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

Lecture 32 - Cryocoolers

Lecture 33 - Cryogenic Insulation - I

Lecture 34 - Cryogenic Insulation - II

Lecture 35 - Cryogenic Insulation - III

Lecture 36 - Vacuum Technology - I

Lecture 37 - Vacuum Technology - II

Lecture 38 - Vaccum Technology - III

Lecture 39 - Instrumentation in Cryogenics - I

Lecture 40 - Instrumentation in Cryogenics - II

Lecture 41 - Instrumentation in Cryogenics - III

Lecture 42 - Safety in Cryogenics

NPTEL : Advanced Strength of Materials (Mechanical Engineering)

Co-ordinators : Prof. S.K. Maiti

NPTEL : Heat and Mass Transfer (Mechanical Engineering)

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

NPTEL : Robotics (Mechanical Engineering)

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

NPTEL : NOC:Optimization from Fundamentals (Mechanical Engineering)

Co-ordinators : Prof. Ankur A. Kulkarni

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

Co-ordinators : Prof. Prasanna Gandhi

NPTEL : NOC:Nonlinear Adaptive Control (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

NPTEL : NOC:Nonlinear Control Design (Mechanical Engineering)

Co-ordinators : Prof. Srikant Sukumar

Lecture 1 - Course Introduction

Lecture 2 - Examples of Nonlinear systems

Lecture 3 - Existence and uniqueness of solutions

Lecture 4 - Preliminaries and notations

Lecture 5 - Preliminaries: Normed linear space

Lecture 6 - Preliminaries: Induced Matrix Norms and Signal Norms

Lecture 7 - Signal Norms and Cauchy-Schwarz Inequality

Lecture 8 - Stability - Part 1

Lecture 9 - Stability - Part 2

Lecture 10 - Stability - Part 3

Lecture 11 - Stability - Part 4

Lecture 12 - Stability - Part 5

Lecture 13 - Lyapunov stability Theorems - Part 1

Lecture 14 - Lyapunov stability Theorems - Part 2

Lecture 15 - Lyapunov stability Theorems - Part 3

Lecture 16 - Lyapunov stability Theorems - Part 4

Lecture 17 - Lyapunov stability Theorems - Part 5

Lecture 18 - Lyapunov stability Theorems - Part 6

Lecture 19 - Proofs of Lyapunov Stability Theorems - Part 1

Lecture 20 - Proofs of Lyapunov Stability Theorems - Part 2

Lecture 21 - Proofs of Lyapunov Stability Theorems - Part 3

Lecture 22 - Proofs of Lyapunov Stability Theorems - Part 4

Lecture 23 - La Salle's Invariance Principle - Part 1

Lecture 24 - La Salle's Invariance Principle - Part 2

Lecture 25 - La Salle's Invariance Principle - Part 3

Lecture 26 - La Salle's Invariance Principle - Part 4

Lecture 27 - La Salle's Invariance Principle - Part 5

Lecture 28 - La Salle's Invariance Principle - Part 6

Lecture 29 - Control Lyapunov functions - Part 1

Lecture 30 - Control Lyapunov functions - Part 2

Lecture 31 - Control Lyapunov functions - Part 3

Lecture 32 - Control Lyapunov functions - Part 4

Lecture 33 - Control Lyapunov functions - Part 5

Lecture 34 - Backstepping method for control design - Part 1

Lecture 35 - Backstepping method for control design - Part 2

Lecture 36 - Backstepping method for control design - Part 3

Lecture 37 - Backstepping method for control design - Part 4

Lecture 38 - Passivity based control - Part 1

Lecture 39 - Passivity based control - Part 2

Lecture 40 - Passivity based control - Part 3

Lecture 41 - Passivity in control systems - Part 1 (Prof. Antonio Loria)

Lecture 42 - Passivity in control systems - Part 2 (Prof. Antonio Loria)

Lecture 43 - Passivity in control systems - Part 3 (Prof. Antonio Loria)

Lecture 44 - Passivity in control systems - Part 4 (Prof. Antonio Loria)

Lecture 45 - Passivity based control - Part 4

Lecture 46 - Passivity based control - Part 5

Lecture 47 - Passivity based control - Part 6

Lecture 48 - Passivity based control - Part 7

Lecture 49 - Feedback Linearization - Part 1

Lecture 50 - Feedback Linearization - Part 2

Lecture 51 - Feedback Linearization - Part 3

Lecture 52 - Feedback Linearization - Part 4

Lecture 53 - Feedback Linearization - Part 5

Lecture 54 - Feedback Linearization - Part 6

Lecture 55 - Feedback Linearization - Part 6

Lecture 56 - Feedback Linearization - Part 7

Lecture 57 - Feedback Linearization - Part 8

Lecture 58 - Feedback Linearization - Part 9

Lecture 59 - Feedback Linearization - Part 10

Lecture 60 - Feedback Linearization - Part 11

Lecture 61 - Barbalat's Lemma

Lecture 62 - Application of Barbalat's Lemma

Lecture 63 - Adaptive control - Part 1

Lecture 64 - Adaptive control - Part 2

NPTEL : NOC:Navigating the Latest Trends in Additive Manufacturing Landscape (Mechanical Engineering)

Co-ordinators : Prof. Alankar, Prof. Akshatha Hulmani Dayananda

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

NPTEL : Project and Production Management (Mechanical Engineering)

Co-ordinators : Prof. Arun Kanda

NPTEL : NOC:RAC Product Design (Mechanical Engineering)

Co-ordinators : Prof. Sanjeev Jain

Lecture 1 - Introduction to Design

Lecture 2 - Design Considerations

Lecture 3 - Basic Concepts Psychrometry and Air-Conditioning

Lecture 4 - Refrigerants

Lecture 5 - Refrigerant Properties and Applications

Lecture 6 - Refrigeration Cycle and Components

Lecture 7 - Compressor Selection

Lecture 8 - Expansion Devices

Lecture 9 - Condensers and Evaporators

Lecture 10 - Types of Heat Exchangers and Air Conditioning Systems

Lecture 11 - Selection of Air Conditioning Systems for Hostels

Lecture 12 - Case Study on a Railway Air Conditioning System

Lecture 13 - Vibration and noise issues in railway AC systems

Lecture 14 - New product launch process

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

NPTEL : NOC:Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. S.R kale

Lecture 32 - Applications, Problem Solving: Devices, Schematic/Flow Diagrams

Lecture 33 - Applications, Problem Solving: Positive Displacement Devices

Lecture 34 - Applications, Problem Solving: Heat Exchangers

Lecture 35 - Applications, Problem Solving: Compressors, Fans and Blowers, Pumps

Lecture 36 - Applications, Problem Solving: Turbines

Lecture 37 - Applications, Problem Solving: Nozzle, Diffuser, Expansion Valve, Pipe/duct flow

Lecture 38 - Applications, Problem Solving: De-Superheater, Deaerator, Separation

Lecture 39 - Applications, Problem Solving: Unsteady processes, Filling, Evacuation

Lecture 40 - Applications, Problem Solving: Realization of Carnot cycle, Practical cycles, Air-standard cycles

Lecture 41 - Applications, Problem Solving: Materials, Compressible flow

Lecture 42 - Applications, Problem Solving: Otto cycle, Diesel cycle

Lecture 43 - Applications, Problem Solving: Closed system

Lecture 44 - Applications, Problem Solving: Open System

Lecture 45 - Properties of Ideal Gas Mixtures: Introduction to mixtures properties

Lecture 46 - Properties of Ideal Gas Mixtures: Equation of state, Conservation equations

Lecture 47 - Gas-Vapour Mixtures: Psychrometry, Moist air Properties,

Lecture 48 - Gas-Vapour Mixtures: Properties, Conservation of Mass and Energy

Lecture 49 - Gas-Vapour Mixtures: Psychrometric chart, Applications

Lecture 50 - Thermodynamics of Reacting sytems: Introduction to reacting systems and combustion

