Forming Processes Edit Lesson

Lecture 43 - Concept of Principal stress, strain

Lecture 44 - Trescas' Yield criteria and Rolling Process

Lecture 45 - Rolling Processes - Part 1

Lecture 46 - Rolling Processes - Part 2

Lecture 47 - Additive Manufacturing Processes

Lecture 48 - Fused Deposition Modeling Process

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

Co-ordinators : Prof. Nachiketa Tiwari

Lecture 32 - Evaluation of Stiffness and Force matrices

Lecture 33 - Stiffness and Force matrices for Triangular element

Lecture 34 - Stiffness and Force matrices for Rectangular element

Lecture 35 - Boundary elements for Finite element Equations

Lecture 36 - Boundary integrals for Triangular element

Lecture 37 - Assembly of 2-D finite elements - Part I

Lecture 38 - Assembly of 2-D finite elements - Part II

Lecture 39 - 2-D Heat transfer problems - Part I

Lecture 40 - 2-D Heat transfer problems - Part II

Lecture 41 - Numerical integration schemes for 2-D problems

Lecture 42 - Jacobian and transformation matrix for 2-D problems

Lecture 43 - Numerical Integration Schemes for 2-D Problems : Closure

Lecture 44 - Post-processing

Lecture 45 - Plane Elasticity Problems

Lecture 46 - Plane Elasticity Problems : Development of Weak form

Lecture 47 - Plane Elasticity Problems : Element level equations

Lecture 48 - Plane Elasticity Problems : Closure

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

Lecture 1 - Lesson 1 - Course Overview

Lecture 2 - Lesson 2 - Introduction

Lecture 3 - Lesson 3 - Nature Of Sound

Lecture 4 - Lesson 4 - The Decibel scale

Lecture 5 - Lesson 5 - Key Terms In Acoustics

Lecture 6 - Lesson 6 - Adding Decibels

Lecture 7 - Lesson 1 - Important Mathematical Concepts-Complex Algebra

Lecture 8 - Lesson 2 - Important Mathematical Concepts-Complex Time Signals

Lecture 9 - Lesson 3 - Important Mathematical Concepts-Transfer Function

Lecture 10 - Lesson 4 - Important Mathematical Concepts-Pole Zero Plot

Lecture 11 - Lesson 5 - Important Mathematical Concepts - Bode Plot For Simple Pole

Lecture 12 - Lesson 6 - Important Mathematical Concepts - Bode Plot For Simple Zero

Lecture 13 - Lesson 1 - Bode Plots (Magnitude) for Complex Transfer Functions

Lecture 14 - Lesson 2 - Momentum Equation for 1-D Sound Propagation

Lecture 15 - Lesson 3 - Continuity Equation for 1-D Sound Propagation

Lecture 16 - Lesson 4 - Gas Law for 1-D Sound Propagation

Lecture 17 - Lesson 5 - 1-D Wave Equation

Lecture 18 - Lesson 6 - Solution for 1-D Wave Equation

Lecture 19 - Lesson 1 - Waveguide

Lecture 20 - Lesson 2 - Transmission Line Equations - Part I

Lecture 21 - Lesson 3 - Transmission Line Equations - Part II

Lecture 22 - Lesson 4 - Transmission Line Equations - Part III

Lecture 23 - Lesson 5 - Transmission Line Equations - Part IV

Lecture 24 - Lesson 6 - Transmission Line Equations - Part V

Lecture 25 - Lesson 1 - Instantaneous Power

Lecture 26 - Lesson 2 - Instantaneous Power in a L-R Circuit

Lecture 27 - Lesson 3 - Power Factor, and Acoustic Power

Lecture 28 - Lesson 4 - Power Flow into an Infinitely Long Tube

Lecture 29 - Lesson 5 - Point Sources of Sound

Lecture 30 - Lesson 6 - Relations for Outward Travelling Spherical Acoustic Wave

Lecture 31 - Lesson 1 - Specific Acoustic Impedance for a Closed Tube

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

Co-ordinators : Dr. Kallol Mondal

Lecture 31 - Experimental verification of Avrami Equation

Lecture 32 - Linear regression (least squares) method to find the value of n and k in Avrami equation

Lecture 33 - In this lecture, method to determine the goodness of fit has been explained. Procedure to estimate the values of n and k from experimental data have also been discussed.

Lecture 34 - Stereology and quantitative metallography - I

Lecture 35 - Stereology and quantitative metallography - II

Lecture 36 - Grain size measurements methods

Lecture 37 - Statistical tools for analysis and reporting of obtained data with examples

Lecture 38 - Evolution of TTT and CCT diagram from f vs. t plots

Lecture 39 - TTT, CCT continue and hardenability of steel

Lecture 40 - Importance of heat treatment practices in real life (with examples)

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 65 - Physical significance of extensional stiffness matrix [A], coupling matrix [B] and bending stiffness matrix [D] matrices

Lecture 66 - Lamination sequence (standard laminate code)

Lecture 67 - Calculation of A, B and D Matrices.

Lecture 68 - Simplification of Stiffness Matrices - Part I

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

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

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

Lecture 32 - Creativity techniques - Part 1

Lecture 33 - Creativity techniques - Part 2

Lecture 34 - Frugal Innovation

Lecture 35 - Rapid Prototyping, an introduction

Lecture 36 - Rapid Prototyping Modelling

Lecture 37 - Rapid Prototyping Processes - Part 1

Lecture 38 - Rapid Prototyping Processes - Part 2

Lecture 39 - Laboratory demonstration; 3D printing - Part 1

Lecture 40 - Laboratory demonstration; 3D printing - Part 2

Lecture 41 - Laboratory demonstration; 3D printing - Part 3

Lecture 42 - Plant Layout Planning - Part 1

Lecture 43 - Plant Layout Planning - Part 2

Lecture 44 - Laboratory demonstration; Plant Simulation - Part 1

Lecture 45 - Laboratory demonstration; Plant Simulation - Part 2

Lecture 46 - Laboratory demonstration; Plant Simulation - Part 3

Lecture 47 - Computer Integrated Manufacturing - Part 1

Lecture 48 - Computer Integrated Manufacturing - Part 2

Lecture 49 - Reverse Engineering

Lecture 50 - Managing Competitiveness

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

Co-ordinators : Dr. Ashish Garg

Lecture 1 - Basic Thermodynamics: System, phase and components

Lecture 2 - Basic Thermodynamics: Gibbs Free Energy

Lecture 3 - Phase Stability in Materials

Lecture 4 - Effects of Temperature and Pressure on Single Components System

Lecture 5 - Clausisus-Clapeyron Equation and Binary Solution

Lecture 6 - Calculation of Configurational Entropy

Lecture 7 - Chemical Potential

Lecture 8 - Phase Stability in Binary Solution

Lecture 9 - Activity and Thermodynamics of Regular Solution

Lecture 10 - Thermodynamic of Real Solution

Lecture 11 - Free Energy Curves and Various Systems

Lecture 12 - Solubility Limits 2-phase Co-existence

Lecture 13 - Phase Diagram Formation: Binary Solution

Lecture 14 - Phase Diagram Construction: Partial Soluble Phases

Lecture 15 - Phase Diagram Construction: Eutectic Phase

Lecture 16 - Intermetallics and Phase Diagrams

Lecture 17 - Phase Rule

Lecture 18 - Gibb's Phase Rule: Unary and Binary System

Lecture 19 - Gibb's Phase Rule: Eutectic Point and Lever Rule

Lecture 20 - Phase Fraction Calculation in a Phase Diagram

Lecture 21 - Microstructure evolution in Cu-Ni binary system

Lecture 22 - Microstructure evolution (Continued...)

Lecture 23 - Phase evolution in hypoeutectic region

Lecture 24 - Phase evolution at Eutectic point

Lecture 25 - Phase Diagrams of Cu-Ni and Al-Si

Lecture 26 - Phase Diagrams of Pb-Sn and Fe-C

Lecture 27 - Phase Diagram of Fe-C (Continued...)

Lecture 28 - Fe-C Phase Diagram (Continued...)

Lecture 29 - Fe-C Phase Diagram (Continued...)

Lecture 30 - Phase Diagrams for non-Ferrous Alloys

Lecture 31 - Method of measuring Phase diagram

NPTEL : NOC:Advanced Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

Lecture 1 - Basics of composite materials

Lecture 2 - Different type of Fibers

Lecture 3 - Properties of single layer continuous fiber composites

Lecture 4 - Properties of single layer continuous fiber composites

Lecture 5 - Strength of single layer continuous fiber composites

Lecture 6 - Strength of single layer continuous fiber composites

Lecture 7 - Concept of Tensor

Lecture 8 - General Anisotropic Material

Lecture 9 - Specially Orthotropic Material

Lecture 10 - Specially Orthotropic Material Under Plane Stress

Lecture 11 - Stress and Strain Transformation

Lecture 12 - Transformation of Stiffness and Compliance Matrices

Lecture 13 - Strain - Displacement relations

Lecture 14 - Relations for stress and strain along thickness of laminate

Lecture 15 - Stress - Strain variation along Laminate thickness

Lecture 16 - Force and Moment resultant - Part 1

Lecture 17 - Force and Moment resultant - Part 2

Lecture 18 - Important observation related to [A], [B] and [D] matrices

Lecture 19 - Quasi-Isotropic Laminates

Lecture 20 - Maximum Stress Theory

Lecture 21 - Maximum Strain Theory

Lecture 22 - Importance of Sign of Shear Stress.

Lecture 23 - Failure Initiation in Composite Laminate.

Lecture 24 - Progressive Failure of Laminae in A Laminate

Lecture 25 - Governing equations for composite plates

Lecture 26 - Force equilibrium in Z-direction

Lecture 27 - Moment equilibrium equations

Lecture 28 - Equilibrium equations for composite plates

Lecture 29 - Boundary conditions associated with different edges of composite plate - Part 1

Lecture 30 - Boundary conditions associated with different edges of composite plate - Part 2

Lecture 31 - Generalized Solution for Semi-Infinite Plate - Part I

NPTEL : NOC:Engineering Metrology (Mechanical Engineering)

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

Lecture 32 - Strain measurements - Part 2

Lecture 33 - Optical measurements and Nanometrology - Part 1

Lecture 34 - Optical measurements and Nanometrology - Part 2

Lecture 35 - Optical measurements and Nanometrology - Part 3

Lecture 36 - Statistics in Metrology, an intoduction - Part 1

Lecture 37 - Statistics in Metrology, an intoduction - Part 2

Lecture 38 - Data and scales in measurements

Lecture 39 - Discrete and continuous data

Lecture 40 - Statistics for metrology, fundamental concepts - Part 1

Lecture 41 - Statistics for metrology, fundamental concepts - Part 2

Lecture 42 - Statistics for metrology, fundamental concepts - Part 3

Lecture 43 - Probability distributions for estimating measurement

Lecture 44 - Normal distribution

Lecture 45 - Statistics for proportions

Lecture 46 - Chi square distribution, and Data outlier detection

Lecture 47 - Quality Control, introduction

Lecture 48 - Quality Control, control charts for variables

Lecture 49 - Quality Control, control charts for attributes

Lecture 50 - Quality Control, critical aspects

Lecture 51 - 3D measurements, Coordinate Measuring Machine (CMM)

Lecture 52 - Laboratory demonstration, Coordinate Measuring Machine (CMM))

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 32 - Materials in Rapid Manufacturing - Part 2

Lecture 33 - Post-processing concerns - Part 1

Lecture 34 - Post-processing concerns - Part 2

Lecture 35 - Product costing for Rapid Manufacturing - Part 1

Lecture 36 - Product costing for Rapid Manufacturing - Part 2

Lecture 37 - Rapid Product Development, CAD/CAM - Part 1

Lecture 38 - Rapid Product Development, CAD/CAM - Part 2

Lecture 39 - Rapid Product Development, CAD/CAM - Part 3

Lecture 40 - Rapid Product Development, CAE and CIM

Lecture 41 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 1

Lecture 42 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 2

Lecture 43 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 3

Lecture 44 - Rapid Manufactiuring, case studies

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

Co-ordinators : Prof. Ashoke De

Lecture 1 - Introduction to Combustion

Lecture 2 - Introduction to Combustion (Continued...)

