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

Lecture 32 - Robot Dynamics and Control

Lecture 33 - Robot Dynamics and Control

Lecture 34 - Robot Dynamics and Control

Lecture 35 - Robot Dynamics and Control

Lecture 36 - Robot Dynamics and Control

Lecture 37 - Futuristic Topics in Robotics

Lecture 38 - Robot Dynamic and Control-Case Studies

Lecture 39 - Robot Dynamic and Control-Case Studies

Lecture 40 - Futuristic Topics in Robotics

NPTEL : NOC:Optimization from Fundamentals (Mechanical Engineering)

Co-ordinators : Prof. Ankur A. Kulkarni

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

Co-ordinators : Prof. Prasanna Gandhi

NPTEL : NOC:Nonlinear Adaptive Control (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

NPTEL : NOC:Nonlinear Control Design (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

NPTEL : Tribology (Mechanical Engineering)

Co-ordinators : Dr. Harish Hirani

NPTEL : Computer Aided Design and Manufacturing (Mechanical Engineering)

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

Lecture 32 - Modeling of B-Spline Curves

Lecture 33 - Modeling of B-spline Curves

Lecture 34 - Surface Modeling

Lecture 35 - Surface Modeling

Lecture 36 - Display of Curves and Surfaces

Lecture 37 - Solid Modeling

Lecture 38 - Solid Modeling

Lecture 39 - Solid Modeling Using Octrees

Lecture 40 - (Lecture Missing)

Lecture 41 - Computer Aided Design

Lecture 42 - Computer Aided Manufacturing

Lecture 43 - What is CAD/CAM

Lecture 44 - An Overview of Geometric Modeling

Lecture 45 - Parametric Cubic Curve

Lecture 46 - Parametric Bezier Curve

Lecture 47 - B-Spline Curve

Lecture 48 - Parametric Surfaces - Part-1

Lecture 49 - Parametric Surfaces - Part-2

Lecture 50 - Solid Modeling

Lecture 51 - Geometric & Product Data Exchange

Lecture 52 - Reverse Engineering

NPTEL : Project and Production Management (Mechanical Engineering)

Co-ordinators : Prof. Arun Kanda

NPTEL : NOC:RAC Product Design (Mechanical Engineering)

Co-ordinators : Prof. Sanjeev Jain

NPTEL : NOC:Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.R kale

NPTEL : NOC:Solid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Ajeet Kumar

Lecture 1 - Mathematical Concepts: Working with Vectors and Tensors

Lecture 2 - Traction Vector

Lecture 3 - Stress Tensor and its Matrix Representation

Lecture 4 - Transformation of Stress Matrix

Lecture 5 - Stress Equilibrium Equations : Balance of Linear and Angular Momentum

Lecture 6 - Balance of Angular Momentum (Continued...)

Lecture 7 - Principal Planes and Principal stress components

Lecture 8 - Maximizing the Shear Component of Traction

Lecture 9 - Mohr's Circle

Lecture 10 - Mohr's Circle (Continued...), Stress Invariants, Decomposition of the Stress Tensor

Lecture 11 - Concept of Strain Tensor

Lecture 12 - Longitudinal and Shear Strains

Lecture 13 - Local Volumetric Strain and Local Infinitesimal Rotation

Lecture 14 - Similarity in Properties of Stress and Strain Tensors

Lecture 15 - Stress-Strain Relation

Lecture 16 - Stress-Strain Relation for Isotropic Materials

Lecture 17 - Linear Momentum Balance in Cylinderical Coordinate System

Lecture 18 - Linear Momentum Balance in Cylinderical Coordinate System (Continued...)

Lecture 19 - Strain Matrix Cylinderical Coordinate System

Lecture 20 - Extension-Torsion-Inflation in a Hollow Cylinder

Lecture 21 - Extension-Torsion-Inflation in a Hollow Cylinder (Continued...)

Lecture 22 - Solving Problems Involving Torsion of Shafts

Lecture 23 - Pure Bending of Rectangular Beams

Lecture 24 - Bending of Beams (Continued...)

Lecture 25 - Bending of Unsymmetrical Beams

Lecture 26 - Concept of Shear Center

Lecture 27 - Theoy of Beams

Lecture 28 - Theoy of Beams (Continued...) and Beam Buckling

Lecture 29 - Energy Methods

Lecture 30 - Energy Methods (Continued...)

Lecture 31 - Theories of Failure

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

Lecture 1 - Ideal fluids, Velocity potential, Potential flows

Lecture 2 - Stream function, Orthogonality of streamlines and equipotential lines

Lecture 3 - Complex variables, Analyticity, Cauchy - Riemann equations, Complex potential, Complex velocity

Lecture 4 - Elementary flows : Uniform flow, Source and Sink, Free vortex

Lecture 5 - Flow in a bend, Flow around a sharp edge

Lecture 6 - Superposition of source and sink : doublet flow

Lecture 7 - Superposition of uniform flow and doublet

Lecture 8 - Superposition of uniform flow, doublet and free vortex

Lecture 9 - Superposition of source and uniform flow

Lecture 10 - Problem solving session - 1

Lecture 11 - Problem solving session - 2

Lecture 12 - Method of images, Forces on a body, Blasius theorem

Lecture 13 - Calculation of forces using derived flow field

Lecture 14 - Introduction to conformal transformation

Lecture 15 - Singularities and their transformations

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

Lecture 1 - Introduction to polymers

Lecture 2 - Polymer structure

Lecture 3 - Polymer classification

Lecture 4 - Polymer length, packing and tacticity

Lecture 5 - Glass transition temperature

Lecture 6 - Temperature effects, glassy regime

Lecture 7 - Viscoelastic, rubbery, viscous, decomposition

Lecture 8 - Relaxation and creep tests

Lecture 9 - Failure of polymers

Lecture 10 - Heaviside, Dirac delta, Laplace

Lecture 11 - Introduction to linear viscoelasticity

Lecture 12 - Phenomenological models for linear viscoelasticity

Lecture 13 - Maxwell model

Lecture 14 - Kelvin model

Lecture 15 - Three and four parameter models

Lecture 16 - Generalized Maxwell and Kelvin models

Lecture 17 - Boltzman superposition principle

Lecture 18 - Alfrey's correspondence principle

Lecture 19 - Analysis of viscoelastic bars

Lecture 20 - Analysis of viscoelastic beams

Lecture 21 - Dynamic mechanical analysis (DMA)

Lecture 22 - Dynamic mechanical thermal analysis (DMTA)

Lecture 23 - Time temperature superposition principle (TTSP)

Lecture 24 - Plastic design consideration and practices

Lecture 25 - What are composites?

Lecture 26 - Composite materials and types

Lecture 27 - Composite advantages and applications

Lecture 28 - Fabrication and other aspects of composites

Lecture 29 - 3D stress and strain components

Lecture 30 - Symmetry in stress, strain and stiffness matrix

Lecture 31 - Monoclinic, orthotropic and isotropic materials

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

Co-ordinators : Prof. (HAG) Harish Hirani

NPTEL : Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S.K. Dwivedy

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

Co-ordinators : Prof. Rajiv Tiwari

Lecture 1 - Introduction

Lecture 2 - A Brief History of Rotor Dynamics

Lecture 3 - The State of the Art of Rotor Dynamics

Lecture 4 - Simple Rotor Models with Rigid Bearings

Lecture 5 - Jeffcott Rotor Model

Lecture 6 - Variant of Jeffcott Rotor Model

Lecture 7 - Rigid Rotor Mounted on Simple Anistropic Springs as Bearings

Lecture 8 - Rigid Rotor Mounted on Complex Anisotropic Bearings

Lecture 9 - Flexible Shaft with a Rigid Disc Mounted on Anistropic Supports

Lecture 10 - Gyroscopic Effects : Synchronous whirl of a Rotor Systems with a thin Disc

Lecture 11 - Gyroscopic Effects : Synchronous and Asynchronous pure wobbling motions

Lecture 12 - Gyroscopic Effects : Asynchronous whirl of a Rotor system with a thin Disc

Lecture 13 - Gyroscopic Effects : Asynchronous whirl analysis with Dynamic Approach

Lecture 14 - Torsional Vibrations: Simple Rotor Systems

Lecture 15 - Three Disc Rotor System

Lecture 16 - Transfer Matrix Approach - Part I

Lecture 17 - Transfer Matrix Approach - Part II

Lecture 18 - Transfer Matrix Approach - Part III

Lecture 19 - Geared and Branched Systems

Lecture 20 - Continuous System and Finite Element Method

Lecture 21 - Finite Element Method

Lecture 22 - Finite Element Analysis

Lecture 23 - Finite Element Analysis - Part III

Lecture 24 - Influence Coefficient Method

Lecture 25 - Transfer Matrix Method - Part I

Lecture 26 - Transfer Matrix Method - Part II

Lecture 27 - Transfer Matrix Method - Part III

Lecture 28 - Continuous System Approach

Lecture 29 - Finite Element Method - Part I

Lecture 30 - Finite Element Method - Part II

Lecture 31 - Finite Element Method - Part III

NPTEL : Engineering Mechanics (Mechanical Engineering)

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

Lecture 1 - Fundamentals Of Engineering Mechanics

Lecture 2 - Equations of Equilibrium

Lecture 3 - Truss Analysis - Part 1

Lecture 4 - Truss Analysis - Part 2

Lecture 5 - Analysis of Frames Machines

Lecture 6 - Internal Forces

Lecture 7 - Internal Forces in Beams

Lecture 8 - Cables

Lecture 9 - Friction

Lecture 10 - Application of Friction - Part 1

Lecture 11 - Application of Friction - Part 2

Lecture 12 - Application of Friction - Part 3

Lecture 13 - Centroids Center of Mass

Lecture 14 - Centroids Area of Moments

Lecture 15 - Product of Inertia, Rotation of Axis and Principle Moments of Inertia

Lecture 16 - Principle Mass Moments of Inertia

Lecture 17 - Second Moment of Mass

Lecture 18 - Virtual Work of Ideal System

Lecture 19 - Principle of Virtual Work

Lecture 20 - Systems with Friction

Lecture 21 - Potential Energy

Lecture 22 - Stability of Equilibrium

Lecture 23 - Kinematics of a Particles

Lecture 24 - Kinematics of a Particle Moving on a Curve

Lecture 25 - Relative Motion

Lecture 26 - Plane Kinematics of Rigid Bodies

Lecture 27 - Kinematics of a Particle

Lecture 28 - Work and Energy

Lecture 29 - Impulse and Momentum

Lecture 30 - Direct and Oblique Impulse

Lecture 31 - Plane Kinetics of Rigid Bodies

NPTEL : Mechanical Vibrations (Mechanical Engineering)

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

Lecture 1 - Overview of the Course, Practical and Research Trends

Lecture 2 - Harmonic and Periodic Motions, Vibration Terminology

Lecture 3 - Vibration Model, Equation of Motion-Natural Frequency

Lecture 4 - Energy Method, Principle of Virtual Work

Lecture 5 - Viscously Damped Free Vibration Special Cases: Oscillatory

Lecture 6 - Logarithmic Decrement Experimental Determination of Damping Coefficient Hystersis Loop

Lecture 7 - Coulomb Damping other Damping Models

Lecture 8 - Forced Harmonic Vibration, Magnification Factor

Lecture 9 - Laplace Transform, Superposition Theorem

Lecture 10 - Rotor Unbalance and Whirling of Shaft, Transmissibility

Lecture 11 - Support Motion, Vibration Isolation

Lecture 12 - Sharpness of Resonance, Vibration Measuring Instruments

Lecture 13 - Generalized and Principle Coordinates, Derivation of Equation of Motion

Lecture 14 - Lagranges's Equation

Lecture 15 - Coordinate Coupling

Lecture 16 - Forced Harmonic Vibration

Lecture 17 - Tuned Absorber, Determination of Mass Ratio

Lecture 18 - Tuned and Damped Absorber, Untuned Viscous Damper

Lecture 19 - Derivation of Equations of Motion, Influence Coefficient Method

Lecture 20 - Properties of Vibrating Systems: Flexibility & Stiffness Matrices, Reciprocity Theorem

Lecture 21 - Modal Analysis: Undamped

Lecture 22 - Modal Analysis: Damped

Lecture 23 - Simple Systems With One Two or Three Discs Geared System

Lecture 24 - Multi-Degree of Freedom Systems-Transfer Matrix Method Branched Systems

Lecture 25 - Derivation of Equations of Motion Part 1 - Newton

Lecture 26 - Derivation of Equations of Motion Part 2 - Newton

Lecture 27 - Vibration of Strings

Lecture 28 - Longitudinal and Torsional Vibration of Rods

Lecture 29 - Transverse Vibration of Beams, Equations of Motion and Boundary Conditions

Lecture 30 - Transverse Vibration of Beams: Natural Frequencies and Mode Shapes

Lecture 31 - Rayleigh's Energy Method

NPTEL : NOC:Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Manas Das

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

Co-ordinators : Prof. Dipankar N. Basu

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

Co-ordinators : Prof. Swarup bag

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

Co-ordinators : Prof. Mamilla Ravi Sankar

NPTEL : NOC:Mechanics of Machining (Mechanical Engineering)

Co-ordinators : Dr. Uday S. Dixit

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

Co-ordinators : Prof. Pranab K. Mondal

Lecture 1 - Introduction to hydraulic machines: classifications and operational principles

Lecture 2 - Euler equation for turbomachines: net head developed by the pump/turbines

Lecture 3 - Velocity triangles of pumps, effect of inlet swirl on pump operation

Lecture 4 - Velocity triangles of pumps, effect of inlet swirl on pump operation

Lecture 5 - Pump casings, Efficiencies and Problems - I

Lecture 6 - Pump casings, Efficiencies and Problems - II

Lecture 7 - Pump casings, Efficiencies and Problems - III

Lecture 8 - Axial flow pump, HQ curve, System Resistance Curve - I

Lecture 9 - Axial flow pump, HQ curve, System Resistance Curve - II

Lecture 10 - HQ Curve, System Resistance Curve - I

Lecture 11 - HQ Curve, System Resistance Curve - II

Lecture 12 - Introduction to Cavitation

Lecture 13 - Condition for Cavitation and NPSH

Lecture 14 - Net Positive Suction Head (NPSH)

Lecture 15 - Suction number and Introduction to off design condition

Lecture 16 - Cavitation: The effect of off-design Conditions

Lecture 17 - Cavitation: Preventive Measures

Lecture 18 - Cavitation: Preventive Measures, Effect on Pump Characteristic

Lecture 19 - Problems on Cavitation

Lecture 20 - Introduction to Slip : Stodola Slip Model

Lecture 21 - Departure from Euler theory

Lecture 22 - Slip Velocity - I

Lecture 23 - Slip Velocity - II

Lecture 24 - Problem on slip

Lecture 25 - Degree of reaction of pump

Lecture 26 - Degree of reaction and axial pump design

Lecture 27 - Testing of radial flow pump - I

Lecture 28 - Testing of radial flow pump - II

Lecture 29 - Problem on radial flow pump testing

Lecture 30 - Radial equilibrium of axial flow pump - I

Lecture 31 - Radial equilibrium of axial flow pump - II

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

Lecture 1 - Basic of Solid Mechanics

Lecture 2 - Enegry Principles

Lecture 3 - Classification of Plate Theories and Some Basics

Lecture 4 - Tutorial: Transformation of Tensors

Lecture 5 - Governing Equation for Plate - 1

Lecture 6 - Governing Equation for Plate - 2

Lecture 7 - Tutorial: Reduced Stiffness and Plate Stiffness

Lecture 8 - Navier Solution + Levy solution

Lecture 9 - Levy Solution

Lecture 10 - Tutorial: Load Matrices Calculation

Lecture 11 - EKM and buckling of plates

Lecture 12 - 3D Solutions

Lecture 13 - Matlab Coding + ABAQUS

Lecture 14 - Tutorial: Levy Solutions

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

Co-ordinators : Prof. Dipankar N. Basu

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

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

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

Co-ordinators : Prof. Pankaj Biswas

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

Co-ordinators : Prof. Mamilla Ravi Sankar

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

Co-ordinators : Prof. Swarup bag

Lecture 32 - Principle and development of additive manufacturing technologies - 2

Lecture 33 - Fundamentals of heat treatment

Lecture 34 - Evaluation of microstructural properties and residual stress

Lecture 35 - Down-scaling of conventional manufacturing processes and Micro-to-nano manufacturing