Lecture 51 - Thermodynamics of Reacting sytems: Flames, Stoichiometry

Lecture 52 - Thermodynamics of Reacting sytems: Analysis of Closed and Open Systems, Enthalpy of Formation

Lecture 53 - Phase and Chemical Equilibrium: Introduction. Chemical equilibrium. Gibbs function

Lecture 54 - Phase and Chemical Equilibrium: Equilibrium constant. Phase equilibrium

NPTEL : NOC:Solid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Ajeet Kumar

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

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

Co-ordinators : Unknown

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

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

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

Co-ordinators : Prof. Amit Gupta

NPTEL : NOC:Experimental Modal Analysis (Mechanical Engineering)

Co-ordinators : Subodh V. Modak

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

Co-ordinators : Dr. Naresh V Datla

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

Co-ordinators : Prof. (HAG) Harish Hirani

NPTEL : NOC:Design of Precision Machines (Mechanical Engineering)

Co-ordinators : Prof. Jitendra P. Khatait

NPTEL : Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S.K. Dwivedy

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

Co-ordinators : Prof. Rajiv Tiwari

NPTEL : Engineering Mechanics (Mechanical Engineering)

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

NPTEL : Mechanical Vibrations (Mechanical Engineering)

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

NPTEL : NOC:Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Manas Das

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

Co-ordinators : Prof. Dipankar N. Basu

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

Co-ordinators : Prof. Swarup bag

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

Co-ordinators : Prof. Mamilla Ravi Sankar

NPTEL : NOC:Mechanics of Machining (Mechanical Engineering)

Co-ordinators : Dr. Uday S. Dixit

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

Co-ordinators : Prof. Pranab K. Mondal

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

Co-ordinators : Prof. Mamilla Ravi Sankar

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

Co-ordinators : Prof. Poonam Kumari

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

Co-ordinators : Prof. Dipankar N. Basu

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

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

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

Lecture 33 - Basic Thermodynamics

Lecture 34 - Brayton Cycle: Introducton and General Relationships

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

Lecture 36 - Brayton Cycle with Heat Exchanger/Reheater

Lecture 37 - Brayton Cycle with Intercooler

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

Lecture 39 - Solved Examples for Real Brayton Cycle

Lecture 40 - Introduction and Performance Parameters of Propulsion System

Lecture 41 - Basics of Various Aircraft Engine

Lecture 42 - Eular Turbomachinary Equation

Lecture 43 - Introduction and Flow Analysis of Centrifugal Compressors

Lecture 44 - Thermodynamics Analysis of Centrifugal Compressors

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

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

Lecture 47 - Complete Analysis of Axial Flow Gas Turbine

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

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

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

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

Co-ordinators : Prof. Pankaj Biswas

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

Co-ordinators : Prof. Mamilla Ravi Sankar

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

Co-ordinators : Prof. Swarup bag

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

Co-ordinators : Prof. Manmohan Pandey

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

Co-ordinators : Prof. Dipankar N. Basu

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

Co-ordinators : Prof. Dipankar N. Basu

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

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

Co-ordinators : Prof. Prasenjit Khanikar

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

Co-ordinators : Prof. P.S. Robi

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

Co-ordinators : Prof. Shyamanta M. Hazarika

NPTEL : NOC:Aircraft Propulsion (Mechanical Engineering)

Co-ordinators : Dr. Vinayak Kulkarni

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

Co-ordinators : Prof. Amaresh Dalal

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

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Automation in Manufacturing (Mechanical Engineering)

Co-ordinators : Dr. Shrikrishna N. Joshi

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

Co-ordinators : Prof. Niranjan Sahoo

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

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

NPTEL : NOC:Computational Continuum Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Sachin Singh Gautam

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

Co-ordinators : Prof. Amaresh Dalal

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

Co-ordinators : Prof. Poonam Kumari

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

Co-ordinators : Prof. Swarup bag

Lecture 1 - Properties, Modelling approaches, Process modelling and Optimization

Lecture 2 - Fusion welding - 1

Lecture 3 - Fusion welding - 2

Lecture 4 - Soldering, Brazing, Solid-state welding processes

Lecture 5 - Advanced welding processes

Lecture 6 - Advances in laser microwelding

Lecture 7 - Additive manufacturing processes

Lecture 8 - Elastic stress analysis - I

Lecture 9 - Elastic stress analysis - II and Potential energy method

Lecture 10 - Three-Dimensional element

Lecture 11 - Weighted residual method

Lecture 12 - Material nonlineaity - I

Lecture 13 - Material nonlineaity - II

Lecture 14 - Fluid flow and Natural coordinate system - I

Lecture 15 - Natural coordinate system in 3D and XFEM

Lecture 16 - Introduction to heat source model

Lecture 17 - Heat source models in welding - I

Lecture 18 - Heat source models in welding - II

Lecture 19 - Heat source model for Keyhole mode and solid state welding

Lecture 20 - Implementation of FEM in fusion welding processes

Lecture 21 - Implementation of FEM for fluid flow in fusion welding processes

Lecture 22 - FEM modeling of EBW and RSW

Lecture 23 - FEM modeling of FSW and hybrid FSW

Lecture 24 - Demonstration of thermal model development using commercial software

Lecture 25 - Fluid flow modeling in welding processes

Lecture 26 - Heat transfer and fluid flow analysis in quasi-steady state

Lecture 27 - Prediction of free surface profile

Lecture 28 - Principle stress, Hydrostatic and Deviatoric Components of Stress

Lecture 29 - Yield Function, Von Mises Yield Surface and Hardening rule

Lecture 30 - Material models, Residual stress and distortion

Lecture 31 - Phase transformation effect on Residual stress and distortion

NPTEL : NOC:Nonlinear Vibration (Mechanical Engineering)

Co-ordinators : Prof. S. K. Dwivedy

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

Co-ordinators : Prof. Deepak Sharma

NPTEL : NOC:Viscous Fluid Flow (Mechanical Engineering)

Co-ordinators : Prof. Amaresh Dalal

NPTEL : NOC:Welding Application Technology (Mechanical Engineering)

Co-ordinators : Prof. Pankaj Biswas

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

Co-ordinators : Prof. Sajan Kapil

NPTEL : NOC:Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Niranjan Sahoo

Lecture 1 - Thermodynamic Systems and Pure Substance

Lecture 2 - Heat and Work Transfer - First Law of Thermodynamics

Lecture 3 - Second Law of Thermodynamics

Lecture 4 - Entropy and Exergy

Lecture 5 - Introduction to Steam Power Plant

Lecture 6 - Thermodynamics aspects of Steam Power Plant-Efficiency and Work ration

Lecture 7 - Rankine Cycle and its analysis

Lecture 8 - Improvement in Rankine Cycle Efficiency: Superheating and Reheating

Lecture 9 - Improvement in Rankine Cycle Efficiency: Reheating and Regenerative Methods

Lecture 10 - Improvement in Rankine Cycle Efficiency: Regenerative Methods

Lecture 11 - Regenerative Cycles

Lecture 12 - Impulse Steam Turbine: Velocity Diagrams,Work Transfer,Blade Efficiency

Lecture 13 - Impulse Steam Turbine: Velocity Diagrams,Work Transfer,Blade Efficiency (Continued...)

Lecture 14 - Reaction Steam Turbine

Lecture 15 - Reaction Steam Turbine: Velocity Diagram, Work transfer, Blade Efficiency

Lecture 16 - Steam Nozzle: Analysis and Efficiency

Lecture 17 - Steam Nozzle: Analysis and Efficiency (Continued...)