Lecture 3 - Introduction to Combustion (Continued...)

Lecture 4 - Introduction to Combustion (Continued...) + Combustion and Thermochemistry

Lecture 5 - Combustion and Thermochemistry

Lecture 6 - Combustion and Thermochemistry (Continued...)

Lecture 7 - Combustion and Thermochemistry (Continued...) + Chemical Kinetics

Lecture 8 - Chemical Kinetics (Continued...)

Lecture 9 - Chemical Kinetics (Continued...)

Lecture 10 - Chemical Kinetics (Continued...) + Combustion Chemistry

Lecture 11 - Combustion Chemistry (Continued...)

Lecture 12 - Heat and Mass Transfer

Lecture 13 - Heat and Mass Transfer + Coupling of Chemical Kinetics and Thermodynamics

Lecture 14 - Coupling of Chemical Kinetics and Thermodynamics (Continued...)

Lecture 15 - Coupling of Chemical Kinetics and Thermodynamics + Laminar Premixed Flames

Lecture 16 - Laminar Premixed Flames (Continued...)

Lecture 17 - Laminar Premixed Flames (Continued...)

Lecture 18 - Laminar Premixed Flames (Continued...) + Laminar Non-Premixed Flames

Lecture 19 - Laminar Non-Premixed Flames (Continued...)

Lecture 20 - Laminar Non-Premixed Flames (Continued...)

Lecture 21 - Laminar Non-Premixed Flames

Lecture 22 - Laminar Non-Premixed Flames (Continued...)

Lecture 23 - Laminar Non-Premixed Flames (Continued...)

Lecture 24 - Laminar Non-Premixed Flames (Continued...)

Lecture 25 - Laminar Non-Premixed Flames (Continued...)

Lecture 26 - Laminar Non-Premixed Flames + Turbulence

Lecture 27 - Turbulence : Introduction

Lecture 28 - Turbulence : Introduction (Continued...)

Lecture 29 - Turbulence : Flow Stability analysis

Lecture 30 - Turbulence : Flow Stability analysis (Continued...)

Lecture 31 - Turbulence : Stability and Burger's Equation

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

Lecture 32 - Robotics

Lecture 33 - Programmable Logic Controller

Lecture 34 - Automatic Identification and Data Capture

Lecture 35 - Computer Aided Quality Control - Part 1

Lecture 36 - Computer Aided Quality Control - Part 2

Lecture 37 - Laboratory Demonstration, Coordinate Measuring Machine

Lecture 38 - Rapid Manufacturing - Part 1

Lecture 39 - Rapid Manufacturing - Part 2

Lecture 40 - Laboratory demonstration, Rapid Manufacturing - Part 1

Lecture 41 - Laboratory demonstration, Rapid Manufacturing - Part 2

Lecture 42 - Laboratory Demonstration, CAD using Fusion 360, an introduction

Lecture 43 - Laboratory Demonstration, CAD using Fusion 360, Rendering and 3D printing

Lecture 44 - Material Handling

Lecture 45 - Laboratory Demonstration, Plant Simulation software - Part 1

Lecture 46 - Laboratory Demonstration, Plant Simulation software - Part 2

Lecture 47 - Laboratory Demonstration, Plant Simulation software - Part 3

Lecture 48 - Computers in Manufacturing Industry, current scenario - Part 1

Lecture 49 - Computers in Manufacturing Industry, current scenario - Part 2

Lecture 50 - Computers in Manufacturing Industry, current scenario - Part 3

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

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

Lecture 31 - Transfer Matrix for Extended-Inlet and Outlet Element and Use of Perforated Elements in Commercial Mufflers

Lecture 32 - Two-interacting Duct Configurations: Development of Equations and Concentric Tube Resonators

Lecture 33 - Concentric Tube Resonator: Partially Perforated Pipe or Airway (MATLAB)

Lecture 34 - Review of Perforate Impedance Expressions

Lecture 35 - MATLAB Demonstration for Fully and Partially Perforated CTR

Lecture 36 - Cross-Flow elements: Setting-up the Equations

Lecture 37 - Cross-Flow elements: MATLAB Demonstration for Simple Configurations

Lecture 38 - Plug Mufflers, Three-pass Perforated Element Muffler (Commercial Configurations) - MATLAB

Lecture 39 - Multiply-Connected Mufflers: HQ Tubes

Lecture 40 - TL Analysis of HQ Tubes (MATLAB): Network Analysis and Analytical Formula

Lecture 41 - Transmission Loss in terms of Scattering and Impedance Matrix Parameters

Lecture 42 - Rectangular Chamber Muffler: Characterization and TL Analysis using 3-D Piston-driven Model

Lecture 43 - Circular Chambers: Characterization and TL Analysis Using 3-D Piston-driven Model

Lecture 44 - Analytical Mode-Matching for Extended-Inlet and Outlet Muffler: Setting-up of the Equations

Lecture 45 - MATLAB Demonstration for Transmission Loss Calculations

Lecture 46 - Dissipative Mufflers (Lined Circular duct) - A Brief Discussion

Lecture 47 - Summary of the Topics Covered in This Course, Topics to be Covered in a Future Course

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

Co-ordinators : Prof. Jishnu Bhattacharya

Lecture 1

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Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

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Lecture 28

Lecture 29

Lecture 30

Lecture 31

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

Lecture 1 - Historical Perspectives and Introduction to the Course

Lecture 2 - Finite Difference Method - Basic Idea of Discretization

Lecture 3 - Explicit and Implicit Formulations, Stability Analysis - Part 1

Lecture 4 - Stability Analysis - Part 2

Lecture 5 - Important Aspects of Flow Modelling - Part 1

Lecture 6 - Important Aspects of Flow Modelling - Part 2

Lecture 7 - Important Aspects of Flow Modelling - Part 3

Lecture 8 - Applications of Our Knowledge to a Problem of Practical Interest and Setting up an Algorithm

Lecture 9 - Finite Volume Method - Part 1

Lecture 10 - Finite Volume Method - Part 2

Lecture 11 - Finite Volume Method - Part 3

Lecture 12 - Introduction to Finite Element Method (Preliminary Concepts)

Lecture 13 - Introduction to Finite Elelment Method (Galerkin Weighted Residual Method)

Lecture 14 - Introduction to Finite element Method (Elemental contributions and formation of Global Matrix)

Lecture 15 - Vorticity Stream Function Approach (Formulation and Algorithm)

Lecture 16 - Vorticity-Stream Function Approach For Solving Navier-Stokes Equations

Lecture 17 - Solving Navier-Stokes Equations For Incompressible Flows using SIMPLE Algorithm - Part 1

Lecture 18 - Solving Navier-Stokes Equations For Incompressible Flows using SIMPLE Algorithm - Part 2

Lecture 19 - Solving Navier-Stokes Equations For Incompressible Flows using MAC Algorithm - Part 2

Lecture 20 - MAC Algorithm (Pressure - Velocity Iteration and the Solution)

Lecture 21 - MAC Algorithm (Solution of Energy Equation)

Lecture 22 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 1

Lecture 23 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 2

Lecture 24 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 3

Lecture 25 - Mathematical Approaches to Turbulent Flows (Preliminaries and Modeling Framework)

Lecture 26 - Mathematical Approaches to Turbulent Flows (Modeling on the basis of RANS)

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

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

Lecture 32 - Reverse Engineering in MAM - Laboratory Demonstration - I

Lecture 33 - Reverse Engineering in MAM - Laboratory Demonstration - II

Lecture 34 - CAD and Topology Optimization Laboratory Demonstration - I

Lecture 35 - CAD and Topology Optimization Laboratory Demonstration - II

Lecture 36 - Non-Destructive Testing - Part 1

Lecture 37 - Non-Destructive Testing - Part 2

Lecture 38 - Sustainability in MAM - Part 1

Lecture 39 - Sustainability in MAM - Part 2

Lecture 40 - Sustainability in MAM - Part 3

Lecture 41 - Metal 3D Printing Laboratory Demonstration - I

Lecture 42 - Metal 3D Printing Laboratory Demonstration - II

Lecture 43 - Safety in MAM

Lecture 44 - Costing in MAM - Part 1

Lecture 45 - Costing in MAM - Part 2

Lecture 46 - Costing in MAM - Part 3

Lecture 47 - Industry 4.0 and MAM

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 1

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Lecture 122

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Lecture 126

Lecture 127

NPTEL : NOC:Social Innovation in Industry 4.0 (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

Lecture 32 - Design Analysis of ORBIT Motor - III : Output torque and stress, Deformation, Gap at Contacts

Lecture 33 - Application and Selection of Accumulators - Part I

Lecture 34 - Application and Selection of Accumulators - Part II

Lecture 35 - Hydraulic Circuits in Industrial Applications

Lecture 36 - Air preparation - Compressor and Accessories

Lecture 37 - Pneumatic Circuits

Lecture 38 - Analysis of Three - Way (Spool and Flapper Nozzle Valve)

Lecture 39 - Analysis of Flapper Nozzle Valves

Lecture 40 - Flow Force Compensation and Spool Design (Electro - hydraulic valves)

Lecture 41 - Premier and Guide to Oil - hydraulic fluids ; and Introduction to Fluid Power Symbols

Lecture 42 - Symbols in Oil Hydraulics

Lecture 43 - Appendices Tutorial on Basic Calculation on HST System and Hydraulic Fluids

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 1 - Introduction and Fundamental Concepts

Lecture 2 - Zeroth Law and Fundamental Concepts

Lecture 3 - Different Kind of Energy and First Low - I

Lecture 4 - First Low - II

Lecture 5 - First Low - III

Lecture 6 - Second Law and Its Corollaries - I

Lecture 7 - Second Law and Its Corollaries - II

Lecture 8 - Second Law and Its Corollaries - III

Lecture 9 - Second Law and Its Corollaries - IV

Lecture 10 - Second Law and Available Energy - I

Lecture 11 - Second Law and Available Energy - II

Lecture 12 - Second Law and Available Energy - III

Lecture 13 - Thermodynamic Property Relations - I

Lecture 14 - Thermodynamic Property Relations - II

Lecture 15 - Joule-Kelvin Expansion: Properties of Pure Substances

Lecture 16 - Properties of Pure Substances - I

Lecture 17 - Properties of Pure Substances - II

Lecture 18 - Properties of Pure Substances: Ideal Gases

Lecture 19 - Properties of Ideal Gases

Lecture 20 - Vapors Power Cycle - I

Lecture 21 - Vapor Power Cycle - II

Lecture 22 - Vapor Power Cycle - III

Lecture 23 - Vapor Power Cycle - IV

Lecture 24 - Gas Power Cycle - I

Lecture 25 - Gas Power Cycle - II

Lecture 26 - Gas Power Cycle - III

Lecture 27 - Thermodynamics of Reacting System - I

Lecture 28 - Thermodynamics of Reacting System - II

Lecture 29 - Thermodynamics of Reacting System - III

Lecture 30 - Thermodynamics of Multi Component System - I

Lecture 31 - Thermodynamics of Multi Component System - II

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

Lecture 32 - Incompressible Viscous Flows - Part IV

Lecture 33 - Application of ViscousFlow Through Pipes - Part I

Lecture 34 - Application of ViscousFlow Through Pipes - Part II

Lecture 35 - Application of ViscousFlow Through Pipes - Part III

Lecture 36 - Principles of Similarity - Part I

Lecture 37 - Principles of Similarity - Part II

Lecture 38 - Principles of Similarity - Part III

Lecture 39 - Flow of Ideal Fluids - Part I

Lecture 40 - Flow of Ideal Fluids - Part II

Lecture 41 - Flows with a Free Surface - Part I

Lecture 42 - Flows with a Free Surface - Part II

Lecture 43 - Flows with a Free Surface - Part III

Lecture 44 - A Few Unsteady Flow Phenomena in Practice - Part I

Lecture 45 - A Few Unsteady Flow Phenomena in Practice - Part II

Lecture 46 - Introduction to Laminar Boundary Layer - Part I

Lecture 47 - Introduction to Laminar Boundary Layer - Part II

Lecture 48 - Introduction to Turbulent Flow - Part I

Lecture 49 - Introduction to Turbulent Flow - Part II

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

Lecture 32 - Thin Film Dynamics (Continued...)

