



Saraswati College of Engineering
Department- MECHANICAL ENGINEERING

SEM-III

Scheme (R-19)

Subject- ENGINEERING MATHEMATICS-III

Subject Code- MEC 301

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3,5	1	1.1	1.1.2	5	CO 1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
1,2,3	1	2.1	2.1.2	3,4	CO 2	Identify the concept of inverse linear transform and compare to various functions and its applications
1,2,3,4	1	3.1	3.1.6	3	CO 3	Determine and develop Fourier series for real life problems and applications.
1,2,4	1	3.2	3.2.1	3	CO 4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1,2	1	1.1	1.1.3	3	CO 5	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
1,2,3,12	1	12.1	12.1.1	3	CO 6	solve partial differential equations and analytical method for one dimensional heat and wave equations.

Course Objectives

Sr. No.	Description
1	To familiarize with the Laplace Transform and its properties.
2	To study Inverse Laplace Transform of various functions, theorems and its applications.
3	To acquaint with the concept of Fourier Series, its complex form and enhance the problem solving skills
4	To familiarize with the concept of complex variables, C-R equations with applications.
5	To study the application of concept of Eigen value and eigen vectors matrices

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Learners will be able to Apply fundamental knowledge about various types of loading and stresses induced
PO 1	1	1.4	1.4.1	Level 3 (Applying)	2	Learners will be able to Apply Fundamental knowledge of Force and Moment to Draw the SFD and BMD for different types of loads and support conditions
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Learners will be able to Analyse the bending Stresses, shear stresses and Direct and Bending Stresses induced in beam.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Learners will be able to Analyse the deflection in beams and stresses in shafts Subjected to Twisting Moment.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Learners will be able to Analyse the Stresses in Thin Cylinders and Thin Spherical Shells and Estimate the strain energy in mechanical elements
PO 2	1	2.2	2.2.4	Level 4 (Analysing)	6	Learners will be able to Analyse buckling phenomenon in columns using Euler's and Rankine's Method

Course Objectives

Sr. No.	Description
1	To Apply fundamental knowledge about various types of loading and stresses induced
2	To Apply Fundamental knowledge of Force and Moment to Draw the SFD and BMD for different types of loads and support conditions
3	To Analyse the bending and shear stresses induced in beam.
4	To Analyse the deflection in beams and stresses in shafts Subjected to Twisting Moment.
5	To Analyse the Stresses in Thin Cylinders and Thin Spherical Shells and Estimate the strain energy in mechanical elements
6	To Analyse buckling phenomenon in columns using Euler's and Rankine's Method

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Demonstrate an understanding of casting process
PO 1	1	1.4	1.4.1	Level 3 (Applying)	2	Demonstrate applications of various types of welding processes.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Differentiate chip forming processes such as turning, milling, drilling, etc.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Illustrate principles and working of non-traditional manufacturing
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Understand the manufacturing technologies enabling Industry 4.0
PO 2	1	2.2	2.2.4	Level 4 (Analysing)	6	Illustrate the concept of producing polymer components and ceramic components.

Course Objectives

Sr. No.	Description
1	To familiarize with the various production processes used on shop floors
2	To study appropriate production processes for a specific application.
3	To introduce to the learner various machine tools used for manufacturing
4	To familiarize with principle and working of non-traditional manufacturing
5	To introduce to them the Intelligent manufacturing in the context of Industry 4.0
6	Demonstrate applications of various types of welding processes.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	Level 2 (Understanding)	1	Learner will be able to Identify the various classes of materials and comprehend their properties
PO1	1	1.4	1.4.1	Level 3 (Applying)	2	Learner will be able to Apply phase diagram concepts to engineering applications
PO1	1	1.3	1.3.1	Level 3 (Applying)	3	Learner will be able to Apply particular heat treatment for required property development
PO1	1	1.3	1.3.1	Level 4 (Analyzing)	4	Learner will be able to Identify the probable mode of failure in materials and suggest measures to prevent them
PO1	1	1.4	1.4.1	Level 2 (Understanding)	5	Learner will be able to Choose or develop new materials for better performance
PO4	1	4.1	4.1.2	Level 2 (Understanding)	6	Learner will be able to Decide an appropriate method to evaluate different components in service