Lecture 18 - Boilers and Condensers

Lecture 19 - Condensers and Second Law Analysis of Steam Power cycle

Lecture 20 - Exergy Analysis of a Steam Turbine

Lecture 21 - Numerical Problems: Steam Power Cycle

Lecture 22 - IC engine-Components, Nomenclature and Classifications

Lecture 23 - Basic Engine Cycle and Engine Kinematic Analysis

Lecture 24 - Engine Operating Characteristics

Lecture 25 - Thermodynamics Analysis of Air Standard Cycles

Lecture 26 - Valve Timing Diagram and Fuel-Air Cycle

Lecture 27 - Thermochemistry and Fuel Characteristics

Lecture 28 - Combustion Phenomena in Engines

Lecture 29 - Heat Transfer Analysis in Engines

Lecture 30 - Exergy Analysis and Engine Emission/Pollution

Lecture 31 - Gas Turbine Engine-Components and Thermal Circuit

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 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 : NOC:Engine System and Performance (Mechanical Engineering)

Co-ordinators : Prof. Pranab K. Mondal

NPTEL : NOC:Fundamentals of Thermo-Mechanical and Fatigue Analysis of Welded Structure (Mechanical Engineering)

Co-ordinators : Prof. Pankaj Biswas

NPTEL : NOC:Industrial Engineering and Operations Research (Mechanical Engineering)

Co-ordinators : Prof. Uday Shanker Dixit

NPTEL : Acoustics (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : Advanced Machining Processes (Mechanical Engineering)

Co-ordinators : Prof. Vijay K. Jain

NPTEL : Biomicroelectromechanical systems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : Computer Aided Engineering Design (Mechanical Engineering)

Co-ordinators : Dr. Anupam Saxena

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

Co-ordinators : Dr. Bhaskar Dasgupta

NPTEL : Dynamics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Amitabha Ghosh

NPTEL : Finite Element Method (Mechanical Engineering)

Co-ordinators : Prof. C.S. Upadhyay

NPTEL : Kinematics of Machines (Mechanical Engineering)

Co-ordinators : Prof. Ashok K Mallik

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

Co-ordinators : Dr. Shantanu Bhattacharya

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

Co-ordinators : Dr. Anupam Saxena

NPTEL : NOC:BioMEMS and Microsystems (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Manufacturing Systems Technology (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

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

Co-ordinators : Dr. Shantanu Bhattacharya

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

Co-ordinators : Prof. Nachiketa Tiwari

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

Co-ordinators : Prof. Nachiketa Tiwari

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

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 1 - Introduction to Manufacturing Process Tecnology

Lecture 2 - Structure of Matter (Bonding of Solids,Crystal Structures)

Lecture 3 - Brief introduction of non-conventional machining processes

Lecture 4 - Structure of matters (bonding of solids, crystal structures)

Lecture 5 - Elastic and Plastic Deformation

Lecture 6 - Crystal imperfaction and dislocation

Lecture 7 - Plastic Deformation

Lecture 8 - Material Properties, Stress Strain Diagram for differnt types of materials

Lecture 9 - Friction and Wear, Solid solutions

Lecture 10 - Equilibrium Phase Diagram

Lecture 11 - Iron-carbon equilibrium phase diagram

Lecture 12 - Control of material properties (Alloying and heat treatment), Mechanical properties and Recrystallization

Lecture 13 - Introduction To Casting Process

Lecture 14 - Pattern and Mold Design

Lecture 15 - Mold Making Procedures

Lecture 16 - Fundamentals of Melting and Furnaces & Pouring and Gating Design

Lecture 17 - Vertical and Bottom Gating Systems Edit Lesson

Lecture 18 - Numerical Estimation To Find Mold Filling Time and Mold Design

Lecture 19 - Effects of friction and velocity distribution in time of filling

Lecture 20 - Numerical design of gating systems using frictional and bending losses

Lecture 21 - Principle of cooling and solidification in single and multiphase systems

Lecture 22 - Estimation of rate of solidification

Lecture 23 - Principles of cooling and solidification of casting

Lecture 24 - Modeling of Solidification Rates of Thin Casting in a Metal Mold

Lecture 25 - Solidification with Predominant Interface Resistance

Lecture 26 - Solidification with Constant Casting Surface Temperature

Lecture 27 - Solidification of Casting with Predominant Resistance in Mold and Solidified Metal

Lecture 28 - Solidification Time for Permanent Mold Casting

Lecture 29 - Solidification with Constant Casting Surface

Lecture 30 - Riser Design and Placement - Part 1

Lecture 31 - Riser Design and Placement - Part 2

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

Lecture 1 - Recap - I

Lecture 2 - Recap - II

Lecture 3 - Recap - III

Lecture 4 - Determination of Phase Diagram (Experimentally) - I

Lecture 5 - Determination of Phase Diagram (Experimentally) - II

Lecture 6 - Determination of Phase Diagram (Thermodynamically)

Lecture 7 - Effect of pressure on phase transformation temperature and concept of equilibrium between condensed and vapor phase

Lecture 8 - Effect of different parameters on heat treatment and concept of saturation vapor pressure with examples

Lecture 9 - Title: Formation of ideal solid or liquid solution and (G-X) diagrams for ideal solutions (Part-I)

Lecture 10 - G-X diagrams (Part- II) and concept of chemical potential (Micro Sign) from G-X diagrams.

Lecture 11 - Concept of common tangent for equilibrium between two phases

Lecture 12 - Expressions for equilibrium of two phases - I

Lecture 13 - Expressions for equilibrium of two phases - II

Lecture 14 - Expressions for equilibrium of two phases - III

Lecture 15 - Determining nucleation of phases using G-X plot

Lecture 16 - Î”G for nucleation and overall transformation, concepts of solid state transformation including precipitation and Quasi-Chemical Model (QCM)

Lecture 17 - Introduction to real solutions and expression of Î”Hmix based on the Quasi-Chemical Model (QCM)

Lecture 18 - Expression for Î”Hmix as a function of interaction energy and mole fraction, based on the QCM - Part I

Lecture 19 - Expression for Î”Hmix as a function of interaction energy and mole fraction, based on the QCM - Part II

Lecture 20 - Graphical representation of Î”Gmix, Î”Hmix, and -TÎ”Smix for real solutions and evolution of eutectic phase diagram from the G-X plots

Lecture 21 - Effect of Î”Hmix on determination of phase diagrams (same crystal structure)

Lecture 22 - Effect of Î”Hmix on determination of phase diagrams (Continued...)

Lecture 23 - Importance of phase diagrams

Lecture 24 - Effect of heat treatment on microstructure evolution in steel - I

Lecture 25 - Effect of heat treatment on microstructure evolution in steel - II

Lecture 26 - Recap of homogeneous and heterogeneous nucleation for solid to solid transformation

Lecture 27 - Nucleation rate and its dependence on T (temp. of interest), Î”T, Î”G v and Î”G* and, introduction to growth kinetics

Lecture 28 - Growth kinetics (Continued...)