Lecture 33 - Lab on a CD

Lecture 34 - Lab on a CD (Continued...)

Lecture 35 - Introduction to Microfabrication

Lecture 36 - Electrokinetics

Lecture 37 - Electrokinetics (Continued...)

Lecture 38 - Electrokinetics (Continued...)

Lecture 39 - Electrokinetics (Continued...)

Lecture 40 - Electrokinetics (Continued...)

Lecture 41 - Electrokinetics (Continued...)

Lecture 42 - Dispersion

Lecture 43 - Introduction to Nanofluidics

Lecture 44 - Introduction to Nanofluidics (Continued...) and Molecular Dynamics Simulations

Lecture 45 - Introduction to Molecular Dynamics Simulations (Continued...)

Lecture 46 - Biomicrofluidics

Lecture 47 - Biomicrofluidics (Continued...)

Lecture 48 - Nanofluidic Energy Conversion

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

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

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37 - Heat Pipe - Part I

Lecture 38 - Heat Pipe - Part II

Lecture 39 - Heat Pipe - Part III

Lecture 40 - Direct Conversion - Introduction to TEG

Lecture 41 - Thermoelectric Generators - Functioning and Applications

Lecture 42 - TEG - performance analysis

Lecture 43 - TEG - performance optimization

Lecture 44 - Direct Conversion - Magneto Hydro dynamics (MHD)

Lecture 45 - Direct Conversion - Thermo-Ionic generation

Lecture 46 - Direct Conversion - Thermo Photo Voltaic generation (TPV)

Lecture 47 - Heat Pumps - I

Lecture 48 - Heat Pumps - II

Lecture 49 - Heat Pumps - III

Lecture 50 - Waste Heat Recovery from Incinerator Plants

Lecture 51 - Energy Storage Systems - I

Lecture 52 - Energy Storage Systems - II

Lecture 53 - Energy Storage Systems - III

Lecture 54 - Energy Storage Systems - IV

Lecture 55 - Energy Storage Systems - V

Lecture 56 - Energy Storage Systems - VI

Lecture 57

Lecture 58

Lecture 59

Lecture 60

Lecture 61

Lecture 62

Lecture 63

Lecture 64

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

Lecture 1 - Introduction

Lecture 2 - Nomenclature

Lecture 3 - Kinematic Diagram

Lecture 4 - Degree of Freedom - I

Lecture 5 - Degree of Freedom - II

Lecture 6 - Degree of Freedom - Failure

Lecture 7 - Grashof Criteria - I

Lecture 8 - Grashof Criteria - II

Lecture 9 - Geometry and Representation of Vectors

Lecture 10 - Displacement Analysis: constrained mechanism - I

Lecture 11 - Displacement Analysis: constrained mechanism - II

Lecture 12 - Displacement Analysis: constrained mechanism - III

Lecture 13 - Displacement Analysis: constrained mechanism - IV

Lecture 14 - Displacement Analysis: open chain robot - I

Lecture 15 - Displacement Analysis: open chain robot - II

Lecture 16 - Displacement Analysis: open chain robot - III

Lecture 17 - Displacement Analysis: open chain robot - IV

Lecture 18 - Displacement Analysis: closed chain robot - I

Lecture 19 - Displacement Analysis: closed chain robot - II

Lecture 20 - Velocity Analysis: geometric concepts - I

Lecture 21 - Velocity Analysis: geometric concepts - II

Lecture 22 - Velocity Analysis: geometric concepts - III

Lecture 23 - Velocity Analysis: application of geometric concepts - I

Lecture 24 - Velocity Analysis: application of geometric concepts - II

Lecture 25 - Velocity Analysis: application of geometric concepts - III

Lecture 26 - Velocity Analysis: analytical approach - I

Lecture 27 - Velocity Analysis: analytical approach - II

Lecture 28 - Velocity Analysis: analytical approach - III

Lecture 29 - Serial Manipulator Velocity Analysis - I

Lecture 30 - Serial Manipulator Velocity Analysis - II

Lecture 31 - Serial Manipulator Velocity Analysis - III

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

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

Lecture 32 - Plate fin heat exchanger : Multistream

Lecture 33 - Plate fin heat exchanger : Multistream (Continued...)

Lecture 34 - Plate fin heat exchanger : Multistream Analysis

Lecture 35 - Plate fin heat exchanger : Layer Stacking

Lecture 36 - Phase change heat exchangers

Lecture 37 - Phase change heat exchangers (Continued...)

Lecture 38 - Surface Condenser

Lecture 39 - Surface Condenser (Continued...)

Lecture 40 - Surface Condenser (Continued...)

Lecture 41 - Surface Condenser (Continued...)

Lecture 42 - In tube condensation

Lecture 43 - Heat pipes and Heat pipe heat exchangers

Lecture 44 - Heat pipes and Heat pipe heat exchangers (Continued...)

Lecture 45 - Heat pipes and Heat exchangers

Lecture 46 - Heat pipes and Heat exchangers (Continued...)

Lecture 47 - Micro Heat Exchanger Introduction

Lecture 48 - Micro scale Heat Transfer

Lecture 49 - Micro scale Heat Transfer (Continued...)

Lecture 50 - Micro Channel

Lecture 51 - Micro Heat Exchanger

Lecture 52 - Regenerators

Lecture 53 - Fixed Bed Regenerator Analysis

Lecture 54 - Design and Simulation of Regenerator (Fixed Bed)

Lecture 55 - Fixed Bed Regenerator (Numerical)

Lecture 56 - Fixed Bed Regenerator (Numerical) (Continued...)

Lecture 57 - Fouling in Heat Exchangers

Lecture 58 - Fouling in Heat Exchangers (Continued...)

Lecture 59 - Fouling in Heat Exchangers (Continued...)

Lecture 60 - Direct Contact heat exchanger

Lecture 61 - Direct Contact heat exchanger (Continued...)

Lecture 62 - Heat exchanger network synthesis

Lecture 63 - Heat exchanger network

Lecture 64 - Heat exchanger network (Continued...)

NPTEL : NOC:Robotics (Mechanical Engineering)

Co-ordinators : Prof. Dilip Kumar Pratihar

Lecture 1 - Introduction to Robots and Robotics

Lecture 2 - Introduction to Robots and Robotics (Continued...)

Lecture 3 - Introduction to Robots and Robotics (Continued...)

Lecture 4 - Introduction to Robots and Robotics (Continued...)

Lecture 5 - Introduction to Robots and Robotics (Continued...)

Lecture 6 - Introduction to Robots and Robotics (Continued...)

Lecture 7 - Introduction to Robots and Robotics (Continued...)

Lecture 8 - Introduction to Robots and Robotics (Continued...)

Lecture 9 - Introduction to Robots and Robotics (Continued...)

Lecture 10 - Introduction to Robots and Robotics (Continued...)

Lecture 11 - Robot Kinematics

Lecture 12 - Robot Kinematics (Continued...)

Lecture 13 - Robot Kinematics (Continued...)

Lecture 14 - Robot Kinematics (Continued...)

Lecture 15 - Robot Kinematics (Continued...)

Lecture 16 - Robot Kinematics (Continued...)

Lecture 17 - Robot Kinematics (Continued...)

Lecture 18 - Robot Kinematics (Continued...)

Lecture 19 - Robot Kinematics (Continued...)

Lecture 20 - Robot Kinematics (Continued...)

Lecture 21 - Trajectory Planning

Lecture 22 - Trajectory Planning (Continued...)

Lecture 23 - Singularity Checking

Lecture 24 - Robot Dynamics

Lecture 25 - Robot Dynamics (Continued...)

Lecture 26 - Robot Dynamics (Continued...)

Lecture 27 - Robot Dynamics (Continued...)

Lecture 28 - Robot Dynamics (Continued...)

Lecture 29 - Robot Dynamics (Continued...)

Lecture 30 - Control Scheme

Lecture 31 - Sensors

NPTEL : NOC:Computational Fluid Dynamics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

Lecture 1 - Intoduction to CFD

Lecture 2 - Classification of partial differential equations

Lecture 3 - Examples of partial differential equations

Lecture 4 - Examples of partial differential equations (Continued...)

Lecture 5 - Nature of the characteristics of partial differential equation

Lecture 6 - Euler-Lagrangian equation

Lecture 7 - Approximate Solutions of Differential Equations

Lecture 8 - Variational formulation

Lecture 9 - Example of variational formulation and introduction to weighted residual method

Lecture 10 - Weighted residual method (Continued...)

Lecture 11 - Point Collocation method, the Galerkin's method and the 'M' form

Lecture 12 - Finite element method (FEM) of discretization

Lecture 13 - Finite element method of discretization (Continued...)

Lecture 14 - Finite difference method (FDM) of discretization

Lecture 15 - Well posed boundary value problem

Lecture 16 - Finite volume method (FVM) of discretization

Lecture 17 - Illustrative examples of finite volume method

Lecture 18 - Illustrative examples of finite volume method (Continued...)

Lecture 19 - Basic rules of finite volume discretization

Lecture 20 - Implementation of boundary conditions in FVM

Lecture 21 - Implementation of boundary conditions in FVM (Continued...)

Lecture 22 - 1-D Unsteady state diffusion problem

Lecture 23 - 1-D Unsteady state diffusion problem (Continued...)

Lecture 24 - Consequences of Discretization of Unsteady State Problems

Lecture 25 - FTCS scheme

Lecture 26 - CTCS scheme (Leap frog scheme) and Dufort-Frankel scheme

Lecture 27 - Part 1: FV Discretization of 2-D Unsteady State Diffusion Type problems; Part 2: Solution to linear algebraic equations

Lecture 28 - Solution to linear algebraic equations (Continued...)

Lecture 29 - Elemination methods

Lecture 30 - Gaussian elemination and LU Decomposition methods

Lecture 31 - Illustrative example of elemination method

Lecture 32 - Tri-Diagonal Matrix Algorithm (TDMA)

Lecture 33 - Elimination Methods: Error Analysis

Lecture 34 - Elimination Methods: Error Analysis (Continued...)

Lecture 35 - Iteration methods

Lecture 36 - Generalized analysis of Iteration method

Lecture 37 - Further discussion on Iterative methods

Lecture 38 - Illustrative examples of Iterative methods

Lecture 39 - Gradient Search based methods

Lecture 40 - Steepest descent method (Continued...)

Lecture 41 - Conjugate gradient method

Lecture 42 - Convection diffusion equation

Lecture 43 - Central difference scheme applied to convection-diffusion equation

Lecture 44 - Upwind scheme

Lecture 45 - Illustrative examples

Lecture 46 - Exact solution of 1-D steady state convection diffusion equation (Continued...)