Lecture 36 - Packaging, micro-finishing and micro-manufacturing processes

Lecture 37 - Processing and shaping of non-metals and bio-materials

Lecture 38 - Principle of glass and ceramics processing and their shaping

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

Lecture 1 - Overview of thermodynamic system and state

Lecture 2 - First and second laws of thermodynamics

Lecture 3 - Concept of entropy and entropy generation

Lecture 4 - Concept of exergy and exergy destruction

Lecture 5 - Thermodynamic potentials and Maxwell relations

Lecture 6 - Generalized relations for entropy and specific heats

Lecture 7 - Joule-Thomson coefficient and Clapeyron equation

Lecture 8 - Liquid-vapor phase-change process

Lecture 9 - Use of property tables

Lecture 10 - Equations-of-state and Compressibility factor

Lecture 11 - Ideal cycles for reciprocating engines

Lecture 12 - Otto, Diesel and Dual combustion cycles

Lecture 13 - Stirling and Ericsson cycles

Lecture 14 - Fuel-air cycle

Lecture 15 - Numerical exercise on Fuel-air cycles

Lecture 16 - Losses in actual cycle and valve-timing diagram

Lecture 17 - Ideal Brayton cycle

Lecture 18 - Intercooling and reheating in Brayton cycle

Lecture 19 - Regeneration in Brayton cycle

Lecture 20 - Ideal Rankine cycle

Lecture 21 - Improvements and modifications in Rankine cycle

Lecture 22 - Regenerative Rankine cycle

Lecture 23 - Binary vapor power cycle

Lecture 24 - Combined gas-steam power plant

Lecture 25 - Different arrangments in combined cycles

Lecture 26 - Vapor compression refrigeration cycle

Lecture 27 - SSS cycles and refrigerants

Lecture 28 - Modifications in VCR systems

Lecture 29 - Vapor absorption refrigeration cycle

Lecture 30 - P-v-T behavior of gas mixtures

Lecture 31 - Numerical examples

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

Co-ordinators : Prof. Dipankar N. Basu

Lecture 1 - Relationship of Thermodynamics with Heat transfer

Lecture 2 - Modes of heat transfer

Lecture 3 - Fourier's law and thermal conductivity

Lecture 4 - Generalized heat diffusion equation

Lecture 5 - Heat diffusion equation in curvilinear coordinates

Lecture 6 - Concept of thermal resistance

Lecture 7 - Use of network of resistances in wall and cylinder

Lecture 8 - Critical thickness of insulation

Lecture 9 - Conduction with energy generation - I

Lecture 10 - Conduction with energy generation - II

Lecture 11 - General Heat Transfer Analysis

Lecture 12 - Fins with uniform cross-section area - I

Lecture 13 - Fins with uniform cross-section area - II

Lecture 14 - Fins with non-uniform cross-section area

Lecture 15 - Method of Separation of Variables

Lecture 16 - Graphical approach

Lecture 17 - Method of Superposition

Lecture 18 - Lumped capacitance approach - I

Lecture 19 - Lumped capacitance approach - II

Lecture 20 - Semi-infinite Solid

Lecture 21 - Steady Heat Conduction

Lecture 22 - Unsteady Heat Conduction

Lecture 23 - Problem solving using Energy Balance Method

Lecture 24 - Introduction to radiative heat fluxes

Lecture 25 - Spectral and directional definitions

Lecture 26 - Blackbody radiation

Lecture 27 - Emissivity

Lecture 28 - Irradiation of real surfaces

Lecture 29 - View factor

Lecture 30 - Blackbody radiation exchange

Lecture 31 - Radiation networks

NPTEL : NOC:Steam Power Engineering (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni

Lecture 1 - Review of thermodynamics

Lecture 2 - Rankine cycle

Lecture 3 - Performance estimation of steam power cycles

Lecture 4 - Carnot cycle examples

Lecture 5 - Rankine cycle with superheat

Lecture 6 - Rankine cycle with reheat theory and example

Lecture 7 - Examples of Rankine cycle

Lecture 8 - Examples of reheat Rankine cycle

Lecture 9 - Rankine cycle with regeneration

Lecture 10 - Feedwater heaters

Lecture 11 - Cogeneration of power and process heat

Lecture 12 - Examples of regeneration

Lecture 13 - Examples of regenerative Rankine cycle

Lecture 14 - Binary/multi-fluid cycles

Lecture 15 - Low temperature power cycles

Lecture 16 - Examples of binary cycles

Lecture 17 - Types of boilers

Lecture 18 - Boiler accessories

Lecture 19 - Practice examples

Lecture 20 - Stagnation conditions and Nozzle flow

Lecture 21 - Nozzle flow

Lecture 22 - Examples of Nozzle

Lecture 23 - Impulse Turbine - 1

Lecture 24 - Impulse Turbine - 2

Lecture 25 - Examples on Impulse Turbine

Lecture 26 - Reaction Turbine

Lecture 27 - Reheat Factor

Lecture 28 - Examples on Turbine - 1

Lecture 29 - Examples on Turbine - 2

Lecture 30 - Gas Mixture

Lecture 31 - Psychrometry - 1

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

Co-ordinators : Prof. Prasenjit Khanikar

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

Co-ordinators : Prof. P.S. Robi

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

Co-ordinators : Prof. Shyamanta M. Hazarika

NPTEL : NOC:Aircraft Propulsion (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni

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

Co-ordinators : Prof. Amaresh Dalal

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

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Automation in Manufacturing (Mechanical Engineering)

Co-ordinators : Dr. Shrikrishna N. Joshi

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

Co-ordinators : Prof. Niranjan Sahoo

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

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

Lecture 1 - Functional, First variation, Euler Lagrange equation; Several Dependent variables

Lecture 2 - Functional with higher order derivatives; Variational statement

Lecture 3 - Differential equation, Variational statement and Minimization problem; Rayleigh-Ritz method

Lecture 4 - FEM steps: Explained with discrete linear springs; Gaussian Quadrature rule for integration

Lecture 5 - Solving one Ordinary Differential Equation using Linear Finite Element

Lecture 6 - Solving one Ordinary Differential Equation using Quadratic Finite Element

Lecture 7 - Bar Element: Elemental equation; Matlab Implementation with Example

Lecture 8 - Bar Element: Postprocessing; Comparison with Analytical Solution; Bar with linear springs

Lecture 9 - Truss Element: Elemental equation; Matlab Implementation with Example

Lecture 10 - Beam Element: Variational statement; Hermite shape function

Lecture 11 - Beam Element: Elemental equation; Matlab implementation with Example

Lecture 12 - Beam Element: Matlab implementation for the example with Non-uniform distributed load

Lecture 13 - Frame Element: Derivation of elemental equation in global reference frame

Lecture 14 - Frame Element: Matlab implementation with one Example

Lecture 15 - Generalization of Geometry data; Stiffness matrix, Load vector formation at element level

Lecture 16 - Generalization of Assembly, Imposition of Boundary condition and Load information

Lecture 17 - Indicial Notation: Summation convention, Kronecker delta, Permutation symbol

Lecture 18 - Second order tensor; Gradient, Divergence, Curl and Laplacian in Indicial notation

Lecture 19 - Gauss Divergence theorem and its application in Heat transfer and Structural analysis

Lecture 20 - Derivation of weak form of 2D steady-state heat conduction problem

Lecture 21 - Triangular element, calculating element stiffness and element force vector

Lecture 22 - Numerical example, assembly, mapping

Lecture 23 - Numerical integration, Neumann boundary, and higher order shape functions

Lecture 24 - Quadrilateral element, Lagrange shape functions, Serendipity elements

Lecture 25 - Development of a MATLAB code for solving 2D steady-state heat conduction problem

Lecture 26 - Demonstration of the MATLAB code

Lecture 27 - Elasticity problems in two dimension and obtaining the weak form

Lecture 28 - Deriving element stiffness matrix and element force vector, numerical example

Lecture 29 - Development of a MATLAB code for solving planar elasticity problems

Lecture 30 - Superconvergent Patch Recovery, error estimator, adaptive refinement

Lecture 31 - Solving eigenvalue problem in bar and beam, writing FEM code in MATLAB

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

Lecture 1 - Application of convective heat transfer

Lecture 2 - Foundations of heat transfer

Lecture 3 - Derivation of energy equation

Lecture 4 - Derivation of boundary layer equation

Lecture 5 - Derivation of boundary layer energy equation

Lecture 6 - Blasius solution: similarity method

Lecture 7 - Pohlhausen solution: similarity method

Lecture 8 - Pohlhausen solution: heat transfer parameters

Lecture 9 - Falkner-Skan equation: Boundary layer flow over a wedge

Lecture 10 - Momentum integral equation for flat plate boundary layer

Lecture 11 - Laminar BL flow over flat plate: Uniform surface temperature

Lecture 12 - Laminar BL flow over flat plate: Uniform surface heat flux

Lecture 13 - Solution of example problems

Lecture 14 - Hydrodynamic and thermal regions

Lecture 15 - Energy balance in channel flow

Lecture 16 - Determination of heat transfer coefficient

Lecture 17 - Velocity profile in fully-developed channel flows

Lecture 18 - Thermally fully developed laminar slug flow with uniform wall heat flux condition

Lecture 19 - Hydrodynamically and thermally fully developed flow with uniform wall heat flux condition

Lecture 20 - Fully developed flow through parallel plate channel with uniform wall temperature

Lecture 21 - Fully developed flow through circular pipe with uniform wall temperature

Lecture 22 - Thermally developing flow through circular pipe with uniform wall heat flux

Lecture 23 - Thermally developing flow through circular pipe with uniform wall temperature

Lecture 24 - Heat transfer in plane Couette flow

Lecture 25 - Solutions of example problems

Lecture 26 - Introduction and scale analysis

Lecture 27 - Natural convection over a vertical plate: Similarity Solution

Lecture 28 - Natural convection over a vertical plate: Similarity solution of energy equation

Lecture 29 - Natural convection over a vertical plate: Integral solution

Lecture 30 - Natural convection over inclined plate and mixed convection

Lecture 31 - Natural convection inside enclosures

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

Co-ordinators : Prof. Poonam Kumari

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

Co-ordinators : Prof. Swarup bag

NPTEL : NOC:Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S. K. Dwivedy

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

Co-ordinators : Prof. Deepak Sharma

NPTEL : NOC:Viscous Fluid Flow (Mechanical Engineering)

Co-ordinators : Prof. Amaresh Dalal

NPTEL : NOC:Welding Application Technology (Mechanical Engineering)

Co-ordinators : Prof. Pankaj Biswas

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

Co-ordinators : Prof. Sajan Kapil

NPTEL : NOC:Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

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

Co-ordinators : Prof. Debabrata Chakraborty

Lecture 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

Lecture 1 - First law of Thermodynamics for control mass and control volume systems

Lecture 2 - First law of Thermodynamics for control volume system (Flow system)

Lecture 3 - Steady State Steady Flow Processes, combination of First and Second Laws

Lecture 4 - Second Law of Thermodynamics: A Brief Review

Lecture 5 - Combined First and Second Laws Applied to Processes

Lecture 6 - Combined First and Second Laws: Flow and Non-Flow Processes

Lecture 7 - Description of Steam Power Plant: Application of 1st and 2nd Laws to Different Processes

Lecture 8 - Second Law Applied to Processes of Power Plant and Ideal Cycle of Power Plant

Lecture 9 - Steam Power Plant: Thermodynamic aspects, Efficiency, Work ratio and Ideal Cycle

Lecture 10 - Ideal Power Cycle and its Limitations, Introduction to Actual Power Cycle

Lecture 11 - Limitations of Carnot Cycle, Simple Rankine Cycle and Analysis

Lecture 12 - Analysis of Simple Rankine Cycle and its Design Modifications

Lecture 13 - Reheat Cycle and Analysis

Lecture 14 - Reheat Cycle and Analysis (Continued...)

Lecture 15 - Regenerative Principle of Steam Power Cycles

Lecture 16 - Analysis of Regenerative Steam Power Cycles

Lecture 17 - Regenerative Steam Power Cycle with Closed Feed-Water Heater, Ideal Working Fluid

Lecture 18 - Multi-fluid Cycle and Analysis

Lecture 19 - Analysis of Multi-fluid Cycle; Second Law Analysis of Steam Power Cycle

Lecture 20 - Problems of Steam Power Cycle

Lecture 21 - Problems of Steam Power Cycle (Continued...)

Lecture 22 - Types of Boiler, Different Cycles in Boiler Operation, Boiler attachment

Lecture 23 - Cochran Boiler Operation, Boiler attachment

Lecture 24 - Boiler Attachments

Lecture 25 - Superheaters and their Arrangements, Steam Temperature Control

Lecture 26 - Characteristics of Convective and Radiant Superheaters; Steam Temperature Control

Lecture 27 - Problems on Boiler/Steam Generator

Lecture 28 - Use of nozzles in steam power plant, flow analysis of steam in nozzle

Lecture 29 - Flow analysis of steam in nozzle: Mass flow rate

Lecture 30 - Mass flow rate of steam in nozzle, Critical Pressure Ratio

Lecture 31 - Critical Pressure Ratio and its Physical Significance

Lecture 32 - Nozzle efficiency and factors that affect the efficiency

Lecture 33 - Factors that affect the efficiency, problem on flow nozzle

Lecture 34 - Problem on flow nozzle

Lecture 35 - Steam Turbines: types and analysis using velocity triangles

Lecture 36 - Analysis of Impulse Steam Turbine

Lecture 37 - Compounding of Steam Turbine

Lecture 38 - Analysis of Reaction Steam Turbine

Lecture 39 - Problems on Steam Turbine

Lecture 40 - The Role of Condenser in Power Plant

Lecture 41 - Cooling Tower: Types and Analysis

Lecture 42 - Cooling Tower Performance

Lecture 43 - IC Engines, Classification, Different Parts, SI and CI Engines

Lecture 44 - Comparison of 2-stroke and 4-stroke Engines

Lecture 45 - Comparison of SI and CI Engines, Compression Ratio

Lecture 46 - Introduction to Carburettor and Regimes of Engine Operation

Lecture 47 - Regimes of Engine Operation and Simple Float Type Carburettor

Lecture 48 - Simple Float Type Carburettor and its Analysis

Lecture 49 - Mass Flow Rate of Fuel and limitations of Simple Float Type Carburettor

Lecture 50 - Limitations of Simple Float Type Carburettor, Problem on Carburettion

Lecture 51 - Engine Operating Characteristics: MEP and Indicator diagram

Lecture 52 - Performance Analysis parameters of IC Engine

Lecture 53 - Fuel of IC Engines

Lecture 54 - Alternative Fuels and Self Ignition Characteristics of Fuel: Octane Numner, Cetane Number

Lecture 55 - Thermodynamic Analysis of SI Engine

Lecture 56 - Thermodynamic Analysis of CI Engine

Lecture 57 - Numerical Problems on Engine Performance

Lecture 58 - Pressure-Crank angle diagram, Engine Efficiencies

Lecture 59 - Numerical Problems on SI and CI Engines

Lecture 60 - Vapour Compression Refrigeration Cycle and its analysis

Lecture 61 - Problems on Vapour Compression Refrigeration Cycle

Lecture 62 - Gas Turbine Units and Thermodynamic Cycles

Lecture 63 - Gas Compressor and Optimum Pressure Ratio

Lecture 64 - Compressor Efficiency and Multistage Compression with Intercooling

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

Co-ordinators : Prof. R Ganesh Narayanan

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

Co-ordinators : Prof. Niranjan Sahoo

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

Co-ordinators : Prof. Swarup Bag

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

Co-ordinators : Prof. Swarup Bag

NPTEL : Acoustics (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Vijay K. Jain

Lecture 1 - Advanced Machining Processes

Lecture 2 - Advanced Machining Processes

Lecture 3 - Advanced Machining Processes

Lecture 4 - Advanced Machining Processes

Lecture 5 - Advanced Machining Processes

Lecture 6 - Advanced Machining Processes

Lecture 7 - Advanced Machining Processes

Lecture 8 - Advanced Machining Processes

Lecture 9 - Advanced Machining Processes

Lecture 10 - Advanced Machining Processes

Lecture 11 - Advanced Machining Processes

Lecture 12 - Advanced Machining Processes

Lecture 13 - Advanced Machining Processes

Lecture 14 - Advanced Machining Processes

Lecture 15 - Advanced Machining Processes

Lecture 16 - Advanced Machining Processes

Lecture 17 - Advanced Machining Processes

Lecture 18 - Advanced Machining Processes

Lecture 19 - Advanced Machining Processes

Lecture 20 - Advanced Machining Processes

Lecture 21 - Advanced Machining Processes

Lecture 22 - Advanced Machining Processes

Lecture 23 - Advanced Machining Processes

Lecture 24 - Advanced Machining Processes

Lecture 25 - Advanced Machining Processes

Lecture 26 - Advanced Machining Processes

Lecture 27 - Advanced Machining Processes

Lecture 28 - Advanced Machining Processes

Lecture 29 - Advanced Machining Processes

Lecture 30 - Advanced Machining Processes

Lecture 31 - Advanced Machining Processes

NPTEL : Biomicroelectromechanical systems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : Computer Aided Engineering Design (Mechanical Engineering)

Co-ordinators : Dr. Anupam Saxena

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

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 : Mathematical Methods in Engineering and Science (Mechanical Engineering)