Lecture 29 - Growth rate variation with undercooling and kinetics of overall phase transformation

Lecture 30 - Implication of Avramiâ€™s equation with example on excel spreadsheet

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

Co-ordinators : Dr. Krishanu Biswas

NPTEL : NOC:Manufacturing of Composites (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar

NPTEL : NOC:Applied Ergonomics (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

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

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

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

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Design Practice (Mechanical Engineering)

Co-ordinators : Dr. Shantanu Bhattacharya

Lecture 32 - Failure Mode Effect Analysis

NPTEL : NOC:Introduction to Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

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

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

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

Co-ordinators : Dr. Ashish Garg

NPTEL : NOC:Advanced Composites (Mechanical Engineering)

Co-ordinators : Prof. Nachiketa Tiwari

NPTEL : NOC:Engineering Metrology (Mechanical Engineering)

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

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

Co-ordinators : Prof. Bisakh Bhattacharya

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

Co-ordinators : Dr. Shantanu Bhattacharya

NPTEL : NOC:Rapid Manufacturing (Mechanical Engineering)

Co-ordinators : Prof. J. Ramkumar

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

Co-ordinators : Prof. Ashoke De

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

Lecture 1 - Introduction to Acoustic Wave Propagation

Lecture 2 - D'Alemberts's solution and 1-D Continuity equation

Lecture 3 - Muffler Acoustics-Application to Automotive Exhaust Noise Control

Lecture 4 - Linearization of governing equations, and Development of 1-D Acoustic wave and Helmholtz equation

Lecture 5 - Solution of 1-D Helmholtz equation: Propagation in 1-D ducts/pipes

Lecture 6 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Derivation

Lecture 7 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Solution

Lecture 8 - 3-D Acoustic Wave Equation in Rectangular and Circular Waveguides: Derivation, Modal Solution and Concept of Cut-on Frequency

Lecture 9 - Sound Pressure Level, Intensity Level and Sound Power Level

Lecture 10 - Acoustic Impedance and Reflection Coefficient

Lecture 11 - Lumped System Analysis: Inertance and Compliance

Lecture 12 - Lumped Analysis of a Uniform Pipe Closed/Open at an End, Concept of End Correction

Lecture 13 - Helmholtz Resonator, Electro-Acoustic Analogy and Layout of a typical engine exhaust system

Lecture 14 - Muffler Performance Measures: Insertion Loss

Lecture 15 - Muffler Performance Measures: Transmission Loss and Level Difference

Lecture 16 - Lumpted Analysis of a Tube, Simple Area Discontinuity and Transfer Matrices

Lecture 17 - Sudden area Discontinuity (Continued...)

Lecture 18 - Simple Expansion Chamber Analysis Using Transfer Matrix Method

Lecture 19 - Transmission Loss (TL) Graph for a Simple Expansion Muffler (MATLAB)

Lecture 20 - Extended-Inlet and Extended-Outlet Muffler Analysis

Lecture 21 - Extended-Inlet and Extended-Outlet Muffler Analysis (Continued...)

Lecture 22 - TL Analysis of Extended-Inlet and Extended-Outlet Muffler (MATLAB)

Lecture 23 - TL Analysis of Side-Inlet and Side-Outlet Muffler Using Transfer Matrix Method

Lecture 24 - Wave Propagation in Gradually Varying Area Ducts: Websterâ€™s Horn Equation

Lecture 25 - Websterâ€™s Horn Equation (Continued...) and Exponential Ducts

Lecture 26 - Solution of Websterâ€™s Horn Equation for Conical Ducts

Lecture 27 - TL analysis for Conical Muffler Configurations (MATLAB)

Lecture 28 - Segmentation Approach for Analysing Gradually Varying Area Ducts (MATLAB)

Lecture 29 - Acoustic Intensity (Energy Flux) in a Pipe with Mean Flow, and Transmission Loss Expression

Lecture 30 - Aeroacoustic State Variables Transfer Matrix for a Tubular Element (Uniform Pipe)

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

Co-ordinators : Prof. Jishnu Bhattacharya

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

Co-ordinators : Prof. Sounak Kumar Choudhury

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

Co-ordinators : Prof. Gautam Biswas

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

Co-ordinators : Prof. Sounak Kumar Choudhury

NPTEL : NOC:Introduction to Turbomachinery (Mechanical Engineering)

Co-ordinators : Prof. Subrata Sarkar

Lecture 1 - Introduction and Classification

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

Lecture 3 - Review of the Fundamental Laws

Lecture 4 - Equation of Motion in Rotating Frame

Lecture 5 - Euler Equation for Turbomachinery

Lecture 6 - Euler Equation for Turbomachinery: Illustration

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

Lecture 8 - Similarity Analysis - I

Lecture 9 - Similarity Analysis - II

Lecture 10 - Similarity Analysis - III

Lecture 11 - Problem Session - II

Lecture 12 - Cassade Analysis - I

Lecture 13 - Cassade Analysis - II

Lecture 14 - Cassade Analysis - III

Lecture 15 - Cassade Analysis - IV

Lecture 16 - Cassade Analysis (Problem Session)

Lecture 17 - Gas Turbine Cycle Analysis - I

Lecture 18 - Gas Turbine Cycle Analysis - II

Lecture 19 - Gas Turbine Cycle Analysis - III

Lecture 20 - Gas Turbine Cycle Analysis - IV

Lecture 21 - Gas Turbine Cycle Analysis - V

Lecture 22 - Illustrative Examples Gas Turbine Cycle

Lecture 23 - Illustrative Examples Jet Propulsion

Lecture 24 - Axial Flow Compressor - I

Lecture 25 - Axial Flow Compressor - II

Lecture 26 - Axial Flow Compressor - III

Lecture 27 - Axial Flow Compressor - IV

Lecture 28 - Illustrative Examples Axial Flow Compressor

Lecture 29 - Centrifugal Compressor - I

Lecture 30 - Centrifugal Compressor - II

Lecture 31 - Centrifugal Compressor - III

NPTEL : NOC:Robot Motion Planning (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Metal Additive Manufacturing (Mechanical Engineering)

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

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

Co-ordinators : Prof. Gautam Biswas

NPTEL : NOC:Advanced Robotics (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Applied Numerical Methods (Mechanical Engineering)

Co-ordinators : Prof. Malay K. Das

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

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

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

Co-ordinators : Prof. Jayant K. Singh

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

Co-ordinators : Prof. Shantanu Bhattacharya

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

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

Lecture 32 - Stress Concentration and Notch Sensitivity - Part 1

Lecture 33 - Stress Concentration and Notch Sensitivity - Part 2

Lecture 34 - Brittleness and ductility

Lecture 35 - Testing for Tension

Lecture 36 - Testing for Compression

Lecture 37 - Testing for bending

Lecture 38 - Testing for impact loads

Lecture 39 - Testing for hardness, and fracture

Lecture 40 - Spring-Mass Systems - Part 1

Lecture 41 - Spring-Mass Systems - Part 2

Lecture 42 - Gears: Basic Concepts

Lecture 43 - Cam and Follower Design

Lecture 44 - Couplings and Shafts

Lecture 45 - Keys, Nuts, Bolts, Screws and Fasteners

Lecture 46 - Chains, Pulleys, and Belts

Lecture 47 - Clutches, Brakes and Flywheels

Lecture 48 - Permanent Joints

Lecture 49 - Vibration and Acoustics

Lecture 50 - Introduction to Engineering Statistics

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

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

NPTEL : NOC:Advanced Robotics Applications (Mechanical Engineering)

Co-ordinators : Prof. Ashish Dutta

NPTEL : NOC:Basics of Mechanical Engineering - 3 (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

NPTEL : Manufacturing Processes II (Mechanical Engineering)

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

NPTEL : Refrigeration and Air Conditioning (Mechanical Engineering)

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

NPTEL : Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

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

Co-ordinators : Prof. S.K. Som

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

Co-ordinators : Prof. S. Chakraborty

NPTEL : Micro fluidics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

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

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

NPTEL : NOC:Vibrations of Structures (Mechanical Engineering)

Co-ordinators : Prof. A. Dasgupta

NPTEL : NOC:Fluid Machines (Mechanical Engineering)

Co-ordinators : Prof. S.K. Som

Lecture 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

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

Co-ordinators : Prof. Asimava Roy Choudhury

NPTEL : NOC:Laws of Thermodynamics (Mechanical Engineering)

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

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

Co-ordinators : Prof. PK Das

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

Co-ordinators : Prof. Ajay M Sidpara

Lecture 32 - Components of machine tool (Continued...)

Lecture 33 - Components of machine tool (Continued...)

Lecture 34 - Components of machine tool (Continued...)

Lecture 35 - Components of machine tool (Continued...)

Lecture 36 - Components of machine tool (Continued...)

Lecture 37 - Components of machine tool (Continued...)

Lecture 38 - Components of machine tool (Continued...)

Lecture 39 - Components of machine tool (Continued...)