Lecture 47 - Exponential scheme

Lecture 48 - Generalized convection diffusion formulation

Lecture 49 - 2-D convection diffusion problem

Lecture 50 - False (numerical) diffusion scheme and the QUICK scheme

Lecture 51 - Discretization of Navier Stokes equation

Lecture 52 - Discretization of Navier Stokes equation (Continued...)

Lecture 53 - Concept of staggered grid

Lecture 54 - SIMPLE algorithm

Lecture 55 - Salient features of SIMPLE algorithm

Lecture 56 - Illustrative examples on the use of SIMPLE algorithm

Lecture 57 - SIMPLER algorithm

Lecture 58 - Illustrative examples of SIMPLER algorithm

Lecture 59 - What is there in implementing a CFD Code

Lecture 60 - Some representative case studies

NPTEL : NOC:Concepts of Thermodynamics (Mechanical Engineering)

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

Lecture 32 - Supplementary Lecture : Problem Solving with the Aid of a Computer

Lecture 33 - Introduction to Second Law of Thermodynamics

Lecture 34 - Statements of the Second Law of Thermodynamics

Lecture 35 - Perpetual Motion Machines; Reversible and Irreversible Processes

Lecture 36 - Factors for Irreversibility and Introduction to Reversible Cycles

Lecture 37 - Carnot Theorem and Absolute Temperature Scale

Lecture 38 - Second Law: Illustrative Problems

Lecture 39 - Clausius Inequality and Introduction to Entropy

Lecture 40 - Thermodynamic Property Relationships; Entropy change for Solids, Liquids and Ideal gases

Lecture 41 - Entropy balance for Reversible and Irreversible Processes

Lecture 42 - What is Entropy ?

Lecture 43 - Entropy Change in closed system: Examples

Lecture 44 - Entropy Change in closed system: Examples

Lecture 45 - Supplementary Lecture: Problem solving with the aid of a computer

Lecture 46 - Supplementary Lecture: Problem solving with the aid of a computer

Lecture 47 - Entropy Transport for a flow process

Lecture 48 - Entropy Transport for flow process: Examples

Lecture 49 - Entropy Transport for flow process: Examples

Lecture 50 - Entropy Transport for flow process: Examples

Lecture 51 - Entropy Transport for flow process: Examples

Lecture 52 - Supplementary Lecture: Problem solving with the aid of a computer

Lecture 53 - Exergy (Availability)

Lecture 54 - Exergy (Availability) (Continued...)

Lecture 55 - Exergy Analysis : Examples

Lecture 56 - Exergy Analysis : Examples (Continued...)

Lecture 57 - Thermodynamic Relationships

Lecture 58 - Thermodynamic Relationships (Continued...)

Lecture 59 - Otto Cycle

Lecture 60 - Diesel Cycle

Lecture 61 - Example Problems : Otto Cycle and Diesel Cycle

Lecture 62 - Brayton Cycle

Lecture 63 - Carnot Cycle and Rankine Cycle

Lecture 64 - Carnot Cycle and Rankine Cycle (Continued...)

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

Lecture 32 - Acceleration Analysis - I

Lecture 33 - Acceleration Analysis - II

Lecture 34 - Force Analysis - I

Lecture 35 - Force Analysis - II

Lecture 36 - Force Analysis Examples

Lecture 37 - Gear Kinematics

Lecture 38 - Gear trains - I

Lecture 39 - Gear trains - II

Lecture 40 - Gear trains - III

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

Co-ordinators : Prof. Suman Chakraborty

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 32 - Potential Flow (Continued...)

Lecture 33 - Potential Flow (Continued...)

Lecture 34 - Stokes Flow past a Sphere

Lecture 35 - Stokes Flow past a Sphere (Continued...)

Lecture 36 - Stokes Flow past a Sphere (Continued...)

Lecture 37 - Lubrication Theory

Lecture 38 - Lubrication Theory (Continued...)

Lecture 39 - Lubrication Theory (Continued...)

Lecture 40 - Thin Film Dynamics

Lecture 41 - Thin Film Dynamics (Continued...)

Lecture 42 - Thin Film Dynamics (Continued...)

Lecture 43 - Thin Film Dynamics (Continued...)

Lecture 44 - Thin Film Dynamics (Continued...)

Lecture 45 - Thin Film Dynamics (Continued...)

Lecture 46 - Thin Film Dynamics (Continued...)

Lecture 47 - Thin Film Dynamics (Continued...)

Lecture 48 - Compressible Flows

Lecture 49 - Compressible Flows (Continued...)

Lecture 50 - Compressible Flows (Stagnation Properties)

Lecture 51 - Compressible Flows (Stagnation Properties, Variable Area)

Lecture 52 - Compressible Flows (Variable Area)

Lecture 53 - Compressible Flows (Variable Area)

Lecture 54 - Compressible Flows (Normal Shock)

Lecture 55 - Compressible Flows (Normal Shock) (Continued...)

Lecture 56 - Compressible Flows (Converging Nozzle)

Lecture 57 - Compressible Flows (Converging Diverging Nozzle)

Lecture 58 - Compressible Flows (Converging Diverging Nozzle) (Continued...)

Lecture 59 - Compressible Flows with Friction

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 65 - Assembly Drawing (Continued...)

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

Co-ordinators : Prof. Aditya Bandopadhyay

Lecture 32 - Poisson equation in PETSc

Lecture 33 - Nonlinear Solver of PETSc

Lecture 34 - Nonlinear solver with Jacobian in PETSc

Lecture 35 - Reaction-diffusion system in PETSc

Lecture 36 - Time stepping in PETSc

Lecture 37 - Heat transport using PETSc

Lecture 38 - Solving nonlinear PDE on a periodic domain yielding different patterns

Lecture 39 - Audio analysis - Determine motor RPM

Lecture 40 - Spectrogram and Doppler shift

Lecture 41 - Image processing - Preliminaries

Lecture 42 - Balloon problem and viscous fingers

Lecture 43 - Analyzing data files and 2D interpolation

NPTEL : NOC:Advanced Dynamics (Mechanical Engineering)

Co-ordinators : Prof. Anirvan DasGupta

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

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 1 - Introduction to Microfluidics

Lecture 2 - Introduction to Microfluidics (Continued...)

Lecture 3 - Introduction to Microfluidics (Continued...)

Lecture 4 - Introduction to Microfluidics (Continued...)

Lecture 5 - Introduction to Microfluidics (Continued...)

Lecture 6 - Introduction to Microfluidics (Continued...)

Lecture 7 - Introduction to Microfluidics (Continued...)

Lecture 8 - Introduction to Microfluidics (Continued...)

Lecture 9 - Introduction to Microfluidics (Continued...)

Lecture 10 - Introduction to Microfluidics (Continued...)

Lecture 11 - Introduction to Microfluidics (Continued...)

Lecture 12 - Foundations of Fluid Dynamics

Lecture 13 - Foundations of Fluid Dynamics (Continued...)

Lecture 14 - Foundations of Fluid Dynamics (Continued...)

Lecture 15 - Foundations of Fluid Dynamics (Continued...)

Lecture 16 - Foundations of Fluid Dynamics (Continued...)

Lecture 17 - Foundations of Fluid Dynamics (Continued...)

Lecture 18 - Foundations of Fluid Dynamics (Continued...)

Lecture 19 - Foundations of Fluid Dynamics (Continued...)

Lecture 20 - Foundations of Fluid Dynamics (Continued...)

Lecture 21 - Foundations of Fluid Dynamics (Continued...)

Lecture 22 - Pressure-driven Microchannel Flows

Lecture 23 - Pressure-driven Microchannel Flows (Continued...)

Lecture 24 - Pressure-driven Microchannel Flows (Continued...)

Lecture 25 - Pressure-driven Microchannel Flows (Continued...)

Lecture 26 - Pressure-driven Microchannel Flows (Continued...)

Lecture 27 - Insights on Inertia-free Flows

Lecture 28 - Inertia-free Flow in Circular Capillaries and Generalizing the Force balance

Lecture 29 - Inertia-free flows for general fluids - Concepts for Microelectric Materials

Lecture 30 - Microelectric Fluid Flow through Microchannel

Lecture 31 - Fluid Flow through Deformable Microchanels

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 : 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 32 - Plane Strain Fracture Toughness Testing

Lecture 33 - Plane Stress Fracture Toughness Testing

Lecture 34 - Paris Law and Sigmoidal Curve

Lecture 35 - Crack Closure

Lecture 36 - Crack Growth Models

Lecture 37 - J-Integral

Lecture 38 - HRR Field and CTOD

Lecture 39 - FAD and Mixed Mode Fracture

Lecture 40 - Crack Arrest and Repair Methodologies

Lecture 41 - Discussion Session - II

NPTEL : Experimental Stress Analysis (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : Rocket Propulsion (Mechanical Engineering)

Co-ordinators : Prof. K. Ramamurthi

Lecture 32 - Efficiencies due to Mixture Ratio Distribution and Incomplete Vaporization

Lecture 33 - Pumps and Turbines; Propellant Feed System at Zero â€œgâ€ Conditions

Lecture 34 - Review of Liquid Bi-propellant Rockets and Introduction to Mono-propellant Rockets

Lecture 35 - Introduction to Hybrid Rockets and a Simple Illustration of Combustion Instability in Liquid Propellant Rockets

Lecture 36 - Combustion Instability in Solid Propellant and Liquid Propellant Rockets â€“ Bulk and Wave Modes

Lecture 37 - Wave modes of Oscillation

Lecture 38 - Mechanisms Causing Instabilities and Strategies for Avoiding Combustion Instability

Lecture 39 - Electric and Magnetic Fields and the Electrostatic Thruster

Lecture 40 - Electrical Thrusters

Lecture 41 - Advances in Rocket Propulsion

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

Lecture 1 - Introduction to Finite Element Method

Lecture 2 - Introduction to Finite Element Method

Lecture 3 - Introduction to Finite Element Method

Lecture 4 - Introduction to Finite Element Method

Lecture 5 - Introduction to Finite Element Method

Lecture 6 - Introduction to Finite Element Method

Lecture 7 - Introduction to Finite Element Method

Lecture 8 - Introduction to Finite Element Method

Lecture 9 - Introduction to Finite Element Method

Lecture 10 - Introduction to Finite Element Method

Lecture 11 - Introduction to Finite Element Method

Lecture 12 - Introduction to Finite Element Method

Lecture 13 - Introduction to Finite Element Method

Lecture 14 - Introduction to Finite Element Method

Lecture 15 - Introduction to Finite Element Method

Lecture 16 - Introduction to Finite Element Method

Lecture 17 - Introduction to Finite Element Method

Lecture 18 - Introduction to Finite Element Method

Lecture 19 - Introduction to Finite Element Method

Lecture 20 - Introduction to Finite Element Method

Lecture 21 - Introduction to Finite Element Method

Lecture 22 - Introduction to Finite Element Method

Lecture 23 - Introduction to Finite Element Method

Lecture 24 - Introduction to Finite Element Method

Lecture 25 - Introduction to Finite Element Method

Lecture 26 - Introduction to Finite Element Method

Lecture 27 - Introduction to Finite Element Method

Lecture 28 - Introduction to Finite Element Method

Lecture 29 - Introduction to Finite Element Method

Lecture 30 - Introduction to Finite Element Method

Lecture 31 - Introduction to Finite Element Method

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

Lecture 1 - Principles Of Mechanical Measurements

Lecture 2 - Principles Of Mechanical Measurements

Lecture 3 - Principles Of Mechanical Measurements

Lecture 4 - Principles Of Mechanical Measurements

Lecture 5 - Principles Of Mechanical Measurements

Lecture 6 - Principles Of Mechanical Measurements

Lecture 7 - Principles Of Mechanical Measurements

Lecture 8 - Principles Of Mechanical Measurements

Lecture 9 - Principles Of Mechanical Measurements

Lecture 10 - Principles of Mechanical Measurements

Lecture 11 - Principles Of Mechanical Measurements

Lecture 12 - Principles Of Mechanical Measurements

Lecture 13 - Principles Of Mechanical Measurements

Lecture 14 - Principles Of Mechanical Measurements

Lecture 15 - Principles Of Mechanical Measurements

Lecture 16 - Principles Of Mechanical Measurements

Lecture 17 - Principles Of Mechanical Measurements

Lecture 18 - Principles Of Mechanical Measurements

Lecture 19 - Principles Of Mechanical Measurements

Lecture 20 - Principles Of Mechanical Measurements

Lecture 21 - Principles Of Mechanical Measurements

Lecture 22 - Principles Of Mechanical Measurements

Lecture 23 - Principles Of Mechanical Measurements

Lecture 24 - Principles Of Mechanical Measurements

Lecture 25 - Principles Of Mechanical Measurements

Lecture 26 - Principles Of Mechanical Measurements

NPTEL : Spray Theory and Applications (Mechanical Engineering)