Co-ordinators : Dr. Bhaskar Dasgupta

Lecture 1 - Introduction

Lecture 2 - Basic Ideas of Applied Linear Algebra

Lecture 3 - Systems of Linear Equations

Lecture 4 - Square Non-Singular Systems

Lecture 5 - Ill-Conditioned and Ill-Posed Systems

Lecture 6 - The Algebraic Eigenvalue Problem

Lecture 7 - Canonical Forms, Symmetric Matrices

Lecture 8 - Methods of Plane Rotations

Lecture 9 - Householder Method, Tridiagonal Matrices

Lecture 10 - QR Decomposition, General Matrices

Lecture 11 - Singular Value Decomposition

Lecture 12 - Vector Space: Concepts

Lecture 13 - Multivariate Calculus

Lecture 14 - Vector Calculus in Geometry

Lecture 15 - Vector Calculus in Physics

Lecture 16 - Solution of Equations

Lecture 17 - Introdcution to Optimization

Lecture 18 - Multivariate Optimization

Lecture 19 - Constrained Optimization: Optimality Criteria

Lecture 20 - Constrained Optimization: Further Issues

Lecture 21 - Interpolation

Lecture 22 - Numerical Integration

Lecture 23 - Numerical Solution of ODE's as IVP

Lecture 24 - Boundary Value Problems, Question of Stability in IVP Solution

Lecture 25 - Stiff Differential Equations, Existence and Uniqueness Theory

Lecture 26 - Theory of First Order ODE's

Lecture 27 - Linear Second Order ODE's

Lecture 28 - Methods of Linear ODE's

Lecture 29 - ODE Systems

Lecture 30 - Stability of Dynamic Systems

Lecture 31 - Series Solutions and Special Functions

NPTEL : Dynamics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Amitabha Ghosh

NPTEL : Finite Element Method (Mechanical Engineering)

Co-ordinators : Prof. C.S. Upadhyay

NPTEL : Kinematics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Ashok K Mallik

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

Co-ordinators : Dr. Shantanu Bhattacharya

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

Co-ordinators : Dr. Anupam Saxena

NPTEL : NOC:BioMEMS and Microsystems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

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 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

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

Co-ordinators : Prof. Shantanu Bhattacharya

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

Co-ordinators : Prof. Bishakh Bhattacharya

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

Co-ordinators : Dr. Shantanu Bhattacharya

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

Co-ordinators : Prof. Nachiketa Tiwari

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

Co-ordinators : Prof. Bishakh Bhattacharya

NPTEL : NOC:Fundamentals of Acoustics (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

Lecture 32 - Lesson 2 - Specific Acoustic Impedance for an Open Tube and an Infinitely Long Tube

Lecture 33 - Lesson 3 - Specific Acoustic Impedance for a Tube with Imperfect Termination

Lecture 34 - Lesson 4 - KundtÂ’s Tube

Lecture 35 - Lesson 5 - Volume Velocity

Lecture 36 - Lesson 6 - Comparison of Impedances for a Radially Propagating Wave and a Planar Wave

Lecture 37 - Lesson 1 - Interference of sound sources - Part I

Lecture 38 - Lesson 2 - Interference of sound sources - Part II

Lecture 39 - Lesson 3 - Interference of sound sources - Part III

Lecture 40 - Lesson 4 - Interference of sound sources - Part IV

Lecture 41 - Lesson 5 - Directivity

Lecture 42 - Lesson 6 - Complex power, pressure and velocity for a spherical source

Lecture 43 - Lesson 1 - Noise reduction - Mass Attenuation Method

Lecture 44 - Lesson 2 - Noise Reduction - Pressure Ratio

Lecture 45 - Lesson 3 - Noise Reduction - Velocity of Wall

Lecture 46 - Lesson 4 - 3 Media Problem - Introduction

Lecture 47 - Lesson 5 - 3 Media Problem - Apply Boundary Conditions

Lecture 48 - Lesson 6 - 3 Media Problem - Special cases

Lecture 49 - Lesson 1 - Mufflers

Lecture 50 - Lesson 2 - Designing of Reactive Mufflers

Lecture 51 - Lesson 3 - Designing of Dissipative Mufflers

Lecture 52 - Lesson 4 - Time and Frequency Domain Representation of a Signal

Lecture 53 - Lesson 5 - Fourier Series

Lecture 54 - Lesson 6 - Fourier Series

Lecture 55 - Lesson 1 - Fourier Transform

Lecture 56 - Lesson 2 - Fourier Transform

Lecture 57 - Lesson 3 - Fourier Transform

Lecture 58 - Lesson 4 - Discrete Fourier Transform (DFT)

Lecture 59 - Lesson 5 - Discrete Fourier Transform (DFT)

Lecture 60 - Lesson 6 - Discrete Fourier Transform (DFT)

Lecture 61 - Lesson 1 - Measuring Sound Signals

Lecture 62 - Lesson 2 - Microphones

Lecture 63 - Lesson 3 - Microphones

Lecture 64 - Lesson 4 - Weighting

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

Co-ordinators : Dr. Kallol Mondal

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

Co-ordinators : Dr. Krishanu Biswas

Lecture 1 - Brief Introduction

Lecture 2 - Define Phase, Equilibrium

Lecture 3 - Free Energy, Stability of Phases

Lecture 4 - Gibbs Free Energy of Binary Solution

Lecture 5 - Ideal Solution and Chemical Potential

Lecture 6 - Thermodynamics of solid solutions

Lecture 7 - G vs X curves

Lecture 8 - Solid solutions: Types

Lecture 9 - Heterogeneous phase equilibria

Lecture 10 - G vs X curves for eutectic system

Lecture 11 - G-X plot for peritectic system

Lecture 12 - Effect of temperature of solid solubility, Influence of interfaces on Equilibrium

Lecture 13 - Introduction of Diffusion

Lecture 14 - Mechanism of Diffusion, Fick's I law

Lecture 15 - Fick's II law

Lecture 16 - Fick's II law (Continued...), Diffusion and Temperature

Lecture 17 - Interfacial Free Energy,Solid/Vapor Interface

Lecture 18 - Boundaries in single phase solids

Lecture 19 - High angle grain boundaries, Equilibrium in poly-crystalline materials, Interphase interfaces in solids

Lecture 20 - Interphase interfaces in solids (Continued...)

Lecture 21 - CSL Boundaries

Lecture 22 - Types of Nucleations

Lecture 23 - Homogeneous Nucleation

Lecture 24 - Homogeneous Nucleation (Continued...)

Lecture 25 - Heterogeneous Nucleation

Lecture 26 - Heterogeneous nucleation (Continued...)

Lecture 27 - Growth

Lecture 28 - Atomic mechanism of growth

Lecture 29 - Dendritic Solidification

Lecture 30 - Growth rate for dendrite formation

Lecture 31 - Alloy solidification

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

Lecture 32 - Interference of 1-D spherically propagating sound waves - II

Lecture 33 - Noise sources and introduction to microphones

Lecture 34 - Classification of microphones - I

Lecture 35 - Classification of microphones - II

Lecture 36 - Classification of microphones - III

Lecture 37 - Microphone Parameters

Lecture 38 - Understanding microphone specifications

Lecture 39 - Noise Source: Terminology

Lecture 40 - Noise Source: Sound Attenuation

Lecture 41 - Noise Source: Sound Pressure Level due to a noise source located outdoors

Lecture 42 - Noise Source: Role of reflecting surfaces

Lecture 43 - Noise Source: Sound Pressure Level due to a noise source located indoors - Part I

Lecture 44 - Noise Source: Sound Pressure Level due to a noise source located indoors - Part II

Lecture 45 - Measuring Sound Power Level - Understanding standard octave bands

Lecture 46 - Measuring Sound Power Level - Fan noise - Part I

Lecture 47 - Measuring Sound Power Level - Fan noise - Part II

Lecture 48 - Measuring Sound Power Level - Fan noise - Part III

Lecture 49 - Weighting

Lecture 50 - Noise coming from Motors

Lecture 51 - Noise coming from Motors and Pumps

Lecture 52 - Noise coming from Pump and Motor Working Simultaneously

Lecture 53 - Noise coming from Compressors

Lecture 54 - Example problems regarding Noise coming from Compressor

Lecture 55 - Noise Spread Mechanisms

Lecture 56 - Reverberation time

Lecture 57 - Reverberation time example problem

Lecture 58 - Noise from Adjacent Room

Lecture 59 - Acoustic Enclosures

Lecture 60 - Acoustic Enclosures - Example Problems

Lecture 61 - Large acoustical enclosures - I

Lecture 62 - Large acoustical enclosures - II

Lecture 63 - Acoustic barriers - I

Lecture 64 - Acoustic barriers - II

Lecture 65 - Acoustic barriers - III

Lecture 66 - Helmholtz resonator - I

Lecture 67 - Silencers

Lecture 68 - Side Branched Mufflers - I

Lecture 69 - Side Branched Mufflers - II

Lecture 70 - Side Branched Mufflers - III

Lecture 71 - Expansion Chamber Muffler

Lecture 72 - Single Expansion Chamber Muffler

NPTEL : NOC:Design Practice (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 32 - Failure Mode Effect Analysis

NPTEL : NOC:Introduction to Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

Lecture 32 - Minimum Volume Fraction and Critical Volume Fraction

Lecture 33 - Example based on Failure of Composite Material

Lecture 34 - Example based on Minimum and Critical Volume Fraction

Lecture 35 - Transverse Modulus of Unidirectional Composite

Lecture 36 - Halpin-Tsai Relation for Transverse Modulus

Lecture 37 - Transverse modulus of unidirectional composites

Lecture 38 - Transverse strength of unidirectional composites

Lecture 39 - Poissonâ€™s ratio of unidirectional composites

Lecture 40 - Failure modes of composite materials

Lecture 41 - Failure modes of composite materials

Lecture 42 - Other properties

Lecture 43 - Concept of Tensor

Lecture 44 - Stress Transformation (Two Dimensional)

Lecture 45 - Analysis of Specially Orthotropic Lamina

Lecture 46 - Analysis of Generally Orthotropic Lamina

Lecture 47 - Transformation of Engineering Constants - Part I

Lecture 48 - Transformation of Engineering Constants - Part II

Lecture 49 - Variation of elastic constants with respect to fiber orientation for generally orthotropic lamina

Lecture 50 - Generally orthotropic lamina

Lecture 51 - Generalized Hookeâ€™s law for anisotropic materials

Lecture 52 - Generalized Hookeâ€™s law for anisotropic materials

Lecture 53 - Elastic constants for Specially orthotropic materials

Lecture 54 - Elastic constants for Specially orthotropic materials in plane stress

Lecture 55 - Relation Betweeen Engineering Constants and Elements of Stiffness and Compliance Matrices - Part I

Lecture 56 - Relation Betweeen Engineering Constants and Elements of Stiffness and Compliance Matrices - Part II

Lecture 57 - Stress Strain Relations for A Lamina With Arbitrary Orientation - Part I

Lecture 58 - Stress- Strain Relation for A Lamina With Arbitrary Orientation - Part II

Lecture 59 - Strength of An Orthotropic Lamina

Lecture 60 - Importance of Sign of Shear Stress in context of Strength of A Unidirectional Lamina

Lecture 61 - Strain displacement relations for a laminate

Lecture 62 - Stress-strain relations for individual layers of a laminate

Lecture 63 - Resultant forces and moments

Lecture 64 - Relations between force and moment resultants and mid-plane strains and curvatures

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

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

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

Co-ordinators : Dr. Ashish Garg

NPTEL : NOC:Advanced Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Engineering Metrology (Mechanical Engineering)

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

Lecture 1 - Introduction to measurements and metrology

Lecture 2 - Instruments in measurement systems

Lecture 3 - Instruments in measurement systems

Lecture 4 - General concepts and definitions in metrology

Lecture 5 - Standards of measurement

Lecture 6 - Limits, Fits, and Tolerances - Part 1

Lecture 7 - Limits, Fits, and Tolerances - Part 2

Lecture 8 - Limits, Fits, and Tolerances - Part 3

Lecture 9 - Limits, Fits, and Tolerances - Part 4

Lecture 10 - Linear Measurements - Part 1

Lecture 11 - Linear Measurements - Part 2

Lecture 12 - Laboratory demonstration, Vernier Caliper

Lecture 13 - Laboratory demonstration, Dial gauge and vernier, micrometer, surface plate, feeler gauge

Lecture 14 - Angular Measurements - Part 1

Lecture 15 - Angular Measurements - Part 2

Lecture 16 - Laboratory demonstration, Vernier height gauge

Lecture 17 - Laboratory demonstration, Thread gauge, spirit level

Lecture 18 - Laboratory demonstration, Combination set, slip gauges, sine bar

Lecture 19 - Comparators - Part 1

Lecture 20 - Comparators - Part 2

Lecture 21 - Transducers - Part 1

Lecture 22 - Transducers - Part 2

Lecture 23 - Screw thread metrology

Lecture 24 - Gears metrology - Part 1

Lecture 25 - Gears metrology - Part 2

Lecture 26 - Laboratory demonstration, Gear Vernier

Lecture 27 - Surface metrology

Lecture 28 - Temperature measurements

Lecture 29 - Pressure measurements - Part 1

Lecture 30 - Pressure measurements - Part 2

Lecture 31 - Strain measurements - Part 1

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

Lecture 1 - Design concepts

Lecture 2 - Computer Aided Design (CAD)

Lecture 3 - Geometrical transformation

Lecture 4 - Composition of geometrical transformation

Lecture 5 - Geometric modeling

Lecture 6 - Representation of curves

Lecture 7 - Parametric representation of synthetic curves

Lecture 8 - Curve fitting problem (Hermite case)

Lecture 9 - Problem solving (based on Bezier curve)

Lecture 10 - Representation of Surfaces

Lecture 11 - Introduction to Micro-Elctro mechanical Systems (MEMS)

Lecture 12 - Lab-on-Chip

Lecture 13 - Introduction to Sensors

Lecture 14 - Introduction to Transducers

Lecture 15 - Introduction to device fabrications

Lecture 16 - Introduction to Silicon as a MEMS material

Lecture 17 - Etching processes

Lecture 18 - Types of Photolithography

Lecture 19 - Introduction to actuators

Lecture 20 - Designing of the Micro-Valve

Lecture 21 - Electrochemical valves

Lecture 22 - Micropumps

Lecture 23 - Designing of peristaltic pumps

Lecture 24 - Different types of pumps and sensors

Lecture 25 - Gas Sensors

Lecture 26 - Computer Numerical Control

Lecture 27 - Numerical Control Programming

Lecture 28 - NC Part Programming

Lecture 29 - Canned Cycles

Lecture 30 - Introduction to Rapid Prototyping

Lecture 31 - Different Types of Rapid Prototyping Technologies

NPTEL : NOC:Rapid Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar

Lecture 1 - Introduction to Rapid Manufacturing - Part 1

Lecture 2 - Introduction to Rapid Manufacturing - Part 2

Lecture 3 - Introduction to Rapid Manufacturing - Part 3

Lecture 4 - Product Development Process - Part 1

Lecture 5 - Product Development Process - Part 2

Lecture 6 - Product Development Process - Part 3

Lecture 7 - Design for Modularity (Manufacturing)

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

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

Lecture 10 - Design for Modularity

Lecture 11 - Subtractive versus Rapid Manufacturing

Lecture 12 - Reverse Engineering - Part 1

Lecture 13 - Reverse Engineering - Part 2

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

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

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

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

Lecture 18 - Polymerization Processes - Part 1

Lecture 19 - Polymerization Processes - Part 2

Lecture 20 - Powder based processes - Part 1

Lecture 21 - Powder based processes - Part 2

Lecture 22 - Powder based processes - Part 3

Lecture 23 - Extrusion based processes - Part 1

Lecture 24 - Extrusion based processes - Part 2

Lecture 25 - Sheet Stacking processes

Lecture 26 - 3D printing processes

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

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

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

Lecture 30 - Beam Deposition processes

Lecture 31 - Materials in Rapid Manufacturing - Part 1

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

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

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

Co-ordinators : Prof. Jishnu Bhattacharya

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

Co-ordinators : Prof. Sounak Kumar Choudhury

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

Co-ordinators : Prof. Gautam Biswas

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

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Introduction to Turbomachinery (Mechanical Engineering)

Co-ordinators : Prof. Subrata Sarkar

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 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

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Lecture 41

Lecture 42

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Lecture 91

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Lecture 94

Lecture 95

Lecture 96

Lecture 97

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

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

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

Co-ordinators : Prof. Jayant K. Singh

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

Co-ordinators : Prof. Shantanu Bhattacharya

Lecture 1 - Introduction to Advanced Manufacturing Processes

Lecture 2 - Ultrasonic Machining

Lecture 3

Lecture 4

Lecture 5 - Abrasive Jet Machining

Lecture 6 - Adrasive Jet Micro-Machining and Mask Materials for AJMM

Lecture 7 - Electro-Chemical Machining

Lecture 8 - Electrochemical Machining - I

Lecture 9 - Electrochemical Machining - II

Lecture 10 - Electrochemical Machining - III

Lecture 11 - Electrochemical Machining - IV

Lecture 12 - Electrochemical Machining - V

Lecture 13 - Electrochemical Machining - VI

Lecture 14 - Electrochemical Machining - VII

Lecture 15 - Electrochemical Machining - VIII

Lecture 16 - Machining Applications

Lecture 17 - Electric Discharge Machining - I

Lecture 18 - Electric Discharge Machining - II

Lecture 19 - Electric Discharge Machining - III

Lecture 20 - Electric Discharge Machining - IV

Lecture 21 - Electric Discharge Machining - IV and Electron Beam Machining - I

Lecture 22 - Electron Beam Machining - II

Lecture 23 - Laser Beam Machining - I

Lecture 24 - Laser Beam Machining - II

Lecture 25 - Silicon and Processing of Silicon - I

Lecture 26 - Silicon and Processing of Silicon - II

Lecture 27 - Polymer Processing

Lecture 28 - Advanced Finishing Processes

Lecture 29 - Lab Session-I: Water Abrasive Jet Machining Process

Lecture 30 - Lab Session-II: Electro-discharge Machining Process - I

Lecture 31 - Lab Session-III: Electro-discharge Machining Process - II

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

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

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

Co-ordinators : Prof. S. Chakraborty

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

Co-ordinators : Prof. R.N. Maiti

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

Co-ordinators : Prof. A.R. Mohanty

NPTEL : Solar Energy Technology (Mechanical Engineering)

Co-ordinators : Prof. V.V. Satyamurty

Lecture 1 - Energy and Dependence on External Sources and Sun, Physical Descriptions and Reactions

Lecture 2 - Sun - Earth Geometry

Lecture 3 - Terminology Extra - Terrestrial Radiation Terrestria Radiation

Lecture 4 - Measuring Instruments

Lecture 5 - Estimation of Solar Radiation or Details

Lecture 6 - Radiation Processing - Long Term

Lecture 7 - Evaluation of the Apparent Sunrise and Sunset Angles

Lecture 8 - Estimation of Daily/Monthly Average daily Tilt Factor Under Terrestrial Conditions

Lecture 9 - Solar Colector Basics

Lecture 10 - Transmission - Absorptance Product

Lecture 11 - Daily (Or Monthly Average Daily) Transmittance - Absorptance Product Analytical Evaluation

Lecture 12 - Theory of Flat Plate Collectors - Liquid Based (A)

Lecture 13 - Theory of Flat Plate Collectors - Liquid Based (B)

Lecture 14 - Theory of Flat Plate Collectors - Liquid Based (C)

Lecture 15 - Mean temperature and Heat Capacity Effects

Lecture 16 - Theory of Air Based Solar Flat Plate Collectors

Lecture 17 - Theory of Air Based Solar Flat Plate Collectors (Continued.)