Lecture 40 - Components of machine tool (Continued...)

Lecture 41 - Components of machine tool (Continued...)

Lecture 42 - Components of machine tool (Continued...)

Lecture 43 - Components of machine tool (Continued...)

Lecture 44 - Components of machine tool (Continued...)

Lecture 45 - Components of machine tool (Continued...)

Lecture 46 - Components of machine tool (Continued...)

Lecture 47 - Components of machine tool (Continued...)

Lecture 48 - Components of machine tool (Continued...)

Lecture 49 - Micro tools

Lecture 50 - Micro tools (Continued...)

Lecture 51 - Micro tools (Continued...)

Lecture 52 - Fabrication of micro tool by EDM process

Lecture 53 - Micro tools (Continued...)

Lecture 54 - Micro machines

Lecture 55 - Micro machines (Continued...)

Lecture 56 - Diamond turning

Lecture 57 - Diamond turning (Continued...)

Lecture 58 - Diamond turning (Continued...)

Lecture 59 - Diamond turning (Continued...)

Lecture 60 - Sensors and metrology for micro machining

Lecture 61 - Sensors and metrology for micro machining (Continued...)

Lecture 62 - Sensors and metrology for micro machining (Continued...)

Lecture 63 - 3D surface measurement using interferometer

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

Co-ordinators : Prof. Amiya Ranjan Mohanty

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

Co-ordinators : Prof. Asimava Roy Choudhury

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

Co-ordinators : Prof. Rathindranath Maiti

Lecture 1 - Introduction - Motivation and Theme of the Course

Lecture 2 - Laws of Gearing, Kinematics and Geometry - Part I

Lecture 3 - Laws of Gearing, Kinematics and Geometry - Part II

Lecture 4 - Involute Toothed Gear- Properties and Terminology

Lecture 5 - Tutorial

Lecture 6 - Involute Straight Tooth Spur Gear

Lecture 7 - Helical Tooth Spur Gear and Loads on Gear Shaft

Lecture 8 - Design of Bevel Gear

Lecture 9 - Crossed Helical Gear - I

Lecture 10 - Crossed Helical Gear - II and Worm Gear

Lecture 11 - Gear Unit Design - Selection of Stage Ratios, Pinion and Gear Teeth Numbers

Lecture 12 - Gear Unit Design - First Stage Pinion and Gear Design- I (Module on Beam Strength Basis)

Lecture 13 - Gear Unit Design - Failure of Gear Tooth (Probable Dynamic Load and Wear Load Capacity)

Lecture 14 - Gear Unit Design - 1st. Stage Pinion and Gear Design-II (Probable Dynamic Load and Wear Load Capacity and Finalizing 1st. Stage Pinion and Gear set)

Lecture 15 - Gear Unit Design - 1st. Layout (After Gear Design)

Lecture 16 - Bearing Arrangement - Gear Box Shafts

Lecture 17 - Bearing Load Calculation - Intermediate Shaft

Lecture 18 - Bearing Selection and Introduction to Shaft Design Verification

Lecture 19 - Design Verification of Gear Box Shafts

Lecture 20 - Development (Layout) of Intermediate Shaft

Lecture 21 - Development (Layout) of Input Shaft and Integral Pinion

Lecture 22 - Development (Layout) of Output Shaft and 2nd. Stage (Output) Gear

Lecture 23 - Development (Layout) of Output Shaft (Continued...), Loads on Shaft and Bearings

Lecture 24 - Output Shaft-Bearing Lives

Lecture 25 - Design Verification of Output Shaft

Lecture 26 - Design Verification of Input Shaft (including Bearing Life Estimation)

Lecture 27 - Finalizing Design including the Sizes of the Keys

Lecture 28 - Development of Plan and Elevation of Gear Reduction Unit - I

Lecture 29 - Development of Plan and Elevation of Gear Reduction Unit - II

Lecture 30 - Development of Plan and Elevation of Gear Reduction Unit - III

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

Lecture 32 - Plate fin heat exchanger : Multistream

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

Lecture 34 - Plate fin heat exchanger : Multistream Analysis

Lecture 35 - Plate fin heat exchanger : Layer Stacking

Lecture 36 - Phase change heat exchangers

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

Lecture 38 - Surface Condenser

Lecture 39 - Surface Condenser (Continued...)

Lecture 40 - Surface Condenser (Continued...)

Lecture 41 - Surface Condenser (Continued...)

Lecture 42 - In tube condensation

Lecture 43 - Heat pipes and Heat pipe heat exchangers

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

Lecture 45 - Heat pipes and Heat exchangers

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

Lecture 47 - Micro Heat Exchanger Introduction

Lecture 48 - Micro scale Heat Transfer

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

Lecture 50 - Micro Channel

Lecture 51 - Micro Heat Exchanger

Lecture 52 - Regenerators

Lecture 53 - Fixed Bed Regenerator Analysis

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

Lecture 55 - Fixed Bed Regenerator (Numerical)

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

Lecture 57 - Fouling in Heat Exchangers

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

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

Lecture 60 - Direct Contact heat exchanger

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

Lecture 62 - Heat exchanger network synthesis

Lecture 63 - Heat exchanger network

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

NPTEL : NOC:Robotics (Mechanical Engineering)

Co-ordinators : Prof. Dilip Kumar Pratihar

NPTEL : NOC:Computational Fluid Dynamics (Mechanical Engineering)

Co-ordinators : Prof. S. Chakraborty

NPTEL : NOC:Concepts of Thermodynamics (Mechanical Engineering)

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

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

Co-ordinators : Prof. A Bhattacharya

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

Co-ordinators : Prof. A. Dasgupta

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

Co-ordinators : Prof. Suman Chakraborty

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

Co-ordinators : Prof. S. Chakraborty

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 1 - Introduction - I

Lecture 2 - Introduction - II

Lecture 3 - Introduction - III

Lecture 4 - Introduction - IV

Lecture 5 - Introduction - V

Lecture 6 - Introduction - VI

Lecture 7 - Conic Sections - I

Lecture 8 - Conic Sections - II

Lecture 9 - Practice - I

Lecture 10 - Practice - II

Lecture 11 - Conic Sections - III

Lecture 12 - Conic Sections - IV

Lecture 13 - Conic Sections - V

Lecture 14 - Conic Sections - VI

Lecture 15 - Conic Sections - VII

Lecture 16 - Conic Sections - VIII

Lecture 17 - Conic Sections - IX

Lecture 18 - Conic Sections - X

Lecture 19 - Conic Sections - XI

Lecture 20 - Conic Sections - XII

Lecture 21 - Orthographic Projections I - Part 1

Lecture 22 - Orthographic Projections I - Part 2

Lecture 23 - Orthographic Projections I - Part 3

Lecture 24 - Orthographic Projections I - Part 4

Lecture 25 - Orthographic Projections I - Part 5

Lecture 26 - Orthographic Projections I - Part 6

Lecture 27 - Orthographic Projections I - Part 7

Lecture 28 - Orthographic Projections I - Part 8

Lecture 29 - Orthographic Projections I - Part 9

Lecture 30 - Orthographic Projections I - Part 10

Lecture 31 - Orthographic Projections II - Part 1

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

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

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

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

NPTEL : NOC:Microfluidics and Nanofluidics (Mechanical Engineering)

Co-ordinators : Prof. Suman Chakraborty

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 : NOC:COBOTS: Theory and Practice (Mechanical Engineering)

Co-ordinators : Prof. Arun Dayal Udai

NPTEL : NOC:Applied Elasticity (Mechanical Engineering)

Co-ordinators : Prof. Soham Roychowdhury

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

Co-ordinators : Prof. Somnath Roy

NPTEL : Advanced Gas Dynamics (Mechanical Engineering)

Co-ordinators : Dr. Rinku Mukherjee

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

Co-ordinators : Prof. C. Balaji

NPTEL : Engineering Fracture Mechanics (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : Experimental Stress Analysis (Mechanical Engineering)