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

Lecture 1 - Introduction to sprays and their applications

Lecture 2 - Spatial versus Temporal Sampling

Lecture 3 - Spatial Vs Temporal Sampling example problem

Lecture 4 - Steady vs unsteady spray

Lecture 5 - Statistical measures on spray

Lecture 6 - Discussion on pdf and moments

Lecture 7 - Size velocity correlation

Lecture 8 - Discussion on Interfacial tension

Lecture 9 - Introduction to Atomizers and their design - 1

Lecture 10 - Introduction to Atomizers and their design - 2

Lecture 11 - Simple measurement techniques

Lecture 12 - Selection of atomizers

Lecture 13 - Spray measurement characteristics

Lecture 14 - Spray measurements techniques

Lecture 15 - Non-intrusive spray measurements techniques

Lecture 16 - Non-intrusive spray measurements techniques

Lecture 17 - Linear stability analysis â€“ Introduction

Lecture 18 - Linear stability analysis- Kelvin-Helmhotz instability - 1

Lecture 19 - Linear stability analysis- Kelvin-Helmhotz instability - 2

Lecture 20 - Linear stability analysis- Kelvin-Helmhotz instability - 3

Lecture 21 - Linear stability analysis procedure

Lecture 22 - Linear stability analysis - Cylindrial jet instability - 1

Lecture 23 - Linear stability analysis - Cylindrial jet instability - 2

Lecture 24 - Linear stability analysis - Planar Liquid Sheet instability - 1

Lecture 25 - Linear stability analysis - Planar Liquid Sheet instability - 2

Lecture 26 - Design of pressure swirl atomizer - 1

Lecture 27 - Design of pressure swirl atomizer - 2

Lecture 28 - Design of pressure swirl atomizer - 3

Lecture 29 - Design of pressure swirl atomizer - 4

Lecture 30 - Secondary atomization-Dimensionless parameters

Lecture 31 - Secondary atomization-Modes of breakup - 1

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

Lecture 32 - Microvalve (Continued...)

Lecture 33 - Microvalve (Continued...)

Lecture 34 - Micro Flow Sensor and Micro mixers

Lecture 35 - Micro mixers

Lecture 36 - Micro mixers (Continued...)

Lecture 37 - Micro droplets

Lecture 38 - Micro reactors (Continued...)

Lecture 39 - Micro needles and Microparticle separation

Lecture 40 - Few applications of microfluidics

Lecture 41 - Lab Demo

NPTEL : Convective Heat Transfer (Mechanical Engineering)

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

Lecture 32 - Extended Graetz problem with wall flux boundary condition

Lecture 33 - Approximate method for laminar internal flows

Lecture 34 - Integral method for thermal entry length problem

Lecture 35 - Introduction to Natural Convection Heat Transfer

Lecture 36 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 1

Lecture 37 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 2

Lecture 38 - Similarity Solution in Natural Convection for Vertical isoflux Plate

Lecture 39 - Approximate Method in Natural Convection Heat Transfer

Lecture 40 - Natural Convection in Other Configurations

Lecture 41 - Turbulent Convective Heat Transfer : RANS Equations - Part 1

Lecture 42 - Turbulent Convective Heat Transfer : RANS Equations - Part 2

Lecture 43 - Analogies in Turbulent Convective Heat Transfer - Part 1

Lecture 44 - Analogies in Turbulent Convective Heat Transfer - Part 2

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

Co-ordinators : Prof. K. Ramamurthi

Lecture 30 - Dust Explosions - II

Lecture 31 - Physical Explosions

Lecture 32 - Rupture of Cryogenic Storage Vessels and Pressure Vessels

Lecture 33 - Condensed Phased Explosives Based on Hydrocarbons

Lecture 34 - Condensed Phase Explosives and their Properties

Lecture 35 - TNT Equivalence and Yield of an Explosion

Lecture 36 - Atmospheric Dispersion

Lecture 37 - Modeling Atmospheric Dispersion

Lecture 38 - Explosions Involving Atmospheric Dispersion

Lecture 39 - Quantification of Damages in an Explosion

Lecture 40 - Risk Analysis for an Explosion

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

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

Lecture 32 - Single phase liquid flow and Heat transport in Microchannels - Part 1

Lecture 33 - Single phase liquid flow and Heat transport in Microchannels - Part 2

Lecture 34 - Fundamentals of Electro kinetics in Microchannels Part1

Lecture 35 - Fundamentals of Electro kinetics in Microchannels Part2

Lecture 36 - Fundamentals of Electro kinetics in Microchannels Part3

Lecture 37 - Two phase Heat transfer in Microchannels - Part 1

Lecture 38 - Two phase Heat transfer in Microchannels - Part 2

Lecture 39 - Nano fluid Heat transfer - Part 1

Lecture 40 - Nano fluid Heat transfer - Part 2

Lecture 41 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 1

Lecture 42 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 2

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

Lecture 32 - Kinetics: Angular Motion - Part IV

Lecture 33 - Kinetics of Arm Swinging during Walking

Lecture 34 - Inverse Dynamics Analysis

Lecture 35 - Biomechanics of Balance - Part I

Lecture 36 - Biomechanics of Balance - Part II

Lecture 37 - Biomechanics of Balance - Part III

Lecture 38 - Human Gait

Lecture 39 - Human Gait Terminologies

Lecture 40 - Characteristics of Normal Gait - Part I

Lecture 41 - Characteristics of Normal Gait - Part II

Lecture 42 - Characteristics of Normal Gait - Part III

Lecture 43 - Pathological Gait - Part I

Lecture 44 - Pathological Gait - Part II

Lecture 45 - Pathological Gait - Part III

Lecture 46 - Introduction to Assistive Devices for Mobility

Lecture 47 - Design Considerations: Prosthetic Foot

Lecture 48 - Design Considerations: Prosthesis and Orthosis

Lecture 49 - Design Considerations: Prosthetic Knee

Lecture 50 - Journey of Standing Wheelchair Development

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

Lecture 1 - Concept of Steel Quality

Lecture 2 - Typical Examples of Surface Defects

Lecture 3 - Origin of Common Quality Problems

Lecture 4 - Present Scenario on Quality Demands

Lecture 5 - Control of Residuals and Impact on Quality

Lecture 6 - Non-Metallic Inclusions

Lecture 7 - Evaluation of Residuals and Inclusions

Lecture 8 - Cleanliness Requirements for Different applications

Lecture 9 - Limitation of Primary Steelmaking and Importance of secondary Refining

Lecture 10 - Deoxidation

Lecture 11 - Prevention of Slag carryover

Lecture 12 - Desulphurisation

Lecture 13 - Degassing

Lecture 14 - Secondary Refining Processes

Lecture 15 - Injection of Calcium

Lecture 16 - Decarburisation

Lecture 17 - Cleanliness Measures in Ladle and Tundish

Lecture 18 - Cleanliness Measures in Mould

Lecture 19 - Different Routes and Temperature Control

Lecture 20 - Nature and Distribution of Entrapments in Casting

Lecture 21 - Sources of Exogenous Entrapments

Lecture 22 - Effect of Vertical vis-a-vis Curved Mould

Lecture 23 - Quality of Cast Product

Lecture 24 - Role of Concast Process, Caster Design and Steel Grade

Lecture 25 - Primary Cooling in Caster Mould

Lecture 26 - Heat Transfer in Mould

Lecture 27 - Cast Structure and Dendrite Size

Lecture 28 - Role of Mould Oscillation

Lecture 29 - Role of Chemistry - Part I

Lecture 30 - Role of Chemistry - Part II

Lecture 31 - Role of Segregation - Part I

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

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

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 Ratio)

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-phase regions)

Lecture 57 - Phase Diagrams (Type 1: Isomorphous Alloys, Microstructure evolution in Equilibrium and Noon equilibrium cooling)

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)

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

Co-ordinators : Prof. Kameswararao Anupindi

Lecture 31 - Finite Volume Method for Convection and Diffusion: Discretization of steady and unsteady convection equation

Lecture 32 - Finite Volume Method for Convection and Diffusion: Discretization of unsteady convection equation

Lecture 33 - Finite Volume Method for Convection and Diffusion: Discretization of convection-diffusion equation on unstructured mesh

Lecture 34 - Finite Volume Method for Convection-diffusion and fluid flow calculations

Lecture 35 - Finite Volume Method for Fluid Flow Calculations: The staggered grid approach

Lecture 36 - Finite Volume Method for Fluid Flow Calculations: SIMPLE algorithm - Part 1

Lecture 37 - Finite Volume Method for Fluid Flow Calculations: SIMPLE algorithm - Part 2

Lecture 38 - Finite Volume Method for Fluid Flow Calculations: SIMPLE algorithm - Part 3

Lecture 39 - Finite Volume Method for Fluid Flow Calculations: SIMPLE-Revised and SIMPLE-Corrected algorithm

Lecture 40 - Finite Volume Method for Fluid Flow Calculations: SIMPLE algorithm for Colocated mesh - Part 1

Lecture 41 - Finite Volume Method for Fluid Flow Calculations: SIMPLE algorithm for Colocated mesh - Part 2

Lecture 42 - Finite Volume Method for Fluid Flow Calculations: SIMPLE-Colocated algorithm for Unstructured mesh

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

Lecture 28 - What causes Pressure Drop ?, Minimising Pressure Drop, Air Distribution System- Sizing of Pipes, Tubes, Materials and Fittings, Important Air Flow Parameters

Lecture 29 - Pressure drop Predictions using Various Empirical Formulae and Nomogram, Best Practices for Compressed Air Piping System and Installation Tips

Lecture 30 - Need for Air Dryer, Analysis of Moisture Removal from Air, Typical Air Drying Methods, Basic Types of Air Dryers

Lecture 31 - Construction and Operation of Refrigerated Air dyers, Absorption Dryer, Adsorption Dryer, Membrane Dryer, How to Choose the Right Air Dryer?