Lecture 18 - Other Collector Geometries

Lecture 19 - Concentrating Collectors

Lecture 20 - Concentrating Collectors (Continued.)

Lecture 21 - Concentrating Collectors (Continued.)

Lecture 22 - Compound Parabolic Collectors

Lecture 23 - Exercise - I

Lecture 24 - Exercise - I (Continued.)

Lecture 25 - Device and System Performance

Lecture 26 - Long Term Solar Energy System Performance

Lecture 27 - Exercise - I (Continued.)

Lecture 28 - Long Term Solar Energy System Performance Simplified Design Methods

Lecture 29 - Long Term Solar Energy System Performance Simplified Design Methods (Continued.)

Lecture 30 - Monthly Average Daily Utilizability

Lecture 31 - The phi(bar) - f chart method (Continued.)

NPTEL : Technology of Surface Coating (Mechanical Engineering)

Co-ordinators : Prof. A.K. Chattopadhyay

NPTEL : Vibration of Structures (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : Basic Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

Lecture 32 - Thermodynamics of Multi Component System - III

NPTEL : Design of Machine Elements I (Mechanical Engineering)

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

Lecture 32 - Belt Drives

Lecture 33 - Design for Strength

Lecture 34 - Design of Shafts

Lecture 35 - Design of Machine Elements - I (V & W)

Lecture 36 - Design of Machine Elements - II (V & W)

Lecture 37 - Design of Cylinders & Pressure Vessels - II

Lecture 38 - Design of Cylinders & Pressure Vessels - III

Lecture 39 - Design of Brakes - I

Lecture 40 - Design of Brakes - II

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

Lecture 1 - History of Refrigeration

Lecture 2 - Refrigerant Compressors & Development

Lecture 3 - Applications of RTAC

Lecture 4 - Review of Fundamentals Thermodynamics - I

Lecture 5 - Review of Fundamentals

Lecture 6 - Fundamentals of Fluid Flow

Lecture 7 - Fundamentals of Heat Transfer

Lecture 8 - Methods of Producing low Temperatures

Lecture 9 - Air Cycle Refrigeration Systems

Lecture 10 - Vapour Compression Refrigeration Systems

Lecture 11 - Vapour Compression Refrigeration Systems (Continued...)

Lecture 12 - Vapour Compression Refrigeration Systems (Continued...)

Lecture 13 - Vapour Compression Refrigeration Systems (Continued...)

Lecture 14 - Vapour Absorption Refrigeration Systems

Lecture 15 - Vapour Absorption Refrigeration System

Lecture 16 - Vapour Absorption Refrigeration Systems (Continued...)

Lecture 17 - Vapour Absorption Refrigeration Systems (Continued...)

Lecture 18 - Worked Out Examples - I

Lecture 19 - Worked Out Examples - II

Lecture 20 - Refrigeration System Components : Compressor

Lecture 21 - Refrigeration System Components : Compressor (Continued...)

Lecture 22 - Refrigeration System Components : Compressor (Continued...)

Lecture 23 - Refrigeration System Components : Compressor (Continued...)

Lecture 24 - Refrigeration System Components : Compressor (Continued...)

Lecture 25 - Refrigeration System Components : Compressor (Continued...)

Lecture 26 - Refrigeration System Components : Condensers

Lecture 27 - Refrigeration System Components : Condensers (Continued...)

Lecture 28 - Refrigeration System Components : Evaporators

Lecture 29 - Refrigeration System Components : Evaporators

Lecture 30 - Refrigeration System Components : Expansion Devices

Lecture 31 - Refrigeration System Components : Expansion Devices

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

Lecture 32 - Some Exact Solutions of Navier Stokes Equation (Continued...)

Lecture 33 - Introduction to Turbulence

Lecture 34 - Introduction to Turbulence (Continued...)

Lecture 35 - Introduction to Turbulence (Continued...)

Lecture 36 - Introduction to Turbulence (Continued...)

Lecture 37 - Boundary Layer Theory

Lecture 38 - Boundary Layer Theory (Continued...)

Lecture 39 - Boundary Layer Theory (Continued...)

Lecture 40 - Boundary Layer Theory (Continued...) and Flow Past Immersed Bodies

Lecture 41 - Flow past Immersed Bodies (Continued...)

Lecture 42 - Potential Flow Past Immersed Bodies

Lecture 43 - Potential Flow (Continued...) and Flow Past Immersed Bodies of Special Shapes

Lecture 44 - Flow Past Immersed Bodies (Continued...) and Sports Ball Aerodynamics

Lecture 45 - Pipe Flow

Lecture 46 - Pipe Flow (Continued...)

Lecture 47 - Pipe Flow (Continued...)

Lecture 48 - Principles of Similarity and Dimensional Analysis

Lecture 49 - Introduction to Fluid Machines

Lecture 50 - Introduction to Fluid Machines (Continued...)

Lecture 51 - Introduction to Fluid Machines (Continued...)

Lecture 52 - Introduction to Fluid Machines (Continued...)

Lecture 53 - Introduction to Fluid Machines (Continued...)

Lecture 54 - Compressible Flows

Lecture 55 - Compressible Flows (Continued...)

Lecture 56 - Compressible Flows (Continued...)

Lecture 57 - Compressible Flows (Continued...)

Lecture 58 - Compressible Flows (Continued...)

NPTEL : Micro fluidics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

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

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

NPTEL : NOC:Vibrations of Structures (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : NOC:Fluid Machines (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

Lecture 1 - Definition of Fluid Machines and Energy Transfer in Fluid Machines - Part I

Lecture 2 - Energy Transfer in Fluid Machines - Part II

Lecture 3 - Impulse and Reaction Machines: Introductory Concepts

Lecture 4 - Principles of Similarity in Fluid Machine

Lecture 5 - Concept of Specific Speed

Lecture 6 - Basic Principles, Analysis of Force and Power Generation - Part I

Lecture 7 - Basic Principles, Analysis of Force and Power Generation - Part II

Lecture 8 - Specific Speed Governing and Limitations of Impulse Turbine

Lecture 9 - Tutorial - I

Lecture 10 - Tutorial - II

Lecture 11 - Introduction and Analysis of Force on Francis Turbine (Radial Flow) - Part I

Lecture 12 - Analysis of Force (Part-II) and Power Generation

Lecture 13 - Draft Tube

Lecture 14 - Tutorial - III

Lecture 15 - Tutorial - IV

Lecture 16 - Axial Flow Turbine

Lecture 17 - Governing of Reaction Turbine

Lecture 18 - Introduction to Rotodynamic Pumps

Lecture 19 - Flow and Energy Transfer to Centrifugal Pumps

Lecture 20 - Tutorial - V

Lecture 21 - Characteristics of a Centrifugal Pump

Lecture 22 - Matching of Pump and System Characteristics

Lecture 23 - Diffuser and Cavitation

Lecture 24 - Tutorial - VI

Lecture 25 - Tutorial - VIII

Lecture 26 - Axial Flow Pump

Lecture 27 - Reciprocating Pump - Part I

Lecture 28 - Reciprocating Pump - Part II

Lecture 29 - Tutorial - VIII

Lecture 30 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part I

Lecture 31 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part II

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

Co-ordinators : Prof. Asimava Roy Choudhury

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

Co-ordinators : Prof. Asimava Roy Choudhury

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

Co-ordinators : Dr. Suman Chakraborty

Lecture 1 - Lagrangian and Eulerian Approach, Types of fluid flow

Lecture 2 - Streamlines, Streakline and Pathline

Lecture 3 - Acceleration of fluid flow

Lecture 4 - Deformation and Conservation of mass of fluid a element

Lecture 5 - Angular deformation of a fluid element, vorticity and streamfunction and velocity potential

Lecture 6 - Eulerâ€™s equation

Lecture 7 - Bernoulli's Equation - Part I

Lecture 8 - Bernoulli's Equation - Part II

Lecture 9 - Reynolds Transport Theorem (RTT)

Lecture 10 - Application of Conservation of Mass

Lecture 11 - Application of RTT: Conservation of Linear Momentum

Lecture 12 - Application of RTT in Accelerating Reference Frames

Lecture 13 - Navier's Equation of Motion

Lecture 14 - Derivation of Navier-Stokes Equation

Lecture 15 - Derivation of Navier-Stokes Equation (Continued...)

Lecture 16 - Derivation of Navier-Stokes Equation (Continued...)

Lecture 17 - Fully developed flow between two parallel plates

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

Lecture 19 - Couette flow

Lecture 20 - Flow with interfaces

Lecture 21 - Thin film flow on an inclined plane and Hagen-Poiseuille flow

Lecture 22 - Hagen-Poiseuille flow (Continued...)

Lecture 23 - Flow between two rotating cylinders

Lecture 24 - Stokes 1st problem

Lecture 25 - Stokes 2nd problem

Lecture 26 - Introduction to turbulence: basic concepts

Lecture 27 - Eddies

Lecture 28 - Eddies (Continued...) and Vortex shredding

Lecture 29 - Statistical description of turbulent flows

Lecture 30 - Reynolds stress

Lecture 31 - Reynolds averaged Navier Stokes equation (RANS)

Lecture 32 - Bernoulliâ€™s equation - Part I

Lecture 33 - Bernoulliâ€™s equation - Part II

Lecture 34 - Bernoulliâ€™s equation - Part III

Lecture 35 - Eulerâ€™s equation in streamline coordinates

Lecture 36 - Flow over a fat plate: Blasius equation

Lecture 37 - Momentum integral method for boundary layer analysis

Lecture 38 - Approximate solution of the momentum integral equation

Lecture 39 - Displacement and Momentum thickness

Lecture 40 - Illustrative examples

Lecture 41 - Boundary layer separation

Lecture 42 - Resultant force on a body immersed in a fluid under motion

Lecture 43 - Potential flow

Lecture 44 - Examples of Potential flow

Lecture 45 - Some more examples of Potential flows, Lift and Drag force

Lecture 46 - Applications of lift and drag force

Lecture 47 - Some examples of flow past immersed bodies

Lecture 48 - Sports Ball aerodynamics

Lecture 49 - Introduction to compressible flows

Lecture 50 - Significance of Mach number

Lecture 51 - Navier-Stokes equation - Part I

Lecture 52 - Navier-Stokes equation - Part II

Lecture 53 - Navier-Stokes equation - Part III

Lecture 54 - Navier-Stokes equation - Part IV

Lecture 55 - Pipe Flow - Part I

Lecture 56 - Pipe Flow - Part II

Lecture 57 - Pipe Flow - Part III

Lecture 58 - Pipe Flow - Part IV

Lecture 59 - Principle of Similarity and Dynamical Analysis - Part I

Lecture 60 - Principle of Similarity and Dynamical Analysis - Part II

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

Lecture 32 - Vibration Monitoring

Lecture 33 - Rotational Speed Measurements

Lecture 34 - Basics of Noise

Lecture 35 - Noise Monitoring

Lecture 36 - Introduction to Faults in Rotating Machines

Lecture 37 - Unbalance Detection

Lecture 38 - Field Balancing

Lecture 39 - Misalignment

Lecture 40 - Crack and Looseness

Lecture 41 - Journal and Anti-Friction Bearings

Lecture 42 - Gears

Lecture 43 - Pumps and Cavitation

Lecture 44 - IC Engines

Lecture 45 - Machinery Diagnostic Chart

Lecture 46 - Principles of Motor Current Signature Analysis

Lecture 47 - Faults in Electrical Machines

Lecture 48 - Thermography

Lecture 49 - Wear Debris Analysis

Lecture 50 - Oil Analysis

Lecture 51 - Ultrasonics

Lecture 52 - Eddy Current and Acoustic Emission

Lecture 53 - Radiography, Dye Penetrant Tests

Lecture 54 - Tool Condition Monitoring

Lecture 55 - Experimental Modal Analysis

Lecture 56 - Introduction to Failure Analysis

Lecture 57 - Railway Locomotive Noise and Vibration Monitoring

Lecture 58 - Paper Mill Vibration Monitoring

Lecture 59 - Overview of CBM facilities at IIT Kharagpur

Lecture 60 - Future of Condition based Monitoring

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

Co-ordinators : Prof. Asimava Roy Choudhury

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

Co-ordinators : Prof. Rathindranath Maiti

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

Co-ordinators : Prof. Dilip Kumar Pratihar

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

Co-ordinators : Dr. Anirvan Das Gupta

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

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

NPTEL : NOC:Robotics (Mechanical Engineering)

Co-ordinators : Prof. Dilip Kumar Pratihar

NPTEL : NOC:Computational Fluid Dynamics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : NOC:Concepts of Thermodynamics (Mechanical Engineering)

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

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

Lecture 1 - Introduction - 1

Lecture 2 - Introduction - 2

Lecture 3 - Introduction - 3

Lecture 4 - Semiconductors and Components - 1

Lecture 5 - Semiconductors and Components - 2

Lecture 6 - 1st Level Packaging - I

Lecture 7 - 1st Level Packaging - II

Lecture 8 - Area Array Packages - I

Lecture 9 - Area Array Packages - II

Lecture 10 - Area Array Packages - III

Lecture 11 - Flip Chip Technology

Lecture 12 - 1st Level Interconnections - I

Lecture 13 - 1st Level Interconnections - II

Lecture 14 - 1st Level Interconnections - III

Lecture 15 - Advanced Packaging

Lecture 16 - 2nd Level Packaging: PCB - I

Lecture 17 - 2nd Level Packaging: PCB - II

Lecture 18 - 2nd Level Packaging: PCB - III

Lecture 19 - 2nd Level Packaging: PCB - IV

Lecture 20 - 2nd Level Packaging: PCB - V

Lecture 21 - System Integration

Lecture 22 - Thermal Management 1: Introduction

Lecture 23 - Thermal Management 2: Concepts

Lecture 24 - Thermal Management 3: Thermal Resistance

Lecture 25 - Thermal Management 4: Heat Sink

Lecture 26 - Thermal Management 5: Heat Sink Characterization

Lecture 27 - Thermal Management 6: Heat Transfer Correlations

Lecture 28 - Thermal Management 7: Practice Problems

Lecture 29 - Thermal Management 8: Thermal Technologies

Lecture 30 - Thermal Management 9: Novel Cooling Technologies

Lecture 31 - Shock and Vibration - 1

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

Co-ordinators : Prof. A. Dasgupta

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

Co-ordinators : Prof. Suman Chakraborty

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

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

Co-ordinators : Prof. Somnath Roy

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

Co-ordinators : Prof. Rajaram Lakkaraju

Lecture 32 - Orthographic Projections II - Part 2

Lecture 33 - Orthographic Projections II - Part 3

Lecture 34 - Orthographic Projections II - Part 4

Lecture 35 - Orthographic Projections II - Part 5

Lecture 36 - Orthographic Projections II - Part 6

Lecture 37 - Orthographic Projections II - Part 7

Lecture 38 - Orthographic Projections II - Part 8

Lecture 39 - Orthographic Projections II - Part 9

Lecture 40 - Orthographic Projections II - Part 10

Lecture 41 - Orthographic Projections II - Part 11

Lecture 42 - Projection of Solids - I

Lecture 43 - Projection of Solids - II

Lecture 44 - Projection of Solids - III

Lecture 45 - Sections and Sectional Views

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

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

Lecture 48 - Isometric Projections

Lecture 49 - Isometric Projections (Continued...)

Lecture 50 - Isometric Projections (Continued...)