Course Objectives

Sr. No.	Description
1	To familiarize the structure -property correlation in materials
2	To study Iron- Carbide phase diagram and TTT- diagram
3	To acquaint with the processing dependency on the performance of the various materials
4	To study Strengthening mechanisms as Fatigue and Creep in materials
5	To familiarize with the advances in materials development
6	To familiarize with Polymers and Ceramics, their Processing also study Non destructive

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.1	2	CO1	Understand the basic concept of thermodynamics and application of first law of thermodynamics to various systems.
PO1	1	1.3	1.3.1	2	CO2	Apply the concept of Second law of thermodynamics and Entropy to solve problems.
PO2	1	2.1	2.1.2	3	CO3	understand the classification of grade of energy and various thermodynamic relations
PO1	1	1.4	1.4.1	3	CO4	understand the basic concepts of steam formatioan and vapour power cycles
PO1	1	1.4	1.4.1	3	CO5	Apply the concept of various gas power cycle to solve problems.
PO2	1	2.4	2.4.1	2	CO6	Understand and apply the fundamentals of thermodyamics in compressible fluid flow to the relevent systems.

Course Objectives

Sr. No.	Description
1	Understand the basic concept of thermodynamics and application of first law of thermodynamics to various systems.
2	understand the classification of grade of energy and various thermodynamic relations
3	understand the basic concepts of steam formatioan and vapour power cycles
4	Understand and apply the fundamentals of thermodyamics in compressible fluid flow to the relevent systems.
5	Apply the concept of various gas power cycle to solve problems.
6	Apply the concept of various gas power cycle to solve problems.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Learners will be able to Prepare metallic samples for studying its microstructure following the appropriate procedure.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Learners will be able to Identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Learners will be able to Perform Fatigue Test and draw S-N curve
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Learners will be able to Perform Tension test to Analyze the stress - strain behaviour of materials
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Learners will be able to Measure torsional strength, hardness and impact resistanceof the material
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Learners will be able to Perform flexural test with central and three point loading conditions

Course Objectives

Sr. No.	Description
1	To Prepare metallic samples for studying its microstructure following the appropriate procedure.
2	To Identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test.
3	To Perform Fatigue Test and draw S-N curve
4	To Perform Tension test to Analyze the stress - strain behaviour of materials
5	To Measure torsional strength, hardness and impact resistanceof the material
6	To Perform flexural test with central and three point loading conditions

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Know the specifications, controls and safety measures related to machines and machining
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Use the machines for making various engineering jobs.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Perform various machining operations
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Perform Tool Grinding
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Learners will be able to Measure torsional strength, hardness and impact resistance of the material
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Perform welding operations

Course Objectives

Sr. No.	Description
1	To familiarize with basic machining processes
2	To familiarize various machining operations and machine protocols
3	Know the specifications, controls and safety measures related to machines and machining operations.
4	Learners will be able to Measure torsional strength, hardness and impact resistance of the material
5	Perform various machining operations
6	Perform welding operations

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Illustrate basic understanding of types of CAD model creation.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Visualize and prepare 2D modeling of a given object using modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Build solid model of a given object using 3D modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Visualize and develop the surface model of a given object using modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Generate assembly models of given objects using assembly tools of a modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Perform product data exchange among CAD systems.

Course Objectives

Sr. No.	Description
1	To impart the 3D modeling skills for development of 3D models of basic engineering components
2	To introduce Product data exchange among CAD systems
3	To familiarize with production drawings with important features like GD &T, surface finish, heat treatments etc.
4	Generate assembly models of given objects using assembly tools of a modeling software
5	Perform product data exchange among CAD systems.
6	Visualize and prepare 2D modeling of a given object using modeling software

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Excel in written and oral communication.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to
4	To inculcate the process of self-learning and research
5	Apply Knowledge and skill to solve societal problems in a group
6	Develop interpersonal skills to work as member of a group or leader.