Lecture 32 - Directional Control Valves

Lecture 33 - Directional Control Valves

Lecture 34 - Directional Control Valves

Lecture 35 - Directional Control Valves

Lecture 36 - Directional Control Valves

Lecture 37 - Pressure Control Valves

Lecture 38 - Pressure Control Valves

Lecture 39 - Pressure Control Valves

Lecture 40 - Flow Control Valves

Lecture 41 - Flow Control Valves

Lecture 42 - Flow Control Valves

Lecture 43 - Estimation of leakage through spool and housing bore and Numericals on DCV, PCV and FCV

Lecture 44 - Estimation of leakage through spool and housing bore and Numericals on DCV, PCV and FCV

Lecture 45 - Hydraulic Motors

Lecture 46 - Hydraulic Motors

Lecture 47 - Hydraulic Motors

Lecture 48 - Hydraulic Motors

Lecture 49 - Hydraulic Motors

Lecture 50 - Hydraulic Motors

Lecture 51 - Hydraulic Cylinders

Lecture 52 - Hydraulic Cylinders

Lecture 53 - Hydraulic Cylinders

Lecture 54 - Hydraulic Cylinders

Lecture 55 - Hydraulic Cylinders

Lecture 56 - Numericals on Fluid Power Actuators

Lecture 57 - Numericals on Fluid Power Actuators

Lecture 58 - Subsystems: Hydraulic Reservoir, Coolers and Filters

Lecture 59 - Subsystems: Hydraulic Reservoir, Coolers and Filters

NPTEL : Introduction to Turbomachines (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

Lecture 1 - Introduction

Lecture 2 - Basic Theroy of Turbomachines - Part 1

Lecture 3 - Basic Theroy of Turbomachines - Part 2

Lecture 4 - Basic Theroy of Turbomachines - Part 3

Lecture 5 - Basic Theroy of Turbomachines - Part 4

Lecture 6 - Basic Theroy of Turbomachines - Part 5

Lecture 7 - Basic Theroy of Turbomachines - Part 6

Lecture 8 - Hydro Turbomachines - Centrifugal pumps - Part 1

Lecture 9 - Hydro Turbomachines - Centrifugal pumps - Part 2

Lecture 10 - Hydro Turbomachines - Centrifugal pumps - Part 3

Lecture 11 - Hydro Turbomachines - Centrifugal pumps - Part 4

Lecture 12 - Hydro Turbomachines - Francis turbine - Part 1

Lecture 13 - Hydro Turbomachines - Francis turbine - Part 2

Lecture 14 - Hydro Turbomachines - Kaplan turbine

Lecture 15 - Hydro Turbomachines - Pelton turbine

Lecture 16 - Positive Displacement Pumps - Gear pump

Lecture 17 - Thermal Turbomachines - Introduction

Lecture 18 - Thermal Turbomachines - Gas turbines

Lecture 19 - Thermal Turbomachines - Steam Turbines

Lecture 20 - Thermal Turbomachines - Part 1

Lecture 21 - Thermal Turbomachines - Part 2

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

Co-ordinators : Prof. Santhakumar Mohan

Lecture 1 - Introduction

Lecture 2 - Introduction to robot mechanics

Lecture 3 - Introduction to forward and inverse kinematics

Lecture 4 - Description of position and orientation

Lecture 5 - Transformation matrix

Lecture 6 - Compound rotations - Part 1

Lecture 7 - Compound rotations - Part 2

Lecture 8 - Kinematic parameters

Lecture 9 - DH parameters

Lecture 10 - DH representation

Lecture 11 - Frame arrangement and examples - Part 1

Lecture 12 - Examples related to frame arrangement

Lecture 13 - Frame arrangement and examples - Part 2

Lecture 14 - Forward and inverse kinematics of robotic manipulators

Lecture 15 - Examples related to inverse kinematics

Lecture 16 - Inverse kinematic solution based on numerical methods

Lecture 17 - Forward kinematic solution using Matlab

Lecture 18 - Inverse kinematic solution based on numerical methods using Matlab

Lecture 19 - Introduction to differential kinematics

Lecture 20 - Velocity propogation model for serial manipulators and Jacobian matrix

Lecture 21 - Velocity propogation model using Matlab

Lecture 22 - Manipulator Statics and Workspace singularities

Lecture 23 - Introduction to robot dynamics and Lagrange-Euler method

Lecture 24 - Newton-Euler method

Lecture 25 - Equation of motion in state-space form

Lecture 26 - Dynamic model derivation using Newton-Euler method in Matlab

Lecture 27 - Dynamic model derivation using Lagrange-Euler method in Matlab

Lecture 28 - Dynamic simulation of serial manipulators using Matlab

Lecture 29 - Introduction to trajectory generation

Lecture 30 - Trajectory generation using smooth functions

Lecture 31 - Trajectory generation schemes for serial manipulators

NPTEL : Inverse Methods in Heat Transfer (Mechanical Engineering)

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

Lecture 1 - Introduction to inverse problems

Lecture 2 - Fermi estimation

Lecture 3 - Forward/Direct and Inverse problems

Lecture 4 - Key drivers for studying inverse methods in engineering

Lecture 5 - Formulation for inverse problems

Lecture 6 - Statistical tools for estimation

Lecture 7 - Statistical description of errors

Lecture 8 - Well-posed and ill-posed problems

Lecture 9 - Probability and Statistics Brief overview - I

Lecture 10 - Probability and Statistics Brief overview - II

Lecture 11 - Gaussian distribution

Lecture 12 - Gaussian distribution (Continued...), and Maximum Likelihood Estimation (MLE)

Lecture 13 - Linear least square regression

Lecture 14 - Linear least square regression (Continued...)

Lecture 15 - Alternatives to Linear least square

Lecture 16 - Polynomial regression

Lecture 17 - Inverse problems in transient conduction - I

Lecture 18 - Inverse problems in transient conduction - II

Lecture 19 - Non-linear regression

Lecture 20 - Gauss-Newton algorithm (GNA)

Lecture 21 - Gauss-Newton algorithm (GNA) Example

Lecture 22 - Levenberg-Marquardt algorithm (LMA)

Lecture 23 - Tikhonov regularization

Lecture 24 - Jacobian and its calculation

Lecture 25 - Bayesian methods

Lecture 26 - Bayesian methods (Continued...)

Lecture 27 - Metropolis-Hastings algorithm (MH) and Markov Chain Monte Carlo Methods (MCMC)

Lecture 28 - Introduction to machine learning in heat transfer

Lecture 29 - Overview of machine learning

Lecture 30 - Calculation in a neural network model

Lecture 31 - Gradient Descent method

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

Lecture 1 - Non-dimensional numbers in interfacial flows

Lecture 2 - Integral form of governing equations

Lecture 3 - Boundary (Jump) conditions at a fluid-fluid interface (no surface tension)

Lecture 4 - On surface tension and interfacial energy

Lecture 5 - Introduction to surface tension effects

Lecture 6 - Boundary (Jump) conditions at a fluid-fluid interface (with surface tension) - Part 1

Lecture 7 - Boundary (Jump) conditions at a fluid-fluid interface (with surface tension) - Part 2