Lecture 51 - Overview of Computer Graphics - I

Lecture 52 - Overview of Computer Graphics - II

Lecture 53 - Overview of Computer Graphics - III

Lecture 54 - Overview of Computer Graphics - IV

Lecture 55 - Solidworks

Lecture 56 - Solidworks (Continued...)

Lecture 57 - Solidworks (Continued...)

Lecture 58 - Solidworks (Continued...)

Lecture 59 - Solidworks (Continued...)

Lecture 60 - Solidworks (Continued...)

Lecture 61 - Assembly Drawing

Lecture 62 - Assembly Drawing (Continued...)

Lecture 63 - Assembly Drawing (Continued...)

Lecture 64 - Assembly Drawing (Continued...)

Lecture 65 - Assembly Drawing (Continued...)

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

Co-ordinators : Prof. Aditya Bandopadhyay

NPTEL : NOC:Advanced Dynamics (Mechanical Engineering)

Co-ordinators : Prof. Anirvan DasGupta

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

Lecture 33 - Spatial kinematics of rigid bodies - I

Lecture 34 - Spatial kinematics of rigid bodies - II

Lecture 35 - Spatial kinetics of rigid bodies - I

Lecture 36 - Spatial kinetics of rigid bodies - II

Lecture 37 - Spatial kinetics of rigid bodies - III

Lecture 38 - Gyroscopic motion - I

Lecture 39 - Gyroscopic motion - II

Lecture 40 - Gyroscopic motion - III

Lecture 41 - Kinematics of rotation - I

Lecture 42 - Kinematics of rotation - II

Lecture 43 - Kinematics of rotation - III

Lecture 44 - Kinematics of rotation - IV

Lecture 45 - Kinematics of rotation - V

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

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

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

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

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

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

Lecture 52 - Systems with constraints - I

Lecture 53 - Systems with constraints - II

Lecture 54 - Systems with constraints - III

Lecture 55 - Systems with constraints - IV

Lecture 56 - Symmetries and conservation laws - I

Lecture 57 - Symmetries and conservation laws - II

Lecture 58 - Symmetries and conservation laws - III

Lecture 59 - Symmetries and conservation laws - IV

Lecture 60 - Intermediate axis theorem

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

Co-ordinators : Prof. Sanjay Gupta

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

Co-ordinators : Prof. Asimava Roy Choudhury

Lecture 32 - Gear Shaping - II

Lecture 33 - Gear Shaping - III

Lecture 34 - Gear Shaping - IV

Lecture 35 - Gear Hobbing - I

Lecture 36 - Gear Hobbing - II

Lecture 37 - Gear Hobbing - III

Lecture 38 - Gear Hobbing - IV

Lecture 39 - Gear Hobbing - V

Lecture 40 - Gear Hobbing - VI

Lecture 41 - Introduction to computer control role of computers in automation

Lecture 42 - Introduction (Continued...) binary logic and logic gates

Lecture 43 - Classification of Computer numerical control (CNC) Point to point and continuous control

Lecture 44 - Classification (Continued...) : Closed loop and open loop control

Lecture 45 - Tutorial involving simple calculations on different aspects of CNC controls

Lecture 46 - Questions, MCQ Discussions on Motors, Encoders, Decoders and Programming Practice

Lecture 47 - Stepper motors, Permanent magnet DC motors

Lecture 48 - Binary circuits and decoders

Lecture 49 - Tachogenerator, printed circuit motors, Encoders

Lecture 50 - Programming Practice - I

Lecture 51 - Programming Practice - 1I

Lecture 52 - Computer Aided Offline Programming

Lecture 53 - Interpolators - Linear

Lecture 54 - Interpolators - Curvilinear

Lecture 55 - Questions on Programming and Interpolation

Lecture 56 - 3-D Machining - Basic Concepts

Lecture 57 - Curved Surface Geometry

Lecture 58 - Cutter Path Generation for Curved Surfaces

Lecture 59 - Cutter Path Generation (Concluding Part) and Current Status - CNC Machining and Related Processes

Lecture 60 - Questions and Discussions on Curved Surface Machining

NPTEL : NOC:Finite Element Method (Mechanical Engineering)

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

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Introduction (Continued...)

Lecture 4 - Introduction (Continued...)

Lecture 5 - Introduction (Continued...)

Lecture 6 - Elements of Calculation of Variations - I

Lecture 7 - Elements of Calculation of Variations - II

Lecture 8 - Elements of Calculation of Variations - III

Lecture 9 - Strong Form and Weak Form

Lecture 10 - Rayleigh - Ritz Method - I

Lecture 11 - Rayleigh - Ritz Method - II

Lecture 12 - Weighted Residual Method

Lecture 13 - Weighted Residual Method - Example

Lecture 14 - Concepts of Element and Axial Bar Problem

Lecture 15 - Axial Bar Problem

Lecture 16 - Axial Bar - II

Lecture 17 - Beam Formulation

Lecture 18 - Beam Stiffness Matrix

Lecture 19 - Problems

Lecture 20 - Beam Column

Lecture 21 - Problem

Lecture 22 - Share Deformable Beam Theory

Lecture 23 - Weak Form and Discretization

Lecture 24 - Reduced Integration Based Stiffness Matrix

Lecture 25 - Problem

Lecture 26 - Problem (Continued...)

Lecture 27 - Element of Formulation

Lecture 28 - Analysis of Plane Truss

Lecture 29 - Analysis of Plane Truss (Computer Implementation)

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

Lecture 31 - Analysis of Plane Frame (Computer Implementation)

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

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

Lecture 32 - Complexity Mitigation in Multidisciplinary, System: Concurrent Engineering Precepts

Lecture 33 - Design Thinking steps

Lecture 34 - Design Thinking Methodologies and Tools

Lecture 35 - Frugal Engineering-A Disruptive Innovation Paradigm in Product Design and Development

Lecture 36 - Design-Driven Innovation

Lecture 37 - User interface and Experience (UI/UX) Design in Product Engineering

Lecture 38 - Industrial Design: Aesthetics and Ergonomics

Lecture 39 - Design Thinking in Industrial Design - Case Studies

Lecture 40 - Product Engineering'- Led Technology Entrepreneurship

NPTEL : NOC:Microfluidics and Nanofluidics (Mechanical Engineering)

Co-ordinators : Prof. Suman Chakraborty

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

Lecture 33 - Lubrication Theory

Lecture 34 - Lubrication Theory (Continued...)

Lecture 35 - Lubrication Theory (Continued...)

Lecture 36 - Lubrication Theory (Continued...)

Lecture 37 - Lubrication Theory (Continued...)

Lecture 38 - Lubrication Theory - 2 Dimensional Problems

Lecture 39 - Unsteady Flows

Lecture 40 - Unsteady Flows (Continued...)

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

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

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

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

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

Lecture 46 - Stokes Flow Past a Sphere

Lecture 47 - Stokes Flow Past a Sphere

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

Lecture 49 - Surface Tension and Its Implications in Mircrofluidics

Lecture 50 - Equilibrium of a Droplet

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

Lecture 52 - Capillary Rise

Lecture 53 - Capillary Filling Dynamics

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

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

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

Lecture 57 - Factors affecting Capillary and Wetting

Lecture 58 - Electrowetting

Lecture 59 - Slip Boundary Condition

Lecture 60 - Apparent Slip

Lecture 61 - Thin Film Flows

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

Lecture 63 - Electrokinetics and Electric Double Layer

Lecture 64 - Equilibrium within Electrical Double Layer Poisson Boltzmann model

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

Co-ordinators : Dr. Arun Dayal Udai

NPTEL : NOC:Cryogenic Hydrogen Technology (Mechanical Engineering)

Co-ordinators : Prof. Indranil Ghosh

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

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

NPTEL : Advanced Gas Dynamics (Mechanical Engineering)

Co-ordinators : Dr. Rinku Mukherjee

Lecture 32 - Example Problems - 1

Lecture 33 - Example Problems - 2

Lecture 34 - Example Problems - 3

Lecture 35 - Supersonic Flow past a 3D Cone at an angle of attack

Lecture 36 - Supersonic Flow past a 3D Cone at an angle of attack: Flow Visualization - I

Lecture 37 - Supersonic Flow past a 3D Cone at an angle of attack: Flow Visualization - II

Lecture 38 - Supersonic Flow past a 3D Cone at an angle of attack: Governing Equations

Lecture 39 - Supersonic Flow past a 3D Cone at an angle of attack: Numerical Procedure

Lecture 40 - Supersonic Flow past a 3D Bluff Body at an angle of attack

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

NPTEL : Experimental Stress Analysis (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : Rocket Propulsion (Mechanical Engineering)

Co-ordinators : Prof. K. Ramamurthi

Lecture 1 - Introduction

Lecture 2 - Motion in Space

Lecture 3 - Rotational Frame of Reference and Orbital Velocities

Lecture 4 - Velocity Requirements

Lecture 5 - Theory of Rocket Propulsion

Lecture 6 - Rocket Equation and Staging of Rockets

Lecture 7 - Review of Rocket Principles; Propulsion Efficiency

Lecture 8 - Examples Illustrating Theory of Rocket Propulsion and Introduction to Nozzles

Lecture 9 - Theory of Nozzles

Lecture 10 - Nozzle Shape

Lecture 11 - Area Ratio of Nozzles; Under-expansion and Over-expansion

Lecture 12 - Characteristic Velocity and Thrust Coefficient

Lecture 13 - Divergence Loss in Conical Nozzles and the Bell Nozzle

Lecture 14 - Unconventional Nozzles and Problems in Nozzles

Lecture 15 - Criterion for Choice of Chemical Propellants

Lecture 16 - Choice of Fuel-Rich Propellants

Lecture 17 - Performance Prediction Analysis

Lecture 18 - Dissociation of Products of Combustion

Lecture 19 - Shifting Equilibrium and Frozen Flow in Nozzles

Lecture 20 - Factors Influencing Choice of Chemical Propellants

Lecture 21 - Low Energy Liquid Propellants and Hybrid Propellants

Lecture 22 - Introduction to Solid Propellant Rockets

Lecture 23 - Burn Rate of Solid Propellants and Equilibrium Pressure in Solid Propellant Rockets

Lecture 24 - Design Aspects of Solid Propellant Rockets

Lecture 25 - Burning Surface Area of Solid Propellant Grains

Lecture 26 - Ignition of Solid Propellant Rockets

Lecture 27 - Review of Solid Propellant Rockets

Lecture 28 - Feed Systems for Liquid Propellant Rockets

Lecture 29 - Feed System Cycles for Pump Fed Liquid Propellant Rockets

Lecture 30 - Analysis of Gas Generator and Staged Combustion Cycles and Introduction to Injectors

Lecture 31 - Injectors, Cooling of Chamber and Mixture Ratio Distribution

NPTEL : Advanced Finite Elements Analysis (Mechanical Engineering)

Co-ordinators : Dr. R. Krishnakumar

Lecture 1 - Advanced Finite Elements Analysis

Lecture 2 - Advanced Finite Elements Analysis

Lecture 3 - Advanced Finite Elements Analysis

Lecture 4 - Advanced Finite Elements Analysis

Lecture 5 - Advanced Finite Elements Analysis

Lecture 6 - Advanced Finite Elements Analysis

Lecture 7 - Advanced Finite Elements Analysis

Lecture 8 - Advanced Finite Elements Analysis

Lecture 9 - Advanced Finite Elements Analysis

Lecture 10 - Advanced Finite Elements Analysis

Lecture 11 - Advanced Finite Elements Analysis

Lecture 12 - Advanced Finite Elements Analysis

Lecture 13 - Advanced Finite Elements Analysis

Lecture 14 - Advanced Finite Elements Analysis

Lecture 15 - Advanced Finite Elements Analysis

Lecture 16 - Advanced Finite Elements Analysis

Lecture 17 - Advanced Finite Elements Analysis

Lecture 18 - Advanced Finite Elements Analysis

Lecture 19 - Advanced Finite Elements Analysis

Lecture 20 - Advanced Finite Elements Analysis

Lecture 21 - Advanced Finite Elements Analysis

Lecture 22 - Advanced Finite Elements Analysis

Lecture 23 - Advanced Finite Elements Analysis

Lecture 24 - Advanced Finite Elements Analysis

Lecture 25 - Advanced Finite Elements Analysis

Lecture 26 - Advanced Finite Elements Analysis

Lecture 27 - Advanced Finite Elements Analysis

Lecture 28 - Advanced Finite Elements Analysis

Lecture 29 - Advanced Finite Elements Analysis

Lecture 30 - Advanced Finite Elements Analysis

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

NPTEL : Convective Heat Transfer (Mechanical Engineering)

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

Lecture 1 - Introduction to convective heat transfer - Part 1

Lecture 2 - Introduction to convective heat transfer - Part 2

Lecture 3 - Continuity Equation

Lecture 4 - Momentum and Energy Equations

Lecture 5 - Energy Equation

Lecture 6 - Reynolds Transport Theorem

Lecture 7 - Entrophy Generation and streamfunction-vorticity formulation

Lecture 8 - Couette flow - Part 1

Lecture 9 - Couette flow - Part 2

Lecture 10 - Couette flow - Part 3

Lecture 11 - Boundary layer approximation

Lecture 12 - Laminar External flow past flat plate (Blasius Similarity Solution)

Lecture 13 - Numerical solution to the Blasius equation and similarity solution to heat transfer

Lecture 14 - Pohlhausen similarity solution and flows including pressure gradient (Falkner-Skan)

Lecture 15 - Falkner skan solutions for heat transfer

Lecture 16 - Similarity solution for flow and heat transfer with transpiration at walls

Lecture 17 - Thermal boundary layer in high speed flows

Lecture 18 - Approximate(Integral) methods for laminar external flow and heat transfer

Lecture 19 - Integral method for laminar external thermal boundary layer over isothermal surface

Lecture 20 - Integral method for flows with pressure gradient (von Karman-Pohlhausen method)

Lecture 21 - Integral method with pressure gradient: heat transfer

Lecture 22 - Heat transfer across a circular cylinder: Walz approximation

Lecture 23 - Duhamel's method for varying surface temperature

Lecture 24 - Laminar External heat transfer with non uniform surface temperature

Lecture 25 - Laminar internal forced convection - fundamentals

Lecture 26 - Hydrodynamically and thermally fully developed internal laminar flows

Lecture 27 - Fully developed laminar internal flow and heat transfer

Lecture 28 - Shooting method for fully developed heat transfer and thermal entry length problem

Lecture 29 - Thermal entry length problem with plug velocity profile: Graetz problem

Lecture 30 - Extended Graetz problem for parabolic velocity profile

Lecture 31 - Extended Graetz problem

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

Co-ordinators : Prof. K. Ramamurthi

NPTEL : Metrology (Mechanical Engineering)

Co-ordinators : Dr. K. Sadashivappa

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

Week 1 - Module-1

Week 1 - Module-2

Week 1 - Module-3

Week 1 - Module-4

Week 1 - Module-5

Week 2 - Module-1

Week 2 - Module-2

Week 2 - Module-3

Week 2 - Module-4

Week 2 - Module-5

Week 3 - Module-1

Week 3 - Module-2

Week 3 - Module-3

Week 3 - Module-4

Week 3 - Module-5

Week 4 - Module-1

Week 4 - Module-2

Week 4 - Module-3

Week 4 - Module-4

Week 4 - Module-5

Week 5 - Module-1

Week 5 - Module-2

Week 5 - Module-3

Week 5 - Module-4

Week 5 - Module-5

Week 5 - Module-6

Week 6 - Module-1

Week 6 - Module-2 - Part 1

Week 6 - Module-2 - Part 2

Week 6 - Module-3

Week 6 - Module-4

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

Co-ordinators : Dr. Rinku Mukherjee

Lecture 1 - Review of fundamentals of fluid mechanics - I

Lecture 2 - Review of fundamentals of fluid mechanics - II

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

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

Lecture 5 - Concepts of BL thickness (?)

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

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

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

Lecture 9 - Concept of wall friction

Lecture 10 - Concept of friction drag

Lecture 11 - Skin Friction Coefficient - I

Lecture 12 - Skin Friction Coefficient - II

Lecture 13 - Derivation of Prandtls Laminar BL Equations - I

Lecture 14 - Derivation of Prandtls Laminar BL Equations - II

Lecture 15 - Derivation of Prandtls Laminar BL Equations - III

Lecture 16 - Derivation of Prandtls Laminar BL Equations - IV

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

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

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

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

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

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

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

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

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

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

Lecture 27 - The Energy Equation - I

Lecture 28 - The Energy Equation - II

Lecture 29 - Similarity Solutions to Thermal BL - I

Lecture 30 - Similarity Solutions to Thermal BL - II

Lecture 31 - Similarity Solutions to Thermal BL - III

Lecture 32 - BL Separation with Pressure-Gradient - I

Lecture 33 - BL Separation with Pressure Gradient - II

Lecture 34 - Effect of Prandtl Number in Thermal BL - I

Lecture 35 - Effect of Prandtl Number in Thermal BL - II

Lecture 36 - Effect of Prandtl Number in Thermal BL - III

Lecture 37 - Effect of Dissipation in Thermal BL - I

Lecture 38 - Effect of Dissipation in Thermal BL - II

Lecture 39 - Effect of Dissipation in Thermal BL - III

Lecture 40 - Similarity Solutions to Thermal BL - An Overview

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

Co-ordinators : Prof.A. Sameen

Lecture 32 - Normal shock relations - 2

Lecture 33 - Rankine-Hugoniot equation

Lecture 34 - Discussion on Normal Shocks - 1

Lecture 35 - Discussion on Normal Shocks - 2

Lecture 36 - Normal shocks in C-D nozzles

Lecture 37 - Normal shocks in C-D nozzles (Continued...)