SEM-IV

Subject- ENGINEERING MATHEMATICS-IV

Subject Code- MEC 401

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3	1	3.2	3.2.1	3	CO 1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
1,2,4	1	2.2	2.2.1	5	CO 2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
1,2,3,12	2	3.1	3.1.6	3	CO 3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
1,2,4,12	2	4.2	4.2.2	4	CO 4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
1,2,3,12	1	3.3	3.3.1	3	CO 5	Apply the concept of probability distribution to engineering problems& Testing hypothesis of small samples using sampling theory
1,2,3,4	1	2.4	2.4.1	2	CO 6	Apply the concepts of parametric and nonparametric tests for analysing practical problems

Course Objectives

Sr. No.	Description
1	To study the concept of Vector calculus & its applications in engineering.
2	To study Line and Contour integrals and expansion of complex valued function in a power series
3	To familiarize with the concepts of statistics for data analysis
4	To acquaint with the concepts of probability, random variables with their distributions and expectations
5	To familiarize with the concepts of probability distributions.
6	To study the sampling theory and its applications

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.1	1	CO1	Define properties of fluids, classify of fluids and evaluate hydrostatic forces on various surfaces.
PO2	2	2.4	2.4.1	2	CO2	Differentiate velocity potential function and stream function and solve for velocity and accelerataion of fluid
PO1	2	1.4	1.4.1	3	CO3	Apply Bernoulli's equation to various flow measuring devices
PO2	1	2.1	2.1.2	2	CO4	Understand the basic concepts of laminar flow in circular pipes
PO2	1	2.1	2.1.3	3	CO5	Apply the concept of Major losses and Minor losses in pipes to solve problems.
PO2	2	2.1	2.1.2	3	CO6	Apply the concept of Boundary layer formation to solve numerical on Boundary layer thickness

Course Objectives

Sr. No.	Description
1	To study Fluid Statics and Fluid Dynamics
2	To acquaint with dimensional analysis of Thermal and Fluid systems.
3	To familiarize with application of mass, momentum and energy equations in fluid flow
4	To study various flow measurement techniques.
5	To familiarize with the dynamics of fluid flows and the governing nondimensional parameters.
6	Understand the basic concepts of laminar flow in circular pipes

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Identify various components of mechanisms
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Develop mechanisms to provide specific motion
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Draw velocity and acceleration diagrams of various mechanisms
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Choose a cam profile for the specific follower motion
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Predict condition for maximum power transmission in the case of a belt drive
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Illustrate requirements for an interference-free gear pair

Course Objectives

Sr. No.	Description
1	To acquaint with basic concept of kinematics and kinetics of machine elements
2	To familiarize with basic and special mechanisms
3	To study functioning of motion and power transmission machine elements
4	Illustrate requirements for an interference-free gear pair
5	Identify various components of mechanisms
6	Draw velocity and acceleration diagrams of various mechanisms

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Identify suitable computer graphics techniques for 3D modeling.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Transform, manipulate objects & store and manage data.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Develop 3D model using various types of available biomedical data.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Create the CAM Toolpath for specific given operations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Build and create data for 3D printing of any given object using rapid prototyping and tooling processes.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Illustrate understanding of various cost effective alternatives for manufacturing

Course Objectives

Sr. No.	Description
1	To familiarize with basic concepts of computer graphics.
2	To acquaint with the process of using biomedical data for 3D modeling.
3	To study programming aspects of subtractive manufacturing process.
4	To familiarize with basic process of additive manufacturing in particularly 3D
5	Create the CAM Toolpath for specific given operations.
6	Develop 3D model using various types of available biomedical data.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	L3	CO1	Illustrate constructional, working principles and applications of Power Electronics switches.
PO2	PSO2	2.2	2.2.2	L2	CO2	Understand working of controlled Rectifiers and Inverters for DC and AC motor speed control
PO4	PSO1	4.1	4.1.2	L4	CO3	Develop circuits using op-amp parameters.
PO2	PSO1	2.1	2.1.2	L1	CO4	Identify use of different basic gates and use digital circuits for industrial applications
PO5	PSO1	5.1	5.1.1	L3	CO5	Demonstrate the knowledge of basic functioning of microcontroller
PO2	PSO1	2.2	2.2.3	L4	CO6	Analyze speed torque characteristic of electrical machines for speed control

Course Objectives

Sr. No.	Description
1	To provide the basic knowledge, operational characteristic and application of Powerelectronic switches .
2	To study the controlled Rectifiers, Inverters and DC to DC converters.
3	To familiarise basic properties of analog circuits for the design of mechanical process control.
4	To explain the principles of digital electronics circuits for the design of mechanical process control.
5	To Acquaint with basics of microcontroller based applications and its programming.
6	To study structure working and characteristic of different types of industrial electric motors and their applications