Lecture 8 - Summary of equations

Lecture 9 - Capillary statics shape of meniscus - Part 1

Lecture 10 - Capillary statics shape of meniscus - Part 2

Lecture 11 - Shape of static meniscus-Energy minimisation - Part 1

Lecture 12 - Calculus of variations (a primer): Euler-Lagrange equations

Lecture 13 - Shape of static meniscus-Energy minimisation - Part 2

Lecture 14 - Method of Lagrange multipliers

Lecture 15 - On wetting and shape of a drop

Lecture 16 - The Young's Equation: Partial wetting

Lecture 17 - Variational approach to the Young-Laplace equation - Part 1

Lecture 18 - Variational approach to the Young-Laplace equation - Part 2

Lecture 19 - Shape of a puddle - large/heavy drops

Lecture 20 - Wetting on rough and textured surface - Part 1

Lecture 21 - Wetting on rough and textured surface - Part 2

Lecture 22 - Wetting on rough and textured surface - Part 3

Lecture 23 - Law of capillary rise

Lecture 24 - Dynamics of capillary rise

Lecture 25 - Dynamics of capillary rise: Analysis of regimes

Lecture 26 - Forced wetting and coating flows

Lecture 27 - More on coating and Landau-Levich equation

Lecture 28 - Lubrication approximation and thin films

Lecture 29 - Free surface flows and interface conditions

Lecture 30 - Uniform flow down an incline

Lecture 31 - Shape of a falling jet

NPTEL : Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Dr. Babu Viswanathan

Lecture 1 - Introduction

Lecture 2 - Entropy change of a control volume - Part 1

Lecture 3 - Entropy change of a control volume - Part 2

Lecture 4 - Entropy change of a control volume - Part 3

Lecture 5 - Work interaction of internally reversible steady flow processes

Lecture 6 - Exergy - Part 1

Lecture 7 - Exergy - Part 2

Lecture 8 - Exergy - Part 3

Lecture 9 - Exergy - Part 4

Lecture 10 - Exergy - Part 5

Lecture 11 - Thermodynamic cycles - Rankine cycle - Part 1

Lecture 12 - Thermodynamic cycles - Rankine cycle - Part 2

Lecture 13 - Thermodynamic cycles - Rankine cycle - Part 3

Lecture 14 - Thermodynamic cycles - Air standard Brayton cycle - Part 1

Lecture 15 - Thermodynamic cycles - Air standard Brayton cycle - Part 2

Lecture 16 - Thermodynamic cycles - Air standard Brayton cycle - Part 3

Lecture 17 - Thermodynamic cycles - Air standard Brayton cycle - Part 4

Lecture 18 - Thermodynamic cycles - Air standard Brayton cycle - Part 5

Lecture 19 - Thermodynamic cycles - Air standard Otto cycle

Lecture 20 - Thermodynamic cycles - Air standard Diesel cycle - Part 1

Lecture 21 - Thermodynamic cycles - Air standard Diesel cycle - Part 2

Lecture 22 - Thermodynamic cycles - Vapor compression refrigeration cycle

Lecture 23 - Psychrometry - Part 1

Lecture 24 - Psychrometry - Part 2

Lecture 25 - Psychrometry - Part 3

Lecture 26 - Psychrometry - Part 4

Lecture 27 - Psychrometry - Part 5

Lecture 28 - Psychrometry - Part 6

Lecture 29 - Psychrometry - Part 7

Lecture 30 - Combustion thermodynamics - Part 1

Lecture 31 - Combustion thermodynamics - Part 2

Lecture 32 - Combustion Thermodynamics - Part 3

Lecture 33 - Combustion thermodynamics - Part 4

Lecture 34 - Compressible flow through nozzles - Part 1

Lecture 35 - Compressible flow through nozzles - Part 2

Lecture 36 - Compressible flow through nozzles - Part 3

Lecture 37 - Compressible flow through nozzles - Part 4

Lecture 38 - Compressible flow through nozzles - Part 5

Lecture 39 - Compressible flow through nozzles - Part 6

Lecture 40 - Compressible flow through nozzles - Part 7

Lecture 41 - Compressible flow through nozzles - Part 8

Lecture 42 - Compressible flow through nozzles - Part 9

Lecture 43 - Compressible flow through nozzles - Part 10

Lecture 44 - Compressible flow through nozzles - Part 11

Lecture 45 - Compressible flow through nozzles - Part 12

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

Lecture 1 - Introduction to Strength of Materials - 1

Lecture 2 - Introduction to Strength of Materials - 2

Lecture 3 - Stress Component is Scalar

Lecture 4 - Stress Vector

Lecture 5 - Stress Tensor

Lecture 6 - Equilibrium Conditions

Lecture 7 - Mohr's Circle

Lecture 8 - Proof of Mohr's Circle

Lecture 9 - Principal Stresses

Lecture 10 - Octahedral and Deviatoric Stresses and Principal Directions

Lecture 11 - Free Surfaces

Lecture 12 - Photoelasticity

Lecture 13 - Strain

Lecture 14 - State of Strain

Lecture 15 - Strain Measurement

Lecture 16 - Tension Test

Lecture 17 - Stress Strain Relations

Lecture 18 - Interrelations between Elastic Constants

Lecture 19 - Thermal Strain

Lecture 20 - Torsion 1 - Thought and Physical Experiments

Lecture 21 - Torsion 2 - Mathematical Development

Lecture 22 - Torsion 3 - Problem solving, Hollow shaft

Lecture 23 - Bending 1 - Euler-Bernoulli Hypothesis

Lecture 24 - Bending 2 - Flexure Formula

Lecture 25 - Bending 3 - Engineering Analysis of Beams

Lecture 26 - Bending 4 - Shear Stress in Beams

Lecture 27 - Bending 5 - Composite Beams

Lecture 28 - Bending 6 - Shear in I Beams and Shear Centre

Lecture 29 - Bending 7 - Unsymmetrical Bending and Combined Loading

Lecture 30 - Review 1

Lecture 31 - Deflection 1 - Moment-Curvature and Load Deflection

NPTEL : NOC:Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

Lecture 32 - Tutorial 4 - Systems involving ideal gas mixtures - Part 3

Lecture 33 - Tutorial 5 - Systems involving Steam and R134a using table - Part 1

Lecture 34 - Tutorial 5 - Systems involving Steam and R134a using table - Part 2

Lecture 35 - Tutorial 5 - Systems involving Steam and R134a using table - Part 3

Lecture 36 - Tutorial 5 - Systems involving Steam and R134a using table - Part 4

Lecture 37 - Tutorial 5 - Systems involving Steam and R134a using table - Part 5

Lecture 38 - Tutorial 5 - Systems involving Steam and R134a using table - Part 6

Lecture 39 - First law of thermodynamics for a control colume

Lecture 40 - Control volume analysis of steady flow devices - Part 1

Lecture 41 - Control volume analysis of steady flow devices - Part 2

Lecture 42 - Control volume analysis of steady flow devices - Part 3

Lecture 43 - Unsteady analysis

Lecture 44 - Tutorial 6 - First law for control volumes

Lecture 45 - Second law of Thermodynamics - Part 1

Lecture 46 - Second law of Thermodynamics - Part 2

Lecture 47 - Second law of Thermodynamics - Part 3

Lecture 48 - Second law of Thermodynamics - Part 4

Lecture 49 - Second law of Thermodynamics - Part 5

Lecture 50 - Tutorial 7 - Second law of thermodynamics - Part 1

Lecture 51 - Tutorial 7 - Second law of thermodynamics - Part 2

Lecture 52 - Tutorial 7 - Second law of thermodynamics - Part 3

Lecture 53 - Tutorial 7 - Second law of thermodynamics - Part 4

Lecture 54 - Tutorial 7 - Second law of thermodynamics - Part 5

Lecture 55 - Entropy - Part 1

Lecture 56 - Entropy - Part 2

Lecture 57 - Entropy - Part 3

Lecture 58 - Entropy - Part 4

Lecture 59 - Entropy - Part 5

Lecture 60 - Entropy - Part 6

Lecture 61 - Tutorial 8 - Entropy - Part 1

Lecture 62 - Tutorial 8 - Entropy - Part 2

Lecture 63 - Tutorial 8 - Entropy - Part 3

Lecture 64 - Tutorial 8 - Entropy - Part 4

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

Co-ordinators : Prof. V. Raghavan

Lecture 1 - Basics of Fire - Part 1

Lecture 2 - Basics of Fire - Part 2

Lecture 3 - Basics of Fire - Part 3

Lecture 4 - Basics of Fire - Part 4

Lecture 5 - Basics of Fire - Part 5

Lecture 6 - Basics of Fire - Part 6

Lecture 7 - Basics of Fire - Part 7

Lecture 8 - Basics of Fire - Part 8

Lecture 9 - Basics of Fire - Part 9

Lecture 10 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 1

Lecture 11 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 2

Lecture 12 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 3

Lecture 13 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 4

Lecture 14 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 5

Lecture 15 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 6

Lecture 16 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 7

Lecture 17 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 8

Lecture 18 - Review of Premixed and Diffusion Flames - Part 1

Lecture 19 - Review of Premixed and Diffusion Flames - Part 2

Lecture 20 - Review of Premixed and Diffusion Flames - Part 3

Lecture 21 - Review of Premixed and Diffusion Flames - Part 4

Lecture 22 - Review of Premixed and Diffusion Flames - Part 5

Lecture 23 - Review of Premixed and Diffusion Flames - Part 6

Lecture 24 - Review of Premixed and Diffusion Flames - Part 7

Lecture 25 - Review of Premixed and Diffusion Flames - Part 8

Lecture 26 - Burning of Liquid Fuels- Part 1

Lecture 27 - Burning of Liquid Fuels- Part 2

Lecture 28 - Burning of Liquid Fuels- Part 3

Lecture 29 - Burning of Liquid Fuels- Part 4

Lecture 30 - Burning of Liquid Fuels- Part 5

Lecture 31 - Burning of Liquid Fuels- Part 6

Lecture 32 - Burning of Liquid Fuels- Part 7

Lecture 33 - Burning of Liquid Fuels- Part 8

Lecture 34 - Burning of Solid Fuels - Part 1

Lecture 35 - Burning of Solid Fuels - Part 2

Lecture 36 - Burning of Solid Fuels - Part 3

Lecture 37 - Burning of Solid Fuels - Part 4

Lecture 38 - Burning of Solid Fuels - Part 5

Lecture 39 - Burning of Solid Fuels - Part 6

Lecture 40 - Burning of Solid Fuels - Part 7

Lecture 41 - Analysis of Fire Plumes - Part 1

Lecture 42 - Analysis of Fire Plumes - Part 2

Lecture 43 - Analysis of Fire Plumes - Part 3

Lecture 44 - Analysis of Fire Plumes - Part 4

Lecture 45 - Analysis of Fire Plumes - Part 5

Lecture 46 - Analysis of Fire Plumes - Part 6

Lecture 47 - Enclosure Fires - Part 1

Lecture 48 - Enclosure Fires - Part 2

Lecture 49 - Enclosure Fires - Part 3

Lecture 50 - Enclosure Fires - Part 4

Lecture 51 - Enclosure Fires - Part 5

Lecture 52 - Enclosure Fires - Part 6

Lecture 53 - Enclosure Fires - Part 7

Lecture 54 - Introduction to dust ignition, dust explosion and forest fires - Part 1

Lecture 55 - Introduction to dust ignition, dust explosion and forest fires - Part 2

Lecture 56 - Introduction to dust ignition, dust explosion and forest fires - Part 3

Lecture 57 - Introduction to dust ignition, dust explosion and forest fires - Part 4

Lecture 58 - Introduction to dust ignition, dust explosion and forest fires - Part 5

Lecture 59 - Fire safety aspects - Part 1

Lecture 60 - Fire safety aspects - Part 2

Lecture 61 - Fire safety aspects - Part 3

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

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

Lecture 1 - Basics of Vibrations for Simple Mechanical Systems

Lecture 2 - Introduction to Damping in Free and Force Vibrations

Lecture 3 - Free and Forced Vibrations of Two Degree of Systems

Lecture 4 - Multi Degree of Freedom Systems

Lecture 5 - Reduction at source - 1

Lecture 6 - Reduction at source - 2

Lecture 7 - Reduction at source - 3

Lecture 8 - Feedback Control System - 1

Lecture 9 - Shunt Damping

Lecture 10 - Vibration Isolation - 1

Lecture 11 - Vibration Isolation - 2

Lecture 12 - Vibration Isolation - 3

Lecture 13 - Source Classification

Lecture 14 - Self Excitation Vibration

Lecture 15 - Flow Induction Vibration

Lecture 16 - Field Balancing of Rigid / Flexible Rotors

Lecture 17 - Damping: Models and Measures - I

Lecture 18 - Damping: Models and Measures - II

Lecture 19 - Numerical Problems

Lecture 20 - Design Sensitivity - I

Lecture 21 - Design Specification

Lecture 22 - Design for Enhanced Material Damping

Lecture 23 - Basics of Passive Vibration Control

Lecture 24 - Design of Absorber

Lecture 25 - Shock Absorber

Lecture 26 - Isolators with Stiffness and Damping

Lecture 27 - Basics of Active Vibration Control

Lecture 28 - Piezoelectric Material - I

Lecture 29 - Piezoelectric Material - II: Applications

Lecture 30 - Piezoelectric Accelerometers

Lecture 31 - Electro-rheological (ER) Fluids

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

Lecture 32 - cost estimating relationships

Lecture 33 - Introduction to decision under risk Criteria for decision under risk

Lecture 34 - Expected value decision making under risk

Lecture 35 - Expected variance decision making under risk

Lecture 36 - Problem solving based on decision under risk

Lecture 37 - Income taxes: Principles and calculation of effective income tax rates

Lecture 38 - Effect of method of depreciation on income taxes

Lecture 39 - After tax economic analysis

Lecture 40 - Problem solving based on Income tax analysis

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

Lecture 32 - Metallurgical transformations in weld and heat affected zone of steels

Lecture 33 - Residual Stresses in Weld Joints

Lecture 34 - Solidification cracking and their control

Lecture 35 - Cracking of Welded Joints II - Cold Cracks

Lecture 36 - Understanding Weldability Introduction - I

Lecture 37 - Understanding Weldability Introduction - II

Lecture 38 - Metal Properties and Weldability - I

Lecture 39 - Metal Properties and Weldability - II

Lecture 40 - Weldability of Work Hardenable Metals

Lecture 41 - Weldability of Work Hardenable and Precipitation Strengthened Metals

Lecture 42 - Weldability of Precipitation Strengthened Metals

Lecture 43 - Weldability of Metals Strengthened by Grain Refinement and Transformation Hardening

Lecture 44 - Weldability of Transformation Hardening Metals

Lecture 45 - Weldability of Metals - Combination of Strengthening Mechanisms

Lecture 46 - Weldability Consideration

Lecture 47 - Weldability of Carbon and Alloy Steel - I

Lecture 48 - Weldability of Carbon and Alloy Steel - II

Lecture 49 - Weldability of Carbon and Alloy Steel - III

Lecture 50 - Weldability of Low Carbon Steel and Mild Steel

Lecture 51 - Weldability of Medium Carbon Steel and High Carbon Steel

Lecture 52 - Weldability of High Strength Low Alloy Steels

Lecture 53 - Weldability of HTLA Steel - I

Lecture 54 - Weldability of HTLA Steel - II

Lecture 55 - Weldability of Cr-Mo Steel - I

Lecture 56 - Weldability of Cr-Mo Steel - II

Lecture 57 - Weldability of Pre-coated Steel - I

Lecture 58 - Weldability of Pre-coated Steel - II

Lecture 59 - Weldability of Stainless Steel - I

Lecture 60 - Weldability of Stainless Steel - II

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

Lecture 32 - Issues in material handling system

Lecture 33 - Modeling of system randomness: Machine downtime

Lecture 34 - Verification of simulation models

Lecture 35 - Model validity and credibility

Lecture 36 - Problem solving and case studies on simulation of manufacturing system

Lecture 37 - Introduction to Monte Carlo Simulation

Lecture 38 - Inventory Control Simulation using Monte Carlo Technique

Lecture 39 - In this lecture, Monte Carlo technique was used to solve inventory system problems

Lecture 40 - Problem solving on Monte Carlo Simulation

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

Lecture 1 - Introduction - Need and scope of failure analysis and prevention

Lecture 2 - Introduction - Engineering disasters and understanding failures

Lecture 3 - Fundamental sources of failures - Deficient design - I

Lecture 4 - Fundamental sources of failures - Deficient design - II

Lecture 5 - Fundamental sources of failures - Deficient design - III and upgrading of a part