Lecture 38 - Moving Normal Shocks

Lecture 39 - Discussion on moving normal shocks

Lecture 40 - Oblique shocks

Lecture 41 - Oblique shock relations

Lecture 42 - Discussion on oblique shocks

Lecture 43 - Reflection of oblique shocks

Lecture 44 - Discussion on reflection of oblique shocks

Lecture 45 - Prandtl-Meyer flow

Lecture 46 - Prandtl-Meyer flow (Continued...)

Lecture 47 - Discussion on Prandtl-Meyer expansion

Lecture 48 - Shock Polar diagram and Prandtl-Meyer relation for Oblique shocks

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

Co-ordinators : Prof. K. Ramesh

Lecture 1 - Introduction to Stress Analysis Â– Analytical and Numerical Approaches

Lecture 2 - Introduction to Stress Analysis - Experimental Approaches

Lecture 3 - Optical Methods Work as Optical Computers

Lecture 4 - Basic information provided by various experimental methods

Lecture 5 - Visual Appreciation of Field Information - Part 1

Lecture 6 - Visual Appreciation of Field Information - Part 2

Lecture 7 - Visual Appreciation of Field Information - Part 3

Lecture 8 - Visual Appreciation of Field Information - Part 4

Lecture 9 - Visual Appreciation of Field Information - Part 5

Lecture 10 - Completeness of a Numerical Solution

Lecture 11 - Principle of Strain Gauges

Lecture 12 - Overview of Strain Gauge Measurements

Lecture 13 - Elegance of Photoelasticity

Lecture 14 - Introduction to Photoelasticity

Lecture 15 - Different Polariscopes

Lecture 16 - Principles of MoirÃ©

Lecture 17 - Introduction to MoirÃ©

Lecture 18 - Introduction to Brittle Coatings

Lecture 19 - Introduction to Holography

Lecture 20 - Introduction to Hologram Interferometry

Lecture 21 - Introduction to Double exposure hologram interferometry

Lecture 22 - Introduction to Speckle Methods

Lecture 23 - Introduction to Speckle Interferometry Techniques

Lecture 24 - Introduction to TSA and DIC

Lecture 25 - Introduction to Caustics

Lecture 26 - Introduction to Coherent Gradient Sensor

Lecture 27 - Naming of Experimental Methods

Lecture 28 - Fringe Patterns - Richness of Qualitative Information

Lecture 29 - Key technologies that have influenced Experimental Mechanics

Lecture 30 - Multiscale analysis and trends in experimental mechanics

Lecture 31 - Selection of an experimental technique - Part 1

Lecture 32 - Selection of an experimental technique - Part 2

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

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

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

Co-ordinators : Dr. Arvind Pattamatta

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

Co-ordinators : Prof. Sundararaman M

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

Co-ordinators : Prof. Abijith Sarkar

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

Lecture 1 - Geometry of Crystals

Lecture 2 - Geometry of Crystals (Continued...)

Lecture 3 - Tutorial-1

Lecture 4 - Reciprocal Lattice

Lecture 5 - Stereographic Projection

Lecture 6 - Tutorial-2

Lecture 7 - Point Groups and Space Groups

Lecture 8 - Point Groups and Space Groups (Continued...)

Lecture 9 - Tutorial-3

Lecture 10 - Point Groups and Space Groups (Continued...)

Lecture 11 - Basics of X-Rays

Lecture 12 - Production and Detection of X-Rays

Lecture 13 - Production and Detection of X-Rays (Continued...)

Lecture 14 - Principles of X-Ray Diffraction

Lecture 15 - X-Ray Diffraction Methods

Lecture 16 - Debye Sherrer Camera

Lecture 17 - Diffractometer Measurements

Lecture 18 - Tutorial-4

Lecture 19 - Intensity of Diffracted Beams

Lecture 20 - Intensity of Diffracted Beams (Continued...)

Lecture 21 - Determination of Crystal Structures

Lecture 22 - Precise Lattice Parameter Determination

Lecture 23 - XRD - Lab Demonstration

Lecture 24 - Discussion - Based on Forum Queries - 1

Lecture 25 - Phase Diagram Determination

Lecture 26 - Ordered Disordered Transformation

Lecture 27 - Ordered Disordered Transformation (Continued...)

Lecture 28 - Qualitative Phase Analysis

Lecture 29 - Quantitative Phase Analysis - 1

Lecture 30 - Precise Lattice Parameter Determination - 1

Lecture 31 - Chemical Analysis by X-Ray Flourescence

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

Co-ordinators : Dr. G. Phanikumar

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

Co-ordinators : Prof. K. Ramesh

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

Co-ordinators : Prof. Sujatha Srinivasan

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

Co-ordinators : Prof. Palaniappaan Ramu

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

Co-ordinators : Prof. Palaniappaan Ramu

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

Co-ordinators : Prof. Santanu Kr. Ray

NPTEL : Theory of Mechanism (Mechanical Engineering)

Co-ordinators : Prof. Sujatha Srinivasan

NPTEL : NOC:Engineering Mechanics (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

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

Co-ordinators : Dr.Narasimhan Swaminathan

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

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

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

Co-ordinators : Prof. Ratna Kumar Annabattula

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

Co-ordinators : Prof. Kameswararao Anupindi

NPTEL : NOC:Wheeled Mobile Robots (Mechanical Engineering)

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

Lecture 32 - Path Planning and Obstacle avoidance

Lecture 33 - Introduction to Motion Control of Mobile Robots - Part 1

Lecture 34 - Introduction to Motion Control of Mobile Robots - Part 2

Lecture 35 - Kinematic control of Land-based Mobile Robots

Lecture 36 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 1

Lecture 37 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 2

Lecture 38 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 3

Lecture 39 - Dynamic Control of Mobile Robots

Lecture 40 - Cascaded or Back-stepping Control of Mobile Robots

Lecture 41 - Modern Robotics and Challenges

Lecture 42 - Multiple Mobile Robotic Systems

Lecture 43 - Autonomous Mobile Robots and Mobile Manipulators

Lecture 44 - Legged and Hybrid Robots

Lecture 45 - Underwater and Aerial Robots

Lecture 46 - Healthcare Robots

NPTEL : NOC:Fundamentals of Combustion (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

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

Co-ordinators : Prof. Somashekhar S

Lecture 1 - Introduction, Learning Objectives, Course Content and References

Lecture 2 - Merits and Demerits of Fluid Power, Power Transmission Method

Lecture 3 - Brief History, Application Areas, Major Divisions of Fluid Power System

Lecture 4 - Introduction to Oil Hydraulics and its Basic Components

Lecture 5 - Introduction to Pneumatic and its Basic Components, Applications-Stationary and Mobile

Lecture 6 - Typical Application of Fluid Power System, Status and Development

Lecture 7 - Pascal's law and its application-Hydraulic jack, Hydraulic brake and Numerical

Lecture 8 - Pressure Intensifier, Numericals, Air-to-Hydraulic Booster and Bernoulli equation

Lecture 9 - Applications of Bernoulli equation-Venturi,Torricelli's theorem, Siphon, Continuity equation and flow configuration, Concept of pressures and Gas laws

Lecture 10 - Introduction to Fluid Power Symbols, Hydraulic lines and Color Coding

Lecture 11 - Symbols for Functional Units, Hydraulic Pumps, Hydraulic Motors, Cylinders, Air Compressors, Pneumatic Motors and Orifices

Lecture 12 - Symbols for Filters, Check Valves, DCVs, Spool Actuation methods, PCV, Miscellaneous, Port Configurations

Lecture 13 - Introduction to Hydraulic Pumps, Facts and Figures, Classifications

Lecture 14 - Positive Displacement pump and pumping theory

Lecture 15 - Ideal pump, pump losses, efficiency curve, Constructional features and Operations of External Gear pump

Lecture 16 - Construction features and operations of Internal Gear Pump, Gerotor Pump and Screw Pump

Lecture 17 - Numericals on Gear Pump, Tree Structure of Vane Pump

Lecture 18 - Vane Pump, Pumping theory, Construction and Operation of Unbalanced Vane Pump, Vane loading and solutions, Different Vanes

Lecture 19 - Variable Displacement Pressure Compensated Vane Pump, Balance Vane Pump, Kinematic Inversion of Vane pump and Numerical

Lecture 20 - Piston pump, Pumping theory, Constructional features and Operations of Hand Pump-Single acting, Twin single acting, Double acting, Two-stage

Lecture 21 - Axial Piston Pump- Construction and Operating principles of Bent axis and Swash plate type pump

Lecture 22 - Radial Piston Pumps- Construction and Operation, Pump failure and Cavitations, Important parameters while selecting Pump, Numerical

Lecture 23 - Pneumatic Control System-Introduction, Air preparation-Primary and Secondary Air Treatment

Lecture 24 - Pneumatic Power Source- Compressor, Classification, Air Receiver and Control Methods

Lecture 25 - Reciprocating Type Air Compressor-Single and Multi-stage Piston Pump, PV Diagram and Work Done

Lecture 26 - Construction and Operation of Two-stage Reciprocating type Air Compressor, Diaphragm Type Air Compressor, Rotary Vane Compressor, Twin Lobe Air compressor, Screw Compressor, Liquid Ring Compressor and Selection Criteria

Lecture 27 - Energy Loss and Cost Break Down in Air Preparation Process, Pressure Drop and its Effect

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

NPTEL : Inverse Methods in Heat Transfer (Mechanical Engineering)

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

NPTEL : Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

Lecture 32 - Entropy - Part 2

Lecture 33 - Entropy - Part 3

Lecture 34 - Entropy - Part 4

Lecture 35 - Entropy - Part 5

Lecture 36 - Entropy - Part 6

Lecture 37 - Thermodynamic cycles - Part 1

Lecture 38 - Thermodynamic cycles - Part 2

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

Co-ordinators : Unknown

NPTEL : NOC:Interfacial Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Harish N Dixit

NPTEL : Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Dr. Babu Viswanathan

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

Co-ordinators : Prof .Dr.C. Balaji

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

Co-ordinators : Prof. Balaji Srinivasan

NPTEL : NOC:Sustainable Energy Technology (Mechanical Engineering)

Co-ordinators : Dr. Sayak Banerjee

Lecture 65 - Mechanical Energy Storage Technologies

Lecture 66 - Compressed Air Energy Storage System

Lecture 67 - Flywheel Based Energy Storage System - Part 1

Lecture 68 - Flywheel Based Energy Storage System - Part 2

Lecture 69 - Energy Storage System Through Capacitor

Lecture 70 - Electrolytic Capacitor

Lecture 71 - Super Capacitor

Lecture 72 - Electrochemical Energy Storage Systems

Lecture 73 - Performance Characteristics of Battery

Lecture 74 - Types of Rechargeable Batteries - Part 1

Lecture 75 - Types of Rechargeable Batteries - Part 2

Lecture 76 - Thermal Energy Storage Systems - Part 1

Lecture 77 - Thermal Energy Storage Systems - Part 2

Lecture 78 - Storage of Coolness and Synoptic View of Energy Storage Technology

Lecture 79 - Storage Needs for the Grid

Lecture 80 - Energy Storage Types

Lecture 81 - Trends in Energy Storage Types and their Characteristics

Lecture 82 - Analysis of Growth in Energy Storage-focussed on Pumped Hydro Storage, Flywheels and Li-ion batteries

Lecture 83 - Fuel Cells and Hydrogen Energy Economy

Lecture 84 - Hydrogen production and storage technologies

Lecture 85 - Hydrogen storage technologies

Lecture 86 - Fuel cell technology

Lecture 87 - Fuel cell types

Lecture 88 - Carbon Capture and Storage (CCS) technologies - Part 1

Lecture 89 - Carbon Capture and Storage (CCS) technologies - Part 2

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

Co-ordinators : Prof. K. Ramesh

NPTEL : NOC:Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

Lecture 1 - Course outline

Lecture 2 - Introduction - Part 1

Lecture 3 - Introduction - Part 2

Lecture 4 - Basic concepts - Part 1

Lecture 5 - Basic concepts - Part 2

Lecture 6 - Basic concepts - Part 3

Lecture 7 - Basic concepts - Part 4

Lecture 8 - Basic concepts - Part 5

Lecture 9 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 1

Lecture 10 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 2

Lecture 11 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 3

Lecture 12 - Work and Heat - Part 1

Lecture 13 - Work and Heat - Part 2

Lecture 14 - Work and Heat - Part 3

Lecture 15 - Tutorial 2 - Work and heat transfer examples - Part 1

Lecture 16 - Tutorial 2 - Work and heat transfer examples - Part 2

Lecture 17 - Tutorial 2 - Work and heat transfer examples - Part 3

Lecture 18 - First law of thermodynamics

Lecture 19 - Pure substances

Lecture 20 - Ideal gases and ideal gas mixtures

Lecture 21 - Two-phase mixtures - Part 1

Lecture 22 - Two-phase mixtures - Part 2

Lecture 23 - First law analysis of systems - Part 1

Lecture 24 - First law analysis of systems - Part 2

Lecture 25 - First law analysis of systems - Part 3

Lecture 26 - First law analysis of systems - Part 4

Lecture 27 - Tutorial 3 - First law analysis of system - Part 1

Lecture 28 - Tutorial 3 - First law analysis of system - Part 2

Lecture 29 - Tutorial 3 - First law analysis of system - Part 3

Lecture 30 - Tutorial 4 - Systems involving ideal gas mixtures - Part 1

Lecture 31 - Tutorial 4 - Systems involving ideal gas mixtures - Part 2

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

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

Co-ordinators : Prof. Aditya G. Nair

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

Co-ordinators : Prof. V. Raghavan

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 - Tutorial 1 - Entropy change of a control volume - Part 1

Lecture 7 - Tutorial 1 - Entropy change of a control volume - Part 2

Lecture 8 - Tutorial 2 - Entropy change of a control volume - Part 3

Lecture 9 - Tutorial 2 - Entropy change of a control volume - Part 4

Lecture 10 - Tutorial 2 - Entropy change of a control volume - Part 5

Lecture 11 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Part 1

Lecture 12 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Part 2

Lecture 13 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Part 3

Lecture 14 - Exergy - Part 1

Lecture 15 - Exergy - Part 2

Lecture 16 - Exergy - Part 3

Lecture 17 - Exergy - Part 4

Lecture 18 - Exergy - Part 5

Lecture 19 - Tutorial 4 - Exergy transfer and exergy change of a system - Part 1

Lecture 20 - Tutorial 4 - Exergy transfer and exergy change of a system - Part 2

Lecture 21 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 3

Lecture 22 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 4

Lecture 23 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 5

Lecture 24 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 1

Lecture 25 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 2

Lecture 26 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 3

Lecture 27 - Thermodynamic cycles - Rankine cycle - Part 1

Lecture 28 - Thermodynamic cycles - Rankine cycle - Part 2

Lecture 29 - Thermodynamic cycles - Rankine cycle - Part 3

Lecture 30 - Thermodynamic cycles - Air standard Brayton cycle - Part 1

Lecture 31 - Thermodynamic cycles - Air standard Brayton cycle - Part 2

Lecture 32 - Thermodynamic cycles - Air standard Brayton cycle - Part 3

Lecture 33 - Thermodynamic cycles - Air standard Brayton cycle - Part 4

Lecture 34 - Thermodynamic cycles - Air standard Brayton cycle - Part 5

Lecture 35 - Thermodynamic cycles - Air standard Otto cycle

Lecture 36 - Thermodynamic cycles - Air standard Diesel cycle - Part 1

Lecture 37 - Thermodynamic cycles - Air standard Diesel cycle - Part 2

Lecture 38 - Thermodynamic cycles - Vapor compression refrigeration cycle

Lecture 39 - Psychrometry - Part 1

Lecture 40 - Psychrometry - Part 2

Lecture 41 - Psychrometry - Part 3

Lecture 42 - Psychrometry - Part 4

Lecture 43 - Psychrometry - Part 5

Lecture 44 - Psychrometry - Part 6

Lecture 45 - Psychrometry - Part 7

Lecture 46 - Tutorial 7 - Psychometry and Air conditioning processes - Part 1

Lecture 47 - Tutorial 7 - Psychometry and Air conditioning processes - Part 2

Lecture 48 - Tutorial 8 - Psychometry and Air conditioning processes - Part 3

Lecture 49 - Tutorial 8 - Psychometry and Air conditioning processes - Part 4

Lecture 50 - Combustion Thermodynamics - Part 1

Lecture 51 - Combustion Thermodynamics - Part 2

Lecture 52 - Combustion Thermodynamics - Part 3

Lecture 53 - Combustion Thermodynamics - Part 4

Lecture 54 - Tutorial 9 - Stoichiometry - Part 1

Lecture 55 - Tutorial 9 - Stoichiometry - Part 2

Lecture 56 - Tutorial 10 - Heat and temperature calculations in combustion - Part 1