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	PSO1	1.3	1.31 2.1.2	L3	CO1	Demonstrate characteristic of various electrical and electronics Components.
PO2	PSO1	2.1	2.1.2	L4	CO2	Develop simple applications built around rectifiers and Inverters components
PO3	PSO2	3.2	3.2.1	L6	CO3	Create and build circuits built around op-amp parameters.
PO2	PSO1	2.2	2.2.2	L4	CO4	Identify and use of different basic gates and digital circuits for industrial applications
PO5	PSO1	5.1	5.1.1	L2	CO5	Understand and demonstrate basic parameters measurement using microcontroller
PO2	PSO2	2.1	2.1.2	L4	CO6	Test and Analyse speed torque characteristic of electrical machines for speed control

Course Objectives

Sr. No.	Description
1	To study characteristic of various electrical and electronics Components.
2	Examine working of controlled Rectifiers and Inverters
3	To familiarise operational characteristics of analog circuits and their applications
4	To study digital logic gates and their applications.
5	To Acquaint with basics of microcontroller based applications and its programming.
6	To impart knowledge of operational characteristics of industrial electricals motors .

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	1.3	1.31 2.1.2	L3	CO1	Draw velocity diagram using Instantaneous Centre method
PO2	PSO1	2.1	2.1.2	L4	CO2	Find velocity and acceleration of a point on a four-bar mechanism by using Relative method.
PO3	PSO2	3.2	3.2.1	L6	CO3	Analyze velocity and acceleration of a specific link of a slider crank mechanism using graphical approach by Relative method.
PO2	PSO1	2.2	2.2.2	L4	CO4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower motion.
PO5	PSO1	5.1	5.1.1	L2	CO5	Draw cam profile for the specific follower motion.
PO2	PSO2	2.1	2.1.2	L4	CO6	Develop and build mechanisms to provide specific motion.

Course Objectives

Sr. No.	Description
1	Draw velocity diagram using Instantaneous Centre method
2	Find velocity and acceleration of a point on a four-bar mechanism by using
3	Analyze velocity and acceleration of a specific link of a slider crank mechanism
4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower
5	Draw cam profile for the specific follower motion.
6	Develop and build mechanisms to provide specific motion.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Illustrate basic understanding of types of CAD model creation.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Visualize and prepare 2D modeling of a given object using modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Build solid model of a given object using 3D modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Visualize and develop the surface model of a given object using modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Generate assembly models of given objects using assembly tools of a modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Perform product data exchange among CAD systems.

Course Objectives

Sr. No.	Description
1	To impart the 3D modeling skills for development of 3D models of basic engineering components
2	To introduce Product data exchange among CAD systems
3	To familiarize with production drawings with important features like GD &T, surface finish, heat treatments etc.
4	Generate assembly models of given objects using assembly tools of a modeling software
5	Perform product data exchange among CAD systems.
6	Visualize and prepare 2D modeling of a given object using modeling software

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Excel in written and oral communication.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
4	To inculcate the process of self-learning and research
5	Apply Knowledge and skill to solve societal problems in a group
6	Develop interpersonal skills to work as member of a group or leader.

SEM-V

Subject- MECHANICAL MEASUREMENTS AND CONTROLS

Subject Code- MEC 501

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	Level 2 (UNDERSTANDING)	1	Handle, operate and apply the precision measuring instruments / equipment's.
3	1	3.1	3.1.3	Level 3 (APPLYING)	2	Analyze simple machined components for dimensional stability & functionality.
1	1	2.3	2.3.2	Level 3 (APPLYING)	3	Classify various types of static characteristics and types of errors occurring in the system.
1	1	2.3	2.3.2	Level 2 (UNDERSTANDING)	4	Classify and select proper measuring instrument for displacement, pressure, flow and temperature measurements
5	1	3.3	1.3.1	Level 5 (EVALUATING)	5	Design mathematical model of system/process for standard input responses and analyse error and differentiate various types of control systems and time domain specifications
3	1	3.1	3.1.3	Level 5 (EVALUATING)	6	Analyse the problems associated with stability