Co-ordinators : Prof. K. Ramesh

NPTEL : Rocket Propulsion (Mechanical Engineering)

Co-ordinators : Prof. K. Ramamurthi

NPTEL : Advanced Finite Elements Analysis (Mechanical Engineering)

Co-ordinators : Dr. R. Krishnakumar

NPTEL : Advanced Operations Research (Mechanical Engineering)

Co-ordinators : Prof. G. Srinivasan

NPTEL : Fundamentals of Operations Research (Mechanical Engineering)

Co-ordinators : Prof. G. Srinivasan

NPTEL : Introduction to Finite Element Method (Mechanical Engineering)

Co-ordinators : Dr. R. Krishnakumar

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

NPTEL : Spray Theory and Applications (Mechanical Engineering)

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

NPTEL : Conduction And Radiation (Mechanical Engineering)

Co-ordinators : Prof. C. Balaji

NPTEL : Gas Dynamics and Propulsion (Mechanical Engineering)

Co-ordinators : Prof. V. Babu

NPTEL : Microfluidics (Mechanical Engineering)

Co-ordinators : Dr. Ashis Kumar Sen

NPTEL : Convective Heat Transfer (Mechanical Engineering)

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

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

Co-ordinators : Prof. K. Ramamurthi

NPTEL : Metrology (Mechanical Engineering)

Co-ordinators : Dr. K. Sadashivappa

Lecture 1 - Introduction to Metrology

Lecture 2 - Metrology terminologies

Lecture 3 - Measurement errors

Lecture 4 - Linear measuring instruments Â– 1 (Angle plate, steel rule, spring calipers)

Lecture 5 - Linear measuring instruments Â– 2 (Combination set, Vernier calipers)

Lecture 6 - Linear measuring instruments Â– 3 (Height gauge, Micrometers Â– 1)

Lecture 7 - Linear measuring instruments Â– 4 (Micrometers Â– 2, Bore gauge)

Lecture 8 - Linear measuring instruments Â– 5 (Dial indicators, thickness gauges, depth gauges)

Lecture 9 - Manufacturing tolerances and fits

Lecture 10 - Terminologies of limits fits and tolerances

Lecture 11 - Numerical problems on fit and tolerances

Lecture 12 - Selection of fits, Geometrical tolerances

Lecture 13 - Positional tolerances

Lecture 14 - Limit gauging - 1

Lecture 15 - Limit gauging - 2

Lecture 16 - Design of limit gauges

Lecture 17 - Measurement of straightness, flatness and squareness

Lecture 18 - Perpendicularity measurement

Lecture 19 - Basics of surface roughness

Lecture 20 - Surface finish parameters

Lecture 21 - Stylus type surface finish measuring instruments

Lecture 22 - Non-contact type surface finish measuring instruments

Lecture 23 - Screw thread production and terminology

Lecture 24 - Measurement of screw thread elements

Lecture 25 - Introduction to gears

Lecture 26 - Measurement of gear elements

Lecture 27 - Angle measurement - 1

Lecture 28 - Angle measurement - 2

Lecture 29 - Radius measurement, Contact angle measurement

Lecture 30 - Basics of interferometry

Lecture 31 - Interferometers

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

Co-ordinators : Prof. Mahesh Panchagnula

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

Co-ordinators : Dr.S.Vengadesan

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

Co-ordinators : Dr. Rinku Mukherjee

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

Co-ordinators : Prof.A. Sameen

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

Co-ordinators : Prof. K. Ramesh

Lecture 32 - Selection of an experimental technique - Part 2

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

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

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

Co-ordinators : Dr. Arvind Pattamatta

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

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

Lecture 1 - Overview of Experimental Stress Analysis

Lecture 2 - Optical Methods Work as Optical Computers

Lecture 3 - Stress, Strain and Displacement Fields

Lecture 4 - Completeness of a numerical solution

Lecture 5 - Fringe Patterns - Richness of Qualitative Information

Lecture 6 - Multi-Scale Analysis in Experimental Mechanics

Lecture 7 - Selection of an Experimental Technique

Lecture 8 - Introduction to Transmission Photoelasticity

Lecture 9 - Ordinary and Extraordinary Rays

Lecture 10 - Light Ellipse, Passage of Light Through a Crystal Plate

Lecture 11 - Retardation Plates, Stress-optic Law

Lecture 12 - Plane Polariscope

Lecture 13 - Jones Calculus

Lecture 14 - Circular Polariscope

Lecture 15 - Determination of Photoelastic Parameters at an Arbitrary Point

Lecture 16 - Tardyâ€™s Method of Compensation

Lecture 17 - Calibration of Photoelastic Materials

Lecture 18 - Fringe Thinning Methodologies

Lecture 19 - Fringe Ordering in Photoelasticity

Lecture 20 - Miscellaneous Topics in Transmission Photoelasticity

Lecture 21 - Three Dimensional Photoelasticity

Lecture 22 - Overview of Digital Photoelasticity

Lecture 23 - Introduction to Photoelastic Coatings

Lecture 24 - Correction Factors for Photoelastic Coatings

Lecture 25 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatings

Lecture 26 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings

Lecture 27 - Analysis of Brittle Coatings

Lecture 28 - Introduction to Strain Gauges

Lecture 29 - Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes

Lecture 30 - Strain Gauge Alloys, Carriers and Adhesives

Lecture 31 - Performance of Strain Gauge System

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

Lecture 1 - Introduction

Lecture 2 - Material Property Landscape

Lecture 3 - Crystal Structure-1 (Platonic Solids)

Lecture 4 - Crystal Structure-2 (Unit Cell, Lattice, Crystal)

Lecture 5 - Crystal Structure-3 (Bravais lattice, Symmetry in Crystals)

Lecture 6 - Crystal Structure-4 (Miller Indices for Crystallographic Points and Directions)

Lecture 7 - Crystal Structure-5 (Miller-Brvais Indices, Linear and Planar Density)

Lecture 8 - Crystal Structure-6 (Planar desnity, Close-Packed Structures, Stacking Faults)

Lecture 9 - Crystal Structure-7 (Single Crystal and Polycrystalline Materials)

Lecture 10 - Crystal Structure-8 (X-Ray Diffraction and Determination of Structure)

Lecture 11 - Defects in Crystalline Materials-1 (Types of Crystalline Defects)

Lecture 12 - Defects in Crystalline Materials-1 (Point Defects)

Lecture 13 - Defects in Crystalline Materials-1 (Equilibrium Concentration of Vacancies)

Lecture 14 - Defects in Crystalline Materials-1 (Theoretical Shear Strength)

Lecture 15 - Defects in Crystalline Materials-2 (Effect of Point Defects)

Lecture 16 - Defects in Crystalline Materials-2 (Point Defects and Solid Solutions)

Lecture 17 - Defects in Crystalline Materials-3 (Line Defects, Types of Dislocations and their Characteristics)

Lecture 18 - Defects in Crystalline Materials-4 (Slip Systems, Burger's Vector and Dislocation Motion)

Lecture 19 - Defects in Crystalline Materials-4 (Slip in Single Crystals and Resolved Shear Stress)

Lecture 20 - Defects in Crystalline Materials-5 (Different Stages of Slip in Single Crystla Materials)

Lecture 21 - Defects in Crystalline Materials-5 (Geometry and Slip, Stress Field Around a Dislocation and Deformation Twinning)

Lecture 22 - Defects in Crystalline Materials-6 (Twinning, Interfacial Defects and Volume Defects)

Lecture 23 - Defects in Crystalline Materials-6 (Strengthening Mechanisms)

Lecture 24 - Defects in Crystalline Materials-7 (Plastic deformation in polycrystalline materials, Softening Mechanisms)

Lecture 25 - Mechanical Properties of Materials (Concept of Stress Tensor)