Lecture 57 - Tutorial 10 - Heat and temperature calculations in combustion - Part 2

Lecture 58 - Tutorial 10 - Heat and temperature calculations in combustion - Part 3

Lecture 59 - Tutorial 10 - Heat and temperature calculations in combustion - Part 4

Lecture 60 - Tutorial 10 - Heat and temperature calculations in combustion - Part 5

Lecture 61 - Compressible flow through nozzles - Part 1

Lecture 62 - Compressible flow through nozzles - Part 2

Lecture 63 - Compressible flow through nozzles - Part 3

Lecture 64 - Compressible flow through nozzles - Part 4

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

Co-ordinators : Prof. Ramkumar

NPTEL : NOC:Turbulence Modeling (Mechanical Engineering)

Co-ordinators : Prof. Vagesh D. Narasimhamurthy

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

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

Lecture 1 - Powder Metallurgy - Part I

Lecture 2 - Powder Metallurgy - Part II

Lecture 3 - Powder Metallurgy - Part III

Lecture 4 - Metal Forming - Fundamentals

Lecture 5 - Forging

Lecture 6 - Swaging and Wire Drawing

Lecture 7 - Sheet Metal Operations - Part I

Lecture 8 - Sheet Metal Operations - Part II

Lecture 9 - Sheet Metal Operations - Part III

Lecture 10 - Sheet Metal Working - Presses

Lecture 11 - Sheet Metal Working - Equipment

Lecture 12 - High Energy Rate Forming Processes

Lecture 13 - Machining Fundamentals

Lecture 14 - Machining - Part I

Lecture 15 - Machining - Part II

Lecture 16 - Machining - Part III

Lecture 17 - Metal casting - Part I

Lecture 18 - Metal casting - Part II

Lecture 19 - Metal Casting - Part III

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Lecture 23 - Metal Casting - Part VII

Lecture 24 - Metal Casting - Part VIII

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Lecture 27 - Introduction

Lecture 28 - Welding Process Classification

Lecture 29 - Brazing Soldering Braze Welding

Lecture 30 - Arc Welding Power Source - Part I

Lecture 31 - Arc Welding Power Source - Part II

NPTEL : Strength of Materials (Mechanical Engineering)

Co-ordinators : Dr. S.P. Harsha

Lecture 1 - Solid Mechanics

Lecture 2 - Strength of Materials

Lecture 3 - Strength of Materials

Lecture 4 - Solid Mechanics

Lecture 5 - Strength of Materials

Lecture 6 - Strength of Materials

Lecture 7 - Strength of Materials

Lecture 8 - Strength of Materials

Lecture 9 - Strength of Materials

Lecture 10 - Strength of Materials

Lecture 11 - Strength of Materials

Lecture 12 - Strength of Materials

Lecture 13 - Strength of Materials

Lecture 14 - Strength of Materials

Lecture 15 - Strength of Materials

Lecture 16 - Strength of Materials

Lecture 17 - Strength of Materials

Lecture 18 - Strength of Materials

Lecture 19 - Strength of Materials

Lecture 20 - Strength of Materials

Lecture 21 - Strength of Materials

Lecture 22 - Strength of Materials

Lecture 23 - Strength of Materials

Lecture 24 - Strength of Materials

Lecture 25 - Strength of Materials

Lecture 26 - Strength of Materials

Lecture 27 - Strength of Materials

Lecture 28 - Strength of Materials

Lecture 29 - Strength of Materials

Lecture 30 - Strength of Materials

Lecture 31 - Strength of Materials

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

Co-ordinators : Dr. Arup Kumar Das

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

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Engineering Economic Analysis (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Convective Heat Transfer (Mechanical Engineering)

Co-ordinators : Dr. Arup Kumar Das

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

Co-ordinators : Prof. Anil Kumar

Lecture 1 - Lesson 1 - Introduction

Lecture 2 - Lesson 2 - Addition of two harmonic motions and beat phenomenon

Lecture 3 - Lesson 3 - Fourier series and harmonic analysis

Lecture 4 - Lesson 4 - Vibration analysis procedure

Lecture 5 - Lesson 5 - Numerical problems

Lecture 6 - Lesson 1 - Undamped free vibration

Lecture 7 - Lesson 2 - Energy method

Lecture 8 - Lesson 3 - Damped free vibration

Lecture 9 - Lesson 4 - Viscous damped systems and logarithmic decrement

Lecture 10 - Lesson 5 - Coulomb damping

Lecture 11 - Lesson 1 - Harmonic excitations

Lecture 12 - Lesson 2 - Magnification factor and frequency response curve

Lecture 13 - Lesson 3 - Rotating unbalance

Lecture 14 - Lesson 4 - Excitation of the support

Lecture 15 - Lesson 5 - Energy input and dissipation by viscous damping

Lecture 16 - Lesson 1 - Coulomb damping and equivalent viscous damping

Lecture 17 - Lesson 2 - Structural damping and equivalent viscous damping

Lecture 18 - Lesson 3 - Vibration isolation and force transmissibility

Lecture 19 - Lesson 4 - Motion transmissibility

Lecture 20 - Lesson 5 - Numerical problems

Lecture 21 - Lesson 1 - Transducers and vibration pickup

Lecture 22 - Lesson 2 - Vibrometer

Lecture 23 - Lesson 3 - Accelerometer

Lecture 24 - Lesson 4 - Velocity pickup or Velometer

Lecture 25 - Lesson 5 - Phase distortion and frequency measurement

Lecture 26 - Lesson 1 - Undamped free vibration

Lecture 27 - Lesson 2 - Principal modes of vibration

Lecture 28 - Lesson 3 - Combined rectilinear and angular modes

Lecture 29 - Lesson 4 - Damped free vibration

Lecture 30 - Lesson 5 - Undamped forced vibration with harmonic excitation

Lecture 31 - Lesson 1 - Undamped dynamic vibration absorber

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

Co-ordinators : Prof. Dheerendra Kumar Dwivedi

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

Co-ordinators : Prof. Pushparaj Mani Pathak

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

Co-ordinators : Dr. Pradeep K. Jha

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

Co-ordinators : Prof. Ravi Kumar

Lecture 1 - Review of Thermodynamics

Lecture 2 - Rankine Cycle

Lecture 3 - Performance of Rankine Cycle

Lecture 4 - Binary vapour cycle and co-generation

Lecture 5 - Problem Solving (Rankine Cycle)

Lecture 6 - Steam Generators

Lecture 7 - Fire Tube Boilers

Lecture 8 - Water Tube Boilers

Lecture 9 - Boiler Mountings and Accessories

Lecture 10 - High Pressure Boilers (Part-1)

Lecture 11 - High Pressure Boilers (Part-2)

Lecture 12 - Draught

Lecture 13 - Performance of Boiler

Lecture 14 - Combustion of Fuel

Lecture 15 - Combustion of Fuel (Problem Solving)

Lecture 16 - Boiler Trial

Lecture 17 - Nozzles and Diffusers - Momentum and Continuity Equations

Lecture 18 - Nozzles and Diffusers - Efficiency and Critical Pressure

Lecture 19 - Nozzles and Diffusers - General Relationships and Supersaturated Flow

Lecture 20 - Problem Solving (Nozzles and diffusers)

Lecture 21 - Steam Turbine

Lecture 22 - Compounding of Steam Turbine

Lecture 23 - Impulse Steam Turbine

Lecture 24 - Impulse Steam Turbine Performance

Lecture 25 - Problem solving (Impulse Steam Turbine)

Lecture 26 - Impulse Reaction Steam Turbine

Lecture 27 - Impulse Reaction Steam Turbine Performance

Lecture 28 - Energy Losses in Steam Turbine

Lecture 29 - Condensers

Lecture 30 - Problem Solving (Steam Turbine)

Lecture 31 - Gas turbine cycle

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

Lecture 32 - Metal Working Processes: Sheet Metal Operations - II

Lecture 33 - Metal Working Processes: Sheet Metal Operations - III

Lecture 34 - Metal Working Processes: Dies and Die sets

Lecture 35 - Material Removal Processes: Machining

Lecture 36 - Material Removal Processes: Mechanism of Metal Cutting

Lecture 37 - Material Removal Processes: Chip Formation

Lecture 38 - Material Removal Processes: Types of Chips and Power Consumption

Lecture 39 - Material Removal Processes: Heat Generation

Lecture 40 - Material Removal Processes: Tool Failure and Tool Life

Lecture 41 - Material Removal Processes: Tool materials

Lecture 42 - Material removal processes: Cutting fluids

Lecture 43 - Material removal processes: Grinding - I

Lecture 44 - Material removal Processes: Grinding - II

Lecture 45 - Material removal Processes: Grinding - III

Lecture 46 - Material removal processes: Grinding operations

Lecture 47 - Joining of metals: Fundamentals - I

Lecture 48 - Joining of metals: Fundamentals - II

Lecture 49 - Joining of metals: Welding processes - I

Lecture 50 - Brazing, soldering and weldability

Lecture 51 - Weldability and welding defects

Lecture 52 - Heat treatment: Fundamentals - I

Lecture 53 - Heat treatment: Fundamentals - II

Lecture 54 - Heat treatment: Fundamentals - III

Lecture 55 - Heat treatment: Normalizing and hardening

Lecture 56 - Heat treatment: Tempering

Lecture 57 - Improving surface properties: Introduction

Lecture 58 - Improving surface properties: Surface modification processes I

Lecture 59 - Improving surface properties: Changing chemical composition

Lecture 60 - Improving surface properties: Coating

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

Co-ordinators : Dr. Pradeep K. Jha

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

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Operations Management (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

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

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Automatic Control (Mechanical Engineering)

Co-ordinators : Dr. Anil Kumar

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

Co-ordinators : Dr. D. K. Dwivedi

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

Lecture 32 - Surface modification techniques: Carburizing - II

Lecture 33 - Surface modification techniques: Carburizing and Cyaniding

Lecture 34 - Surface modification techniques: Nitriding

Lecture 35 - Surface modification techniques: Plasma carburizing and plasma nitriding

Lecture 36 - Surface modification techniques: Vacuum based surface modification I

Lecture 37 - Surface modification techniques: Ion implantation and ion plating

Lecture 38 - Surface modification techniques: Sputtering and Ion beam assisted deposition

Lecture 39 - Surface modification techniques: Chemical vapour deposition and boronizing

Lecture 40 - Surface modification techniques: Laser alloying

Lecture 41 - Surface modification techniques: Laser nitriding and developing surface layer

Lecture 42 - Surface modification techniques: Fundamentals of surface modification by weld surfacing and thermal spraying

Lecture 43 - Surface modification techniques: Fundamentals of surface modification by weld surfacing

Lecture 44 - Surface modification techniques: Weld surfacing processes

Lecture 45 - Surface modification techniques: Weld surfacing - I

Lecture 46 - Surface modification techniques: Weld surfacing - II

Lecture 47 - Surface modification techniques: Weld surfacing - III

Lecture 48 - Surface modification techniques: Laser cladding

Lecture 49 - Surface modification techniques: Principle of thermal spraying

Lecture 50 - Surface modification techniques: Flame spraying

Lecture 51 - Surface modification techniques: Improving the performance of flame spray coating

Lecture 52 - Surface modification techniques: HVOF and Detonation spraying

Lecture 53 - Surface modification techniques: Cold spraying, arc spraying

Lecture 54 - Surface modification techniques: Plasma spraying, electroplating, electroless plating

Lecture 55 - Characterization of modified surfaces: Surface roughness and thickness - I

Lecture 56 - Characterization of modified surfaces: Surface roughness and thickness - II

Lecture 57 - Characterization of modified surfaces: Thickness and soundness

Lecture 58 - Characterization of modified surfaces: Soundness and mechanical properties

Lecture 59 - Characterization of modified surfaces: Metallography

Lecture 60 - Characterization of modified surfaces: Wear behavior

NPTEL : NOC:Work System Design (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

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

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Radiative Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Ankit Bansal

NPTEL : NOC:Weldability of Metals (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

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

Co-ordinators : Dr. Inderdeep Singh

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

Lecture 1 - Introduction to Product Design and Development

Lecture 2 - Product Design Steps and Product Analysis

Lecture 3 - Profit Consideration

Lecture 4 - Value Engineering (VE) History, Concept and Definitions

Lecture 5 - Value Engineering vs Cost Cutting

Lecture 6 - Creative Thinking

Lecture 7 - Problem Identification and VEJP

Lecture 8 - Types of Product Functions

Lecture 9 - Funtional Analysis

Lecture 10 - Functional Analysis System Technique

Lecture 11 - Function-Cost Relationship - I

Lecture 12 - Function-Cost Relationship - II

Lecture 13 - VE Applications in Product Design

Lecture 14 - Value Engineering: Case Study - I

Lecture 15 - Value Engineering: Case Study - II

Lecture 16 - VE Tools and Techniques - I

Lecture 17 - VE Tools and Techniques - II

Lecture 18 - VE Success Stories - I

Lecture 19 - VE Success Stories - II

Lecture 20 - Behavioral Roadblocks

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

Lecture 32 - Experiments on Robot Assisted Percutaneous Interventions

Lecture 33 - Sliding Mode Control

Lecture 34 - Higher Order Sliding Mode Control

Lecture 35 - Smart Needles for Percutaneous Interventions - I

Lecture 36 - Smart Needles for Percutaneous Interventions - II

Lecture 37 - Flexible Link Kinematics - I

Lecture 38 - Flexible Link Kinematics - II

Lecture 39 - Model Based Control of Robot Manipulators

Lecture 40 - Simulation of Robot Manipulators

NPTEL : NOC:Acoustic Metamaterials (Mechanical Engineering)

Co-ordinators : Prof. Sneha Singh

NPTEL : NOC:Power Plant Engineering (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

Lecture 1 - Energy Scenario and Basic Concepts

Lecture 2 - Steam Power Plant Cycle

Lecture 3 - Fossil Fuel Steam Generator - I

Lecture 4 - Fossil Fuel Steam Generator - II

Lecture 5 - Mountings and Accessories - I

Lecture 6 - Mountings and Accessories - II

Lecture 7 - Boiler Performance

Lecture 8 - Coal Properties

Lecture 9 - Coal Handling

Lecture 10 - Problem Solving - I

Lecture 11 - Burning of Fuel

Lecture 12 - Ash Handling

Lecture 13 - Feed Water Treatment

Lecture 14 - Steam Turbines

Lecture 15 - Impulse Steam Turbines

Lecture 16 - Impulse-Reaction Steam Turbines

Lecture 17 - Energy Losses in Steam Turbines

Lecture 18 - Steam Condensers

Lecture 19 - Gas Turbines

Lecture 20 - Problem Solving - II

Lecture 21 - Hydroelectric power plant

Lecture 22 - Hydro plants and forces on plates

Lecture 23 - Hydro Turbines - I

Lecture 24 - Hydro Turbines - II

Lecture 25 - Problem solving - III

Lecture 26 - Principles of nuclear energy

Lecture 27 - Nuclear power plants - I

Lecture 28 - Nuclear power plants - II

Lecture 29 - Combined operations

Lecture 30 - Solar radiations

Lecture 31 - Solar thermal power

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

Co-ordinators : Prof. D K Dwivedi

Lecture 32 - Production Planning and Control: Scheduling

Lecture 33 - Production Planning and Control: Priority Sequencing - I

Lecture 34 - Production Planning and Control: Priority Sequencing - II

Lecture 35 - Production Planning and Control: Relative Performance of Priority Sequencing Rules

Lecture 36 - Inventory: Fundamentals

Lecture 37 - Inventory: Models - I

Lecture 38 - Inventory: Models - II

Lecture 39 - Inventory: Wilson Model

Lecture 40 - Inventory: Gradual Replenishment Model

Lecture 41 - Project Management and Network Modelling: Introduction

Lecture 42 - Network Modelling: PERT

Lecture 43 - Network Analysis: PERT - I

Lecture 44 - Network Analysis: PERT - II

Lecture 45 - Network Analysis: Crashing Network and CPM

Lecture 46 - Network Analysis: Critical Path Method

Lecture 47 - Forecasting: Introduction

Lecture 48 - Forecasting: Methods - I

Lecture 49 - Forecasting: Methods - II

Lecture 50 - Forecasting: Methods - III

Lecture 51 - Forecasting: Methods - IV

Lecture 52 - Forecasting: Methods - V

Lecture 53 - Quality Control: Introduction

Lecture 54 - Quality Control: Fundamentals

Lecture 55 - Quality Control: SPC - I

Lecture 56 - Quality Control: SPC - II

Lecture 57 - Quality Control: Control Charts - I

Lecture 58 - Quality Control: Control Charts - II

Lecture 59 - Quality Control: Control Charts for Attributes

Lecture 60 - Productivity and Work Study

NPTEL : NOC:Mechatronics (Mechanical Engineering)

Co-ordinators : Prof. Pushparaj Mani Pathak

NPTEL : NOC:Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Anjani Kumar Tiwari

Lecture 1 - Course outline

Lecture 2 - Vectorial representation of forces and moments

Lecture 3 - Couple moment and reduction of a force system to a force and a couple