Course Objectives

Sr. No.	Description
1	To Study principles of precision measuring instruments & their significance.
2	To familiarize with the handling & use of precision measuring instruments/ equipment's.
3	To impart knowledge of architecture of the measurement system.
4	To deliver working principle of mechanical measurement system.
5	To study concept of mathematical modelling of the control system.
6	To acquaint with control system under different time domain.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	Level 2 (UNDERSTANDING)	1	Analyze the three modes of heat transfer in engineering application.
2	1	3.1	3.1.3	Level 3 (APPLYING)	2	Develop mathematical models for different modes of heat transfer
2	1	2.3	2.3.2	Level 3 (APPLYING)	3	Analyze performance parameters of different types of heat exchangers.
2	1	2.3	2.3.2	Level 2 (UNDERSTANDING)	4	Identify and analyze the Transient heat Transfer in engineering applications.
2	1	1.3	1.3.1	Level 5 (EVALUATING)	5	Explain construction and working of different components of internal combustion engines.
3	1	3.1	3.1.3	Level 5 (EVALUATING)	6	Evaluate engine performance and emission characteristics

Course Objectives

Sr. No.	Description
1	To study the heat transfer concepts applicable for steady state and transient conditions.
2	To study mathematical modeling and design concepts of heat exchangers.
3	To familiarize with the working of S.I. and C.I. engines and their performance.
4	Identify and analyze the Transient heat Transfer in engineering applications.
5	Explain construction and working of different components of internal combustion engines.
6	Evaluate engine performance and emission characteristics

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 2 Understand	1	To apply acquaint with working principles and applications of Governors / Gyroscope
PO3	1	1.3	1.3.1	Level 3 Apply	2	To apply study static and dynamic force analysis in the mechanisms
PO1	1	2.4	2.4.1	Level 3 Apply	3	To apply familiarise with basics of mechanical vibrations
PO3	1	1.4	1.4.2	Level 4 Analyse	4	To analyse the vibration isolation of Mechanical system
PO3	1	1.3	1.3.2	Level 3 Apply	5	To solve the vibration response of Mechanical system
PO1	1	1.4	1.4.1	Level 4 Analyse	6	To analyse the vibration isolation of Mechanical system

Course Objectives

Sr. No.	Description
1	To apply acquaint with working principles and applications of Governors / Gyroscope
2	To apply study static and dynamic force analysis in the mechanisms
3	To apply familiarise with basics of mechanical vibrations
4	To analyse the vibration isolation of Mechanical system
5	To solve the vibration response of Mechanical system
6	To analyse the vibration isolation of Mechanical system

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	CO1	Solve differential equations using weighted residual methods
PO2	1	2.1	2.1.3	Level 3 Apply	CO2	Apply the finite element equations to model engineering problems governed by second order differential equations
PO2	2	2.1	2.1.3	Level 3 Apply	CO3	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements
PO2	2	2.4	2.4.1	Level 3 Apply	CO4	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements
PO2	2	2.1	2.5.2	Level 3 Apply	CO5	Apply the basic finite element formulation techniques to solve Vector Variable Problems
PO2	2	2.6	2.6.2	Level 3 Apply	CO6	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system

Course Objectives

Sr. No.	Description
1	To solve differential equations using weighted residual methods
2	To apply the finite element equations to model engineering problems governed by second order differential equations
3	To apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements
4	To apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements
5	To apply the basic finite element formulation techniques to solve Vector Variable Problems
6	To apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	3- Apply	CO1	To obtain clear understanding of use of statistics in experiments
PO1	1	1.2	1.2.1	3- Apply	CO2	To become familiar with methodologies that can be used in conjunction with experimental designs for robustness and optimization
PO4	2	4.1	4.1.1	4- Analyze	CO3	Discuss various cutting tool materials and estimate machining induced surface integrity
PO3	2	3.3	3.3.1	4- Analyze	CO4	To obtain clear understanding of scheme of experimentation and its effect on accuracy of experimentation
PO3	2	3.1	3.1.6	6- Create	CO5	To obtain knowledge of how to analyze results from such investigations to obtain conclusions
PO3	2	3.1	3.1.6	6- Create	CO6	Design multipoint cutting tools and its industrial applications

Course Objectives

Sr. No.	Description
1	Plan, design, and conduct experimental investigations efficiently and effectively
2	Choose an appropriate experimentation scheme to evaluate a new product design or process improvement through experimentation strategy, data analysis, and interpretation of experimental results.
3	Understand strategy in planning and conducting experiments
4	To become familiar with methodologies that can be used in conjunction with experimental
5	To obtain knowledge of how to analyze results from such investigations to obtain conclusions
6	To obtain clear understanding of use of statistics in experiments