Lecture 26 - Mechanical Properties (Tension Test-Elastic Deformation)

Lecture 27 - Mechanical Properties (Tension Test - Plastic Deformation)

Lecture 28 - Mechanical Properties (Tension Test - Plastic Deformation)

Lecture 29 - Mechanical Properties (Hardness Test)

Lecture 30 - Static Failure Theories (Introduction, Definition of Failure)

Lecture 31 - Static Failure Theories (General form of failure theory, Stress tensor, Principal stress)

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

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

NPTEL : Introduction to Turbomachines (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

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

Co-ordinators : Prof. Santhakumar Mohan

NPTEL : Inverse Methods in Heat Transfer (Mechanical Engineering)

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

NPTEL : Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. Babu Viswanathan

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

Co-ordinators : Unknown

NPTEL : NOC:Interfacial Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Harish N Dixit

NPTEL : Applied Thermodynamics (Mechanical Engineering)

Co-ordinators : Dr. Babu Viswanathan

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

Co-ordinators : Prof .Dr.C. Balaji

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

Co-ordinators : Prof. Balaji Srinivasan

NPTEL : NOC:Sustainable Energy Technology (Mechanical Engineering)

Co-ordinators : Dr. Sayak Banerjee

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

Co-ordinators : Prof. K. Ramesh

NPTEL : NOC:Engineering Thermodynamics (Mechanical Engineering)

Co-ordinators : Prof. V. Raghavan

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 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

Lecture 1 - Course Introduction, Evaluation, and Application of Gearbox

Lecture 2 - Machine Tool Gearbox: GP, Step Ratio, Preferred Numbers, Structural Formula and Rules of Optimum Gearbox

Lecture 3 - Machine Tool Gearbox: Ray Diagram Construction

Lecture 4 - Machine Tool Gearbox: Kinematic Diagram Construction

Lecture 5 - Machine Tool Gearbox: Centre Distance and Teeth Calculation

Lecture 6 - Machine Tool Gearbox: Problem Solving

Lecture 7 - Automobile Gearbox: General Engine Operation and Transmission Types

Lecture 8 - Automobile Gearbox: Saw Tooth Diagram and Design Procedure for Gearbox

Lecture 9 - Automobile Gearbox: Problem Solving and Tyre Specification

Lecture 10 - Automobile Gearbox: Basic Transmission Types and Kinematic Diagram

Lecture 11 - Automobile Gearbox: Gear Failures and Material Selection

Lecture 12 - Automobile Gearbox: Module Calculation Concept - Part I

Lecture 13 - Automobile Gearbox: Module Calculation Concept - Part II

Lecture 14 - Automobile Gearbox: Shaft Design, Lubrication Selection and Method

Lecture 15 - Automobile Gearbox: Bearing Selection and Gearbox Losses

Lecture 16 - Brake: Introduction, Working Principle and Types

Lecture 17 - Brake: Torque Requirement for Drum Brake Systems

Lecture 18 - Brake: Problem Solving

Lecture 19 - Brake: Torque Requirement for Disc Brake Systems

Lecture 20 - Brake: Static and Dynamic Analysis

Lecture 21 - Brake: Dynamic Analysis - Brake Force Distribution and Optimum

Lecture 22 - Brake: Problem Solving

Lecture 23 - Brake: Braking Efficiency and Distance and Brake Factor

Lecture 24 - Brake: Problem Solving and Friction Materials

Lecture 25 - Brake: Thermal Analysis and Braking Conditions

Lecture 26 - Brake: Energy and Power, Braking Power Absorbed by Lining and Drum/Disc

Lecture 27 - Brake: Single Stop Braking and Repeated Braking - Temperature Analysis

Lecture 28 - Brake: Thermal Analysis Problem Solving

Lecture 29 - Clutch: Types and Working Method

Lecture 30 - Clutch: Torque Transmitting Capacity - Uniform Pressure and Wear Theories

Lecture 31 - Clutch: Multiple Discs and Cone Clutches, Problem Solving

NPTEL : NOC:Turbulence Modeling (Mechanical Engineering)

Co-ordinators : Prof. Vagesh D. Narasimhamurthy

Lecture 1 - Introduction to turbulence

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

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

Lecture 4 - Statistical Analysis and Cartesian tensors - I

Lecture 5 - Statistical Analysis and Cartesian tensors - II

Lecture 6 - Navier Stokes: the governing equations - 1

Lecture 7 - Navier Stokes: the governing equations - 2

Lecture 8 - RANS equations I - 1

Lecture 9 - RANS equations I - 2

Lecture 10 - RANS equations II - 1

Lecture 11 - RANS equations II - 2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Lecture 65 - Introduction to Large Eddy Simulations (LES) Filtering operation and SGS stresses - II

Lecture 66 - Large Eddy Simulations: Filtered Navier-Stokes Equations - I

Lecture 67 - Large Eddy Simulations: Filtered Navier-Stokes Equations - II

Lecture 68 - Large Eddy Simulations: Filters and its types - I

Lecture 69 - Large Eddy Simulations: Filters and its types - II

Lecture 70 - Large Eddy Simulations: Smagorinsky model - I

Lecture 71 - Large Eddy Simulations: Smagorinsky model - II

Lecture 72 - LES: Dynamic Smagorinsky model and Scale similarity models - I

Lecture 73 - LES: Dynamic Smagorinsky model and Scale similarity models - II

Lecture 74 - Numerics in LES and Hybrid models

NPTEL : NOC:Manufacturing of Turbines (Gas, Steam, Hydro and Wind) (Mechanical Engineering)

Co-ordinators : Prof. Sunny Zafar

NPTEL : NOC:Advanced Fluid Mechanics (Mechanical Engineering)

Co-ordinators : Prof. Anubhab Roy

NPTEL : NOC:Microrobotics (Mechanical Engineering)

Co-ordinators : Prof. I. A. Palani

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

NPTEL : Strength of Materials (Mechanical Engineering)

Co-ordinators : Dr. S.P. Harsha

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

Co-ordinators : Dr. Arup Kumar Das

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

Co-ordinators : Prof. Ravi Kumar

NPTEL : NOC:Engineering Economic Analysis (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

Lecture 1 - Introduction to Engineering Economy, Physical and Economic Environment, Phases in Engg. process

Lecture 2 - Some economic concepts, Value and utility, Interest and Interest rate, Time value of money

Lecture 3 - Interest formulas: Simple and compound interest, Cash flow diagrams

Lecture 4 - Interest formulas for discrete compounding and discrete payments: Single payment (CAF and PWF)

Lecture 5 - Interest formulas for discrete compounding and discrete payments: Equal payment series (CAF, CRF and PWF)

Lecture 6 - Problem solving on discrete compounding, discrete payment

Lecture 7 - Interest formulas for Uniform gradient series

Lecture 8 - Interest formulas for geometric gradient series

Lecture 9 - Compounding frequency of Interest: Nominal and Effective interest rates

Lecture 10 - Problem solving on frequency compounding of interest and gradient series factors

Lecture 11 - Economic equivalence: Meaning and principles of equivalence

Lecture 12 - Equivalence calculations involving cash flows

Lecture 13 - Methods of comparison of alternatives: Present worth, Annual equivalent, Future worth, Internal rate of return

Lecture 14 - comparison of alternatives: Capitalized equivalent amount, Capital recovery with return

Lecture 15 - Problem solving on equivalence and comparison of alternatives

Lecture 16 - Replacement analysis: Reason, Concept of defender and challenger

Lecture 17 - Proper treatment of sunk cost in replacement

Lecture 18 - Replacement because of improved efficiency, inadequacy, demand etc.