Lecture 6 - Fundamental sources of failures - Imperfections in base metals

Lecture 7 - Fundamental sources of failures - Improper Manufacturing - I

Lecture 8 - Fundamental sources of failures - Improper Manufacturing - II

Lecture 9 - Fundamental sources of failures - Improper Manufacturing - III

Lecture 10 - Fundamental sources of failures - Improper Manufacturing - IV and improper service conditions

Lecture 11 - Fundamental sources of failures - Poor assembly, service and maintenance

Lecture 12 - Industrial engineering tool for failure analysis - Pareto diagram

Lecture 13 - Industrial engineering tool for failure analysis - Fishbone diagram and FMEA

Lecture 14 - Industrial engineering tool for failure analysis - FMEA

Lecture 15 - Industrial engineering tool for failure analysis - Fault tree analysis

Lecture 16 - Industrial engineering tool for failure analysis - Reliability - I

Lecture 17 - Industrial engineering tool for failure analysis - Reliability - II

Lecture 18 - General procedure of failure analysis - Steps

Lecture 19 - General procedure of failure analysis - Background information collection

Lecture 20 - General procedure of failure analysis - Preliminary examination

Lecture 21 - General procedure of failure analysis - NDT for failure analysis

Lecture 22 - General procedure of failure analysis - Destructive testing

Lecture 23 - General procedure of failure analysis - DT, selection, preservation, cleaning and sectioning of samples

Lecture 24 - General procedure of failure analysis - Macroscopy of fracture surfaces - I

Lecture 25 - General procedure of failure analysis - Macroscopy of fracture surfaces - II

Lecture 26 - General procedure of failure analysis - Macroscopy of fracture surfaces - III

Lecture 27 - General procedure of failure analysis - Macroscopy of fracture surfaces - IV

Lecture 28 - General procedure of failure analysis - Microscopy of fracture surfaces

Lecture 29 - General procedure of failure analysis - Metallography of failed components

Lecture 30 - General procedure of failure analysis - Determination of type of fracture - I

Lecture 31 - General procedure of failure analysis - Determination of type of fracture - II

Lecture 32 - General procedure of failure analysis - Determination of type of fracture - III and chemical analysis

Lecture 33 - General procedure of failure analysis - Application of fracture mechanics - I

Lecture 34 - General procedure of failure analysis - Application of fracture mechanics - II

Lecture 35 - General procedure of failure analysis - Simulated test service conditions and analysis of evidences

Lecture 36 - General procedure of failure analysis - Question for analysis

Lecture 37 - General procedure of failure analysis - Reporting failure analysis and failure analysis of welded joint

Lecture 38 - General procedure of failure analysis - Failure analysis of weld joint

Lecture 39 - General procedure of failure analysis - Examples of failure analysis

Lecture 40 - General procedure of failure analysis - Embrittlement of steels

NPTEL : NOC:Mechanical Measurement System (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

Lecture 1 - Basic concepts of measurement

Lecture 2 - Functional elements of instruments

Lecture 3 - Classification of measuring instruments

Lecture 4 - Methods of correction for interfering and modifying inputs

Lecture 5 - Static characteristics of measuring instruments - 1

Lecture 6 - Static characteristics of measuring instruments - 2

Lecture 7 - Loading effect and Impedance matching

Lecture 8 - Statistical analysis

Lecture 9 - Chi-square test

Lecture 10 - Least square method

Lecture 11 - Uncertainty analysis

Lecture 12 - Problem solving - 1

Lecture 13 - Generalized model of a measuring system

Lecture 14 - Zero and first order system

Lecture 15 - First order system - step response

Lecture 16 - First order system - ramp response

Lecture 17 - First order system - impulse response

Lecture 18 - First order system - frequency response

Lecture 19 - Second order system - step response - 1

Lecture 20 - Second order system - step response - 2

Lecture 21 - Second order system - ramp response

Lecture 22 - Second order system - impulse and frequency response

Lecture 23 - Higher order systems

Lecture 24 - Compensation

Lecture 25 - Transducers - 1

Lecture 26 - Transducers - 2

Lecture 27 - Flow measurement - 1

Lecture 28 - Flow measurement - 2

Lecture 29 - Temperature measurement - 1

Lecture 30 - Temperature measurement - 2

Lecture 31 - Strain gauges

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

Lecture 1 - Introduction

Lecture 2 - Fundamentals of Radiation

Lecture 3 - Basic Laws of Thermal Radiation

Lecture 4 - Properties of Plane Surfaces

Lecture 5 - Radiative Properties of Materials

Lecture 6 - View Factor

Lecture 7 - Hottel Crossed String Method

Lecture 8 - Inside Sphere and Monte Carlo Method

Lecture 9 - Radiative Heat Exchange Between Black Surfaces

Lecture 10 - Radiative Heat Exchange Between Gray Diffuse Surfaces

Lecture 11 - Network Analogy

Lecture 12 - Solution Methods for Governing Integral Equations

Lecture 13 - Radiative Heat Exchange between Partially Specular Gray Surfaces

Lecture 14 - Non-Gray Surfaces

Lecture 15 - Radiative Heat Transfer in the Presence of Conduction/Convection

Lecture 16 - Radiative Transfer in Participating Media

Lecture 17 - Equation of Radiative Transfer

Lecture 18 - Solution of Radiative Transfer Equation

Lecture 19 - Radiative Heat Transfer in Cylindrical Media

Lecture 20 - Approximate Methods-I

Lecture 21 - Approximate Methods-II

Lecture 22 - The Method of Spherical Harmonics (PN Approximation) - I

Lecture 23 - The Method of Spherical Harmonics (PN Approximation) - II

Lecture 24 - Discrete Ordinate Method (DOM)

Lecture 25 - Zone Method

Lecture 26 - Exchange Areas

Lecture 27 - Monte Carlo Method for Thermal Radiation - I

Lecture 28 - Monte Carlo Method for Thermal Radiation - II

Lecture 29 - Radiative Properties of Gases

Lecture 30 - Atomic and Molecular Spectra

Lecture 31 - Line Radiation

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

Lecture 32 - Ultrasonic Welding : Plastics

Lecture 33 - Vibration and Spin Welding : Plastics

Lecture 34 - Microwave Joining

Lecture 35 - Hole making : Guidelines

Lecture 36 - Design for Environment

Lecture 37 - Design for Environment : Steps

Lecture 38 - Product Architecture

Lecture 39 - Rapid Prototyping

Lecture 40 - Product Design : Manufacturing Perspective

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

Lecture 32 - Advantages and Applications of Membrane Type AMM

Lecture 33 - Tutorial on Membrane Type AMM

Lecture 34 - Introduction to Sonic Crystals

Lecture 35 - Fundamentals of Crystals

Lecture 36 - Principle of Working of Sonic Crystals - 1

Lecture 37 - Principle of Working of Sonic Crystals - 2

Lecture 38 - Tutorial on Sonic Crystals

Lecture 39 - More on Sonic Crystals and Conclusions

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 : 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 31 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdmann corner conditions - Part II

Lecture 32 - Variational (energy) methods in statics; principles of minimum potential energy and virtual work

Lecture 33 - General framework of optimal structural designs - Part I

Lecture 34 - General framework of optimal structural designs - Part II

Lecture 35 - Optimal structural design of bars and beams using the optimality criteria method

Lecture 36 - Invariants of Euler-Lagrange equations and canonical forms

Lecture 37 - NoetherÂ's theorem

Lecture 38 - Minimum characterization of Sturm-Liouville problems

Lecture 39 - Rayleigh quotient for natural frequencies and mode shapes of elastic systems

Lecture 40 - Stability analysis and buckling using calculus of variations

Lecture 41 - Strongest (most stable) column

Lecture 42 - Dynamic compliance optimization

Lecture 43 - Electro-thermal-elastic structural optimization

Lecture 44 - Formulating the extremization problem starting from the differential equation, self-adjointness of the differential operator, and methods to deal with conservative and dissipative system

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

Lecture 1 - Introduction, Types and Classification of Robots

Lecture 2 - Main Elements of a Robot

Lecture 3 - Modelling and Analysis of Robots

Lecture 4 - Mathematical Preliminaries, Homogeneous Transformations

Lecture 5 - Elements of robot - Joints, Elements of robots - Links

Lecture 6 - Examples of D-H parameters and Link transformation matrices

Lecture 7 - Introduction, Direct Kinematics of Serial Robots

Lecture 8 - Inverse Kinematics of Serial Robots

Lecture 9 - Inverse Kinematics of Serial Robots with n < 6, Inverse Kinematics of Serial Robots with n > 6

Lecture 10 - Elimination Theory and Solution of Non-linear Equations, Inverse Kinematics of a General 6R Robot

Lecture 11 - Introduction, Loop-closure Equations

Lecture 12 - Direct Kinematics of Parallel Manipulators

Lecture 13 - Mobility of Parallel Manipulators

Lecture 14 - Inverse Kinematics of Parallel Manipulators

Lecture 15 - Direct Kinematics of Stewart Platform Manipulators

Lecture 16 - Sun tracking using 3-DOF parallel manipulator

Lecture 17 - Stewart-Gough platform-based force-torque sensor

Lecture 18 - Vibration isolation using a Stewart-Gough platform

Lecture 19 - Introduction, Linear and Angular Velocity of Links

Lecture 20 - Serial Manipulator Jacobian Matrix

Lecture 21 - Parallel Manipulator Jacobian Matrix

Lecture 22 - Singularities in Serial and Parallel Manipulators

Lecture 23 - Statics of Serial and Parallel Manipulators

Lecture 24 - Hyper-redundant robots

Lecture 25 - Redundancy resolution in human arm

Lecture 26 - Flexible robots

Lecture 27 - Introduction, Lagrangian formulation

Lecture 28 - Examples of Equations of Motion

Lecture 29 - Inverse Dynamics and Simulation of Equations of Motion

Lecture 30 - Recursive Formulations of Dynamics of Manipulators

Lecture 31 - Motion planning

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

Lecture 32 - Hermite polynomials as vibrational energy mode solution

Lecture 33 - Equivalent two body model of atomic hydrogen

Lecture 34 - The Electronic Energy Mode for Atomic Hydrogen

Lecture 35 - Problem Solving - 3

Lecture 36 - The four quantum numbers and multielectron systems

Lecture 37 - Spectroscopic term symbols for multielectron atoms

Lecture 38 - Electron energies for multielectron systems

Lecture 39 - Combined energy modes for atoms and diatomic molecules

Lecture 40 - Perturbation analysis of the Schrodinger Wave equation

Lecture 41 - Selection rules

Lecture 42 - The Rotational and vibrational spectroscopy

Lecture 43 - Ro-vibrational spectroscopy (Simplex model)

Lecture 44 - Rotation vibration coupling (Complex model)

Lecture 45 - Ro-vibrational spectroscopy (Complex model)

Lecture 46 - Ro-vibronic spectroscopy

Lecture 47 - Working with Spectroscopic Schemes, Notations and Term Symbols

Lecture 48 - From Particles to assembly - I

Lecture 49 - From Particles to assembly - II

Lecture 50 - Connecting Quantum Mechanics to Classical Mechanics

Lecture 51 - The Equipartition principle and ideal gas

Lecture 52 - Thermodynamic properties of ideal monoatomic and diatomic gas

Lecture 53 - The zero of energy (rotational and vibrational)

Lecture 54 - Specific heats, Internal energy through Vibrational and Ro-vibrational energy modes

Lecture 55 - The Ro-vibrational partition function and Introduction to intersction of Radiationand Matter

Lecture 56 - Absorption and Emission of Radiation

Lecture 57 - The Rabi frequency and Beer's Law

Lecture 58 - Insights into radiative spectral transitions

Lecture 59 - Theory of Absoprtion Spectroscopy