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	Level 2 (UNDERSTANDING)	1	Analyze the three modes of heat transfer in engineering application.
2	1	3.1	3.1.3	Level 3 (APPLYING)	2	Develop mathematical models for different modes of heat transfer
2	1	2.3	2.3.2	Level 3 (APPLYING)	3	Analyze performance parameters of different types of heat exchangers.
2	1	2.3	2.3.2	Level 2 (UNDERSTANDING)	4	Identify and analyze the Transient heat Transfer in engineering applications.
2	1	1.3	1.3.1	Level 5 (EVALUATING)	5	Explain construction and working of different components of internal combustion engines.
3	1	3.1	3.1.3	Level 5 (EVALUATING)	6	Evaluate engine performance and emission characteristics

Course Objectives

Sr. No.	Description
1	To study the heat transfer concepts applicable for steady state and transient conditions.
2	To study mathematical modeling and design concepts of heat exchangers.
3	To familiarize with the working of S.I. and C.I. engines and their performance.
4	Identify and analyze the Transient heat Transfer in engineering applications.
5	Explain construction and working of different components of internal combustion engines.
6	Evaluate engine performance and emission characteristics

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	3- Apply	CO1	To apply acquaint with working principles and applications of Governors / Gyroscope
PO1	1	1.2	1.2.1	3- Apply	CO2	To apply study static and dynamic force analysis in the mechanisms
PO4	2	4.1	4.1.1	4- Analyze	CO3	To apply familiarise with basics of mechanical vibrations
PO3	2	3.3	3.3.1	4- Analyze	CO4	To analyse the vibration isolation of Mechanical system
PO3	1	3.1	3.1.6	6- Create	CO5	To solve the vibration response of Mechanical system
PO3	1	3.1	3.1.6	6- Create	CO6	To analyse the vibration isolation of Mechanical system

Course Objectives

Sr. No.	Description
1	Plot and analyze governor characteristics
2	Analyze gyroscopic effect on laboratory model
3	Estimate natural frequency of mechanical systems
4	Analyze vibration response of mechanical systems
5	Determine damping coefficient of a system
6	Balance rotating mass

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 4 Analyse	C01	Select appropriate element for given problem
PO2	1	2.1	2.1.3	Level 4 Analyse	CO2	Select suitable meshing and perform convergence test
PO2	2	2.1	2.1.3	Level 4 Analyse	CO3	Select appropriate solver for given problem
PO2	2	2.4	2.4.1	Level 2 Understand	CO4	Interpret the result
PO2	1	2.1	2.5.2	Level 3 Apply	CO5	Apply basic aspects of FEA to solve engineering problems
PO2	1	2.6	2.6.2	Level 5 Evaluate	CO6	Validate FEA solution

Course Objectives

Sr. No.	Description
1	To select appropriate element for given problem
2	To select suitable meshing and perform convergence test
3	To select appropriate solver for given problem
4	To interpret the result
5	To apply basic aspects of FEA to solve engineering problems
6	To validate FEA solution

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	3- Apply	CO1	Plan and prepare effective business/ technical documents which will in turn provide solid
PO1	1	1.2	1.2.1	3- Apply	CO2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
PO4	2	4.1	4.1.1	4- Analyze	CO3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
PO3	2	3.3	3.3.1	4- Analyze	CO4	Deliver persuasive and professional presentations.
PO3	1	3.1	3.1.6	6- Create	CO5	Develop creative thinking and interpersonal skills required for effective professional
PO3	1	3.1	3.1.6	6- Create	CO6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour

Course Objectives

Sr. No.	Description
1	Discern and develop an effective style of writing important technical/business documents.
2	Investigate possible resources and plan a successful job campaign.
3	Understand the dynamics of professional communication in the form of group discussions,
4	Develop creative and impactful presentation skills.
5	Analyse personal traits, interests, values, aptitudes and skills.
6	Understand the importance of integrity and develop a personal code of ethics.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Excel in written and oral communication.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentalsto attempt solutions to
4	To inculcate the process of self-learning and research
5	Apply Knowledge and skill to solve societal problems in a group
6	Develop interpersonal skills to work as member of a group or leader.