Lecture 19 - Problem solving on replacement analysis

Lecture 20 - Economic life of the asset

Lecture 21 - Depreciation: Definition, Reasons, Types of property, Value time function and book value

Lecture 22 - Basic depreciation methods:S-L method, Declining balance method

Lecture 23 - Depreciation: Declining balance switching to S-L, SOYD Method

Lecture 24 - Modified accelerated cost recovery system (MACRS) method of depreciation, Depletion

Lecture 25 - Depreciation: Units of production method, Depletion

Lecture 26 - Problem solving based on Depreciation and Depletion

Lecture 27 - Elements of cost: types of cost

Lecture 28 - Breakeven analysis, Effect of fixed and variable cost on BEP.

Lecture 29 - Economic order quantity

Lecture 30 - Problem solving based on Breakeven analysis and EOQ

Lecture 31 - Cost estimation: Methods of cost estimation, Adjustment of data, Learning

Lecture 32 - cost estimating relationships

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

Lecture 34 - Expected value decision making under risk

Lecture 35 - Expected variance decision making under risk

Lecture 36 - Problem solving based on decision under risk

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

Lecture 38 - Effect of method of depreciation on income taxes

Lecture 39 - After tax economic analysis

Lecture 40 - Problem solving based on Income tax analysis

NPTEL : NOC:Convective Heat Transfer (Mechanical Engineering)

Co-ordinators : Dr. Arup Kumar Das

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

Co-ordinators : Prof. Anil Kumar

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

Co-ordinators : Prof. Dheerendra Kumar Dwivedi

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

Co-ordinators : Prof. Pushparaj Mani Pathak

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

Co-ordinators : Dr. Pradeep K. Jha

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

Co-ordinators : Prof. Ravi Kumar

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

Co-ordinators : Prof. Indradeep Singh

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

Co-ordinators : Dr. D. K. Dwivedi

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

Co-ordinators : Dr. Pradeep K. Jha

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

Co-ordinators : Dr. Inderdeep Singh

NPTEL : NOC:Operations Management (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

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

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Automatic Control (Mechanical Engineering)

Co-ordinators : Dr. Anil Kumar

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

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Mechanical Measurement System (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

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

Co-ordinators : Dr. D. K. Dwivedi

NPTEL : NOC:Work System Design (Mechanical Engineering)

Co-ordinators : Dr. Inderdeep Singh

Lecture 1 - Work System Design: Introduction

Lecture 2 - Introduction and Concept of Productivity

Lecture 3 - Measurement of Productivity

Lecture 4 - Productivity Measures

Lecture 5 - Productivity Measurement Models

Lecture 6 - Factors Influencing Productivity

Lecture 7 - Causes of Low Productivity

Lecture 8 - Productivity Improvement Technique

Lecture 9 - Numerical Problems on Productivity

Lecture 10 - Case Study on Productivity

Lecture 11 - Work Study: Basic Concept

Lecture 12 - Steps Involved in Work Study

Lecture 13 - Concept of Work Content

Lecture 14 - Techniques of Work Study

Lecture 15 - Human Aspects of Work Study

Lecture 16 - Method Study: Basic Concept

Lecture 17 - Method Study: Steps

Lecture 18 - Method Study: Recording Techniques

Lecture 19 - Operation Process Charts

Lecture 20 - Operation Process Charts: Examples

Lecture 21 - Flow Process Charts

Lecture 22 - Flow Process Charts: Examples

Lecture 23 - Two-Handed-Process Charts

Lecture 24 - Multiple Activity Charts

Lecture 25 - Flow Diagrams

Lecture 26 - String Diagrams

Lecture 27 - Principles of Motion Economy

Lecture 28 - Micro-Motion Study

Lecture 29 - Therbligs

Lecture 30 - SIMO Charts

Lecture 31 - Memo-Motion Study

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

Co-ordinators : Dr. Pradeep K. Jha

NPTEL : NOC:Radiative Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof. Ankit Bansal

NPTEL : NOC:Weldability of Metals (Mechanical Engineering)

Co-ordinators : Dr. D. K. Dwivedi

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

Co-ordinators : Dr. Inderdeep Singh

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

Co-ordinators : Prof. Kaushik Pal

NPTEL : NOC:Financial Mathematics (Mechanical Engineering)

Co-ordinators : Dr. Pradeep K. Jha

Lecture 1 - Introduction to Financial Mathematics

Lecture 2 - Important Mathematical Functions and its Characteristics

Lecture 3 - Progressions and Series, Growth and Decay Curves

Lecture 4 - Statistical Measures

Lecture 5 - Problem Solving on Mathematical Functions and Statistical Measures

Lecture 6 - Interest and Interest Rate, Time Value of Money

Lecture 7 - Simple Discount, Focal Date and Equation of Value

Lecture 8 - Introduction to Bank Discount

Lecture 9 - Introduction to Compound Interest

Lecture 10 - Problem Solving on Simple Interest and Bank Discount

Lecture 11 - Introduction to Discrete Compounding and Discrete Payments

Lecture 12 - Equal Payment Series and Gradient Series Factors

Lecture 13 - Geometric Gradient Series Factors

Lecture 14 - Annuities Due and Annuities Deferred

Lecture 15 - Problem Solving on Compounding Factors

Lecture 16 - Compounding Frequency of Interest

Lecture 17 - Interest Factors for Continuous Compounding

Lecture 18 - Introduction to Economic Equivalence

Lecture 19 - Principles of Equivalence

Lecture 20 - Problem Solving on Compounding Frequency and Economic Equivalence

Lecture 21 - Methods of Comparison of Alternatives

Lecture 22 - Payback Period

Lecture 23 - Capitalized Equivalent and Capital Recovery with Return

Lecture 24 - Project Balance

Lecture 25 - Problem Solving on Alternatives Comparison and Project Balance

Lecture 26 - Analysis of Credit and Loans

Lecture 27 - Assessing Interest and Structured Payments in Loans

Lecture 28 - Introduction to Cost of Credit and Amortization

Lecture 29 - Analysis of Amortization Schedule

Lecture 30 - Graduated Payment Mortgage, Sinking Funds

Lecture 31 - Introduction to Depreciation and Depletion

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

Co-ordinators : Dr. Inderdeep Singh

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

Co-ordinators : Prof. Kaushik Pal

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

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

NPTEL : NOC:Acoustic Metamaterials (Mechanical Engineering)

Co-ordinators : Prof. Sneha Singh

NPTEL : NOC:Power Plant Engineering (Mechanical Engineering)

Co-ordinators : Prof. Ravi Kumar

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

NPTEL : NOC:Noise Control in Mechanical Systems (Mechanical Engineering)

Co-ordinators : Prof. Sneha Singh

NPTEL : NOC:Material Processing (Metallurgical Aspects): Fundamental and Practical (Mechanical Engineering)

Co-ordinators : Prof. Dheerendra Kumar Dwivedi

NPTEL : Micro and Smart Systems (Mechanical Engineering)

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

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

Co-ordinators : Prof. G.K. Anathasuresh

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

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

Lecture 3 - Genesis of Calculus of Variations - Part I

Lecture 4 - Genesis of Calculus of Variations - Part II

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

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

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

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

Lecture 9 - Constrained minimization KKT conditions - Part I

Lecture 10 - Constrained minimization KKT conditions - Part II

Lecture 11 - Sufficient conditions for constrained minimization - Part I

Lecture 12 - Sufficient conditions for constrained minimization - Part II

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

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

Lecture 15 - Function spaces and Gateaux variation

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Co-ordinators : Prof. G. K. Ananthasuresh

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

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

Co-ordinators : Prof. Venkata Sonti

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

Co-ordinators : Prof. Aloke Kumar

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

Co-ordinators : Prof. Ashitava Ghosal

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

Co-ordinators : Prof. Venkata R. Sonti

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

Co-ordinators : Prof. Venkata R. Sonti

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

Co-ordinators : Prof. Ashitava Ghosal

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

NPTEL : NOC:Advanced Measurement Techniques in Fluid Mechanics and Heat Transfer (Mechanical Engineering)

Co-ordinators : Prof Saptarshi Basu