Lecture 4 - Examples of couple moment

Lecture 5 - Examples: moment in three dimensions

Lecture 6 - Free body diagram and support reactions

Lecture 7 - Equilibrium of rigid bodies in two and three dimensions

Lecture 8 - Examples: Equilibrium of rigid bodies in two dimensions

Lecture 9 - Examples: Equilibrium of rigid bodies in three dimensions

Lecture 10 - Examples: Beams and distributed loads

Lecture 11 - Flexible Cable

Lecture 12 - Flexible Cable, Catenary curve

Lecture 13 - Examples: Parabolic and Catenary cables

Lecture 14 - Flexible Cable: Concentrated load

Lecture 15 - Structures: Plane Trusses

Lecture 16 - Analysis of trusses: Method of joints

Lecture 17 - Analysis of trusses: Method of sections

Lecture 18 - Shear force and bending moment

Lecture 19 - Shear force and bending moment: distributed load

Lecture 20 - Principle of virtual work

Lecture 21 - Principle of virtual work: examples - I

Lecture 22 - Principle of virtual work: examples - II

Lecture 23 - Stable and unstable equilibrium

Lecture 24 - Friction

Lecture 25 - Friction: examples

Lecture 26 - Rope and belt friction

Lecture 27 - Rope and belt friction: examples

Lecture 28 - Rolling resistance

Lecture 29 - Revision: static

Lecture 30 - Coordinate systems: Cartesian and planar polar coordinates

Lecture 31 - Coordinate systems: spherical coordinates

Lecture 32 - Coordinate systems: cylindrical coordinates

Lecture 33 - Cartesian and planar polar coordinates: examples

Lecture 34 - Spherical and cylindrical coordinates: examples

Lecture 35 - Equation of motion in different coordinate systems

Lecture 36 - Equation of motion: examples

Lecture 37 - Work energy method

Lecture 38 - Work energy method: examples

Lecture 39 - Impulse momentum relation

Lecture 40 - Variable mass

Lecture 41 - Direct central impact

Lecture 42 - Oblique central impact

Lecture 43 - Moment of inertia

Lecture 44 - Moment of inertia: examples

Lecture 45 - Moment of inertia of composite bodies

Lecture 46 - Product of inertia and principal axes of inertia

Lecture 47 - Principal axes of inertia: examples - I

Lecture 48 - Principal axes of inertia: examples - II

Lecture 49 - Harmonic oscillator: simple harmonic motion

Lecture 50 - Simple harmonic motion: examples

Lecture 51 - Damped harmonic oscillator

Lecture 52 - Translation and rotation of rigid bodies

Lecture 53 - Translation and rotation of rigid bodies: examples

Lecture 54 - Plane motion of a rigid body

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

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

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

Lecture 58 - Eulerâ€™s equations of motion

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

Lecture 60 - Revision: Dynamics

NPTEL : Micro and Smart Systems (Mechanical Engineering)

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

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

Co-ordinators : Prof. G.K. Anathasuresh

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

Co-ordinators : Prof. G. K. Ananthasuresh

Lecture 1 - Overview

Lecture 2 - Spirit of compliant design

Lecture 3 - A glimpse of applications

Lecture 4 - Mobility and degrees of freedom in compliant mechanisms

Lecture 5 - MaxwellÂ’s rule and GrÃ¼blerÂ’s formula

Lecture 6 - Using compatibility and force equilibrium matrices to identify degrees of freedom and states of self-stress in trusses

Lecture 7 - Empirical formula for flexure joints

Lecture 8 - Types of elastic pairs (flexures)

Lecture 9 - Linear finite element analysis of compliant mechanisms with beam elements

Lecture 10 - A compliant mechanism kit

Lecture 11 - Linear and nonlinear finite element analyses using continuum elements

Lecture 12 - Subtleties in finite element analysis: geometric nonlinearity and contact

Lecture 13 - Deformation of a cantilever under a tip-load, using elliptic integrals

Lecture 14 - Elliptic integrals and their use in elastica analysis

Lecture 15 - Frisch-FayÂ’s approach to large deformation of beam

Lecture 16 - Burns-CrossleyÂ’s kinematic model

Lecture 17 - Howell-MidhaÂ’s elastic model

Lecture 18 - Putting together the pseudo rigid-body model

Lecture 19 - Modeling a partially compliant mechanism

Lecture 20 - Kinematic coefficients of a four-bar linkage with and without springs

Lecture 21 - Solving equations of PRB modeling and comparing with finite element analysis

Lecture 22 - Loop-closure equations for PRB models of compliant mechanisms

Lecture 23 - Burmester theory for compliant mechanisms

Lecture 24 - PRB-based Synthesis Examples

Lecture 25 - Structural optimization approach

Lecture 26 - Early works on design for compliance

Lecture 27 - Design for deflection of trusses

Lecture 28 - Design for deflection of beams and frames

Lecture 29 - Design of elastic continua for desired deflection

Lecture 30 - Continuum element-based topology optimization of compliant mechanisms

Lecture 31 - YinSyn; synthesis of nonlinear responses with compliant mechanisms

Lecture 32 - Five different formulations for compliant mechanism design and some benchmark problems

Lecture 33 - Distributed compliance

Lecture 34 - How to achieve distributed compliance

Lecture 35 - Shape optimization

Lecture 36 - Cam-flexure clamp-case-study

Lecture 37 - SL model for compliant mechanisms

Lecture 38 - Feasibility maps for compliant mechanisms

Lecture 39 - Selection of compliant mechanisms for given user-specifications

Lecture 40 - Two case-studies using feasibility maps technique

Lecture 41 - SML model for compliant mechanisms for dynamic response

Lecture 42 - Re-design of compliant mechanisms; Matlab and Java codes

Lecture 43 - Non-dimensional analysis of beams

Lecture 44 - Deformation index and slenderness ratio of compliant mechanisms

Lecture 45 - Kinetoelastostatic maps

Lecture 46 - Designing with kinetoelastic maps

Lecture 47 - Non-dimensinalization of stress, frequency, and other measures

Lecture 48 - Designing compliant suspensions using kinetoelastic maps

Lecture 49 - Instant centre method for designing compliant mechanisms

Lecture 50 - Stiffness and compliance ellipsoids

Lecture 51 - Building block method of designing compliant mechanisms

Lecture 52 - Comparative analysis of different methods for designing compliant mechanisms

Lecture 53 - Aspects of Mechanical advantage of compliant mechanisms

Lecture 54 - Mechanical advantage of rigid-body and compliant mechanisms

Lecture 55 - Bistability in elastic systems

Lecture 56 - Analysis of bistable arches

Lecture 57 - Compliant mechanisms with bistable arches

Lecture 58 - Static balancing and zero-free-length springs

Lecture 59 - Static balance of a compliant mechanism using a linkage

Lecture 60 - Static balancing method for compliant mechanisms

Lecture 61 - A catalogue of compliant mechanisms

Lecture 62 - Compliant suspension mechanism in microsystems (MEMS)

Lecture 63 - Micromechanical signal processors using compliant mechanisms

Lecture 64 - A few special concepts of compliant mechanisms

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

Lecture 1 - Introduction to convective heat transfer

Lecture 2 - Governing equations I - Momentum Conservation

Lecture 3 - Governing equations II - Energy Conservation

Lecture 4 - Introduction to external forced convection

Lecture 5 - Scaling Analysis - Momentum

Lecture 6 - Scaling Analysis - Energy I

Lecture 7 - Scaling Analysis - Energy II

Lecture 8 - Similarity solution - Momentum

Lecture 9 - Similarity solution - Energy

Lecture 10 - Integral solutions - Momentum

Lecture 11 - Integral solutions - Energy

Lecture 12 - Suction and Blowing

Lecture 13 - Falkner-Skan solution

Lecture 14 - Arbitrary Wall temperature

Lecture 15 - Internal forced convection - Developing flow

Lecture 16 - Hydrodynamic fully developed flow

Lecture 17 - Mean temperature in fully developed flow

Lecture 18 - Uniform heat flux

Lecture 19 - Uniform wall temperature

Lecture 20 - Tube surrounded by isothermal flow

Lecture 21 - Heat transfer to fully developed flow - I

Lecture 22 - Heat transfer to fully developed flow - II

Lecture 23 - Laminar slug flow

Lecture 24 - Power law fluids

Lecture 25 - Forced convection - Tutorial I

Lecture 26 - Forced convection - Tutorial II

Lecture 27 - Forced convection - Tutorial III

Lecture 28 - Introduction to external natural convection

Lecture 29 - Scaling analysis - I

Lecture 30 - Scaling analysis - II

Lecture 31 - Integral solution

Lecture 32 - Similarity solution

Lecture 33 - Uniform wall heat flux

Lecture 34 - Thermal stratification

Lecture 35 - Mixed convection

Lecture 36 - Internal natural convection - Scaling analysis

Lecture 37 - Heat transfer regimes

Lecture 38 - Regime III

Lecture 39 - Regime IV - Shallow enclosure limit - I

Lecture 40 - Regime IV - Shallow enclosure limit - II

Lecture 41 - Partially divided enclosures

Lecture 42 - Inclined enclosures

Lecture 43 - Natural convection - Tutorial I

Lecture 44 - Natural convection - Tutorial II

Lecture 45 - Introduction to Turbulence

Lecture 46 - Reynoldâ€™s Averaged Navier Stokes equation - I

Lecture 47 - Reynoldâ€™s Averaged Navier Stokes equation - II

Lecture 48 - Turbulent boundary layer - Viscous sub layer

Lecture 49 - Turbulent boundary layer - Fully turbulent sub layer

Lecture 50 - Heat transfer in turbulent boundary layer

Lecture 51 - Turbulent internal flow - I

Lecture 52 - Turbulent internal flow - II

Lecture 53 - Turbulent internal flow - III

Lecture 54 - K - Îµ model

Lecture 55 - Turbulence - Tutorial

Lecture 56 - Experimental techniques - Thermochromic liquid crystals

Lecture 57 - Experimental techniques - IR thermography

Lecture 58 - Droplet evaporation - Sessile I

Lecture 59 - Droplet evaporation - Sessile II

Lecture 60 - Droplet evaporation - Contact free

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

Co-ordinators : Prof. Venkata Sonti

Lecture 1 - Introduction to complex variables

Lecture 2 - Cauchy Riemann Equations

Lecture 3 - Analytic Functions

Lecture 4 - Simple definitions

Lecture 5 - Definition of sets, domains, theorem on antiderivative

Lecture 6 - Cauchy Gorsat Theorem

Lecture 7 - Implications of Cauchy Gorsat Theorem, Cauchy Integral Formula

Lecture 8 - Implications of CIF, converse of CG theorem

Lecture 9 - Examples in contour integrals, ratios of polynomials

Lecture 10 - Contour integration of sinc function

Lecture 11 - Method of path deformation

Lecture 12 - Method of path deformation (Continued...)

Lecture 13 - Infinite and finite branch cuts

Lecture 14 - Finite Branch Cut

Lecture 15 - Infinite branch cut example

Lecture 16 - Contour integration: rectangular contour

Lecture 17 - Finite square root branch cut

Lecture 18 - Example on finite branch cut

Lecture 19 - Pole on a branch cut

Lecture 20 - L shaped branch cut

Lecture 21 - L shaped branch cut continued

Lecture 22 - Inverse Laplace Transform

Lecture 23 - Inverse Laplace Transform (Continued...)

Lecture 24 - Additional material or corrections to lectures

Lecture 25 - Summary of the total course

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

Lecture 1 - The longitudinal wave in vibrating spring

Lecture 2 - Harmonically excited systems

Lecture 3 - The concept of coincidence frequency

Lecture 4 - A classical problem in sound-structure interaction

Lecture 5 - Classical problem (Continued...)

Lecture 6 - Uncoupled solution to the classical problem

Lecture 7 - Uncoupled solution (Continued...).

Lecture 8 - Introduction to the coupled problem.

Lecture 9 - The coupled roots

Lecture 10 - Physical meaning of terms

Lecture 11 - Derivation of coupled roots using asymptotic method

Lecture 12 - Coupled roots derivation (Continued...)

Lecture 13 - Regions of heavy and light fluid loading

Lecture 14 - Light and heavy fluid loading (Continued...)

Lecture 15 - The coupled vibration field

Lecture 16 - The coupled acoustic field and stationary phase

Lecture 17 - The 2-D structural-acoustic waveguide

Lecture 18 - The coupled partial differential equations

Lecture 19 - Derivation of the coupled dispersion equation

Lecture 20 - A schematic of coupled waves

Lecture 21 - Derivation of coupled waves using asymptotic method

Lecture 22 - Asymptotic method (Continued...) and Maple demo

Lecture 23 - Physics of the coupled waves

Lecture 24 - Critical points

Lecture 25 - Heavy fluid loading

Lecture 26 - Summary of the rectangular waveguide

Lecture 27 - Impedance and mobility

Lecture 28 - Derivation of acoustic and vibration response

Lecture 29 - Derivation of vibro-acoustic response (Continued...)

Lecture 30 - Derivation of vibro-acoustic response (Continued...)

Lecture 31 - Numerical example

Lecture 32 - Coupled resonance analysis using matrices

Lecture 33 - Coupled resonance analysis (Continued...)

Lecture 34 - Sound radiation from a baffled panel

Lecture 35 - Derivation of pressure response.

Lecture 36 - Radiation efficiency

Lecture 37 - Physics of volume velocity cancellation

Lecture 38 - Derivations in the frequency domain: 1-D

Lecture 39 - Physics of the vibration spectrum in 2-D

Lecture 40 - Modal character across the frequency range

Lecture 41 - Simultaneous radiation from several modes

Lecture 42 - Panel radiation model using monopoles

Lecture 43 - Physics of panel radiation using monopole model

Lecture 44 - Physics of panel radiation using monopole model (Cointinued...)

Lecture 45 - Radiation resistance derivation from Maidanikâ€™s work (Continued...)

Lecture 46 - Radiation resistance derivation from Maidanikâ€™s work (Continued...)

Lecture 47 - Radiation resistance derivation from Maidanikâ€™s work (Continued...)

Lecture 48 - Modal average radiation efficiency

Lecture 49 - Modal average radiation efficiency (Cointinued...)

Lecture 50 - Transmission of sound through a rigid panel with flexible mounts

Lecture 51 - Frequency dependence of sound transmission

Lecture 52 - Sound transmission through a flexible partition

Lecture 53 - Transmission loss in different situations

Lecture 54 - Cylindrical shell vibration

Lecture 55 - Behavior of uncoupled shell waves

Lecture 56 - Fluid waves in rigid-walled cylindrical shells

Lecture 57 - Wave propagation characteristics in flexible cylindrical shells carrying fluid: Fullers paper

Lecture 58 - Wave impedance of an infinite plate: fluid loading

Lecture 59 - Fluid loading in a finite plate

Lecture 60 - Summary of the entire course

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

Co-ordinators : Prof. Venkata R. Sonti

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

Co-ordinators : Prof. Ashitava Ghosal

Lecture 32 - 3 Case Studies

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

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

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

Co-ordinators : Prof. Saptarshi Basu

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

Co-ordinators : Prof. Venkata R. Sonti

Lecture 32 - Sound from a pulsating sphere using boundary matching technique (Continued...)

Lecture 33 - Sound radiation from a spherical cap on a rigid sphere using the Neumann Green function

Lecture 34 - Scattering of a plane acoustic wave from a rigid sphere

Lecture 35 - Example to show that the surface in the KHIE is notional (not actual)

Lecture 36 - The Rayleigh Integral

Lecture 37 - Sound field of an oscillating piston in a rigid baffle

Lecture 38 - Sound field of an oscillating piston in a rigid baffle (Continued...)

Lecture 39 - Physics of the sound field of an oscillating piston in a rigid baffle

Lecture 40 - Physics of the sound field of an oscillating piston in a rigid baffle (Continued...)

Lecture 41 - Physics of the sound field of the oscillating piston (cap) on a rigid sphere

Lecture 42 - The Sommerfeld radiation condition

Lecture 43 - Sound field inside a rigid walled box due to initial conditions

Lecture 44 - Sound field inside a rigid walled box due to a harmonic source

Lecture 45 - Sound field inside a rigid walled hollow cylinder due to initial conditions

Lecture 46 - Modeshape visualization inside a rigid walled cylinder

Lecture 47 - Sound field inside a rigid walled hollow cylinder due to initial conditions (Continued...)

Lecture 48 - Green function inside a rigid walled cylinder

Lecture 49 - Measures of sound

Lecture 50 - Measures of sound (Continued...)

Lecture 51 - Average mean square value of different frequency sinusoids

Lecture 52 - Frequency analysis of sounds in terms of third octave bands

Lecture 53 - Transient solution of the wave equation using Fourier series

Lecture 54 - Total soln of harmonically forced wave equation with initial conditions using Fourier series

Lecture 55 - Total soln of forced wave eqn with initial conditns using Laplace transform and Fourierseries

Lecture 56 - Branched systems, Helmholtz resonator

Lecture 57 - The radiation impedance and acoustic power

Lecture 58 - Acoustic potential, combined systems, special techniques for solving acoustic wave equation

Lecture 59 - Why do we take the real value of the solution in acoustic wave problems

Lecture 60 - Course summary - Part 1

Lecture 61 - Course summary - Part 2