Saraswati College of Engineering
Department- MECHANICAL ENGINEERING
SEM-III
Scheme (R-16)

Subject- APPLIED MATHEMATICS-III **Subject Code- MEC301**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	1	1.1	1.1.2	5	1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
1,2.3 ,4	1	3.1	3.1.6	3	2	Determine and develop Fourier series for real life problems and applications.
1,2,3	1	2.1	2.1.2	3,4	3	Identify the concept of inverse linear transform and compare to various functions and its applications
1,2,3	1	3.2	3.2.1	3	4	Apply properties of complex analysis and mapping and bilinear transformation
1,2,3	1	12.1	12.1.3	3	5	Solve partial differential equation such as vibration of string heat flow etc.
1,2,4 ,12	1	2.2	2.2.3	3	6	To identify theorem of complex integration and study of correlation and curve fitting

Course Objectives

Sr. No	Description
1	Provide sound foundation in the mathematical fundamentals necessary to formulate, solve and analyse engineering problems.
2	To Study the basic principles of Laplace Transform, Fourier series, Complex variables.
3	Provide sound foundation in the mathematical fundamentals necessary to formulate, solve and analyse engineering problems.
4	To study properties of complex analysis and mapping and bilinear transformation
5	Formulate simple engineering problem as PDE & state the boundary conditions.
6	Apply statistical methods like correlation, regression analysis & curve fitting applied to construction management

Subject-Thermodynamics   **Subject Code- MEC302**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.1	2	C01	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	undrstand 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.

Subject- Strength of Materials   **Subject Code- MEC303**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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
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

Subject-PRODUCTION PROCESS I   **Subject Code- MEC304**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.2	2.2.3	Level 2 Understand	CO1	Understand and identify the various Production process and Metal casting process
PO2	1	2.2	2.2.4	Level 4 Analyze	CO2	Differentiaite various joining process and contrast alternative processes to select the best joining process
PO2	1	2.3	2.3.1	Level 2 Understand	CO3	Classification and Analysis of various metal working process
PO2	1	2.2	2.2.3	Level 2 Understand	CO4	Identify machine tool and machining process
PO1	1	1.4	1.4.1	Level3 Apply	CO5	Illustrate principal and working of Non traditional machining process
PO2	1	2.4	2.4.4	Level 2 Understand	CO6	Demonstrate and understand the manufacturing technologies like polymer processing, powder metallurgy and industry 4.0

Course Objectives

Sr. No	Description
1	Demonstrate understanding of casting process
2	Illustrate principles of forming processes
3	Demonstrate applications of various types of welding processes. components.
4	Illustrate the concept of producing polymer components and ceramic
5	Differentiate chip forming processes such as turning, milling, drilling, etc.
6	Distinguish between the conventional and modern machine tools.

Subject-MATERIAL TECHNOLOGY   **Subject Code- MEC305**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	Level 2 Understanding	1	Learner will be able to Identify various materils, defects, deformation mechanisms.
PO1	1	1.4	1.4.1	Level 4 Analyzing	2	Learner will be able to Demonstrate understanding of various failure mechanisms of materials.
PO1	1	1.4	1.4.1	Level 4 Analyzing	3	Learner will be able to interpret iron-iron carbide phase diagram, and different phases in microstructures of materials at different condition.
PO1	1	1.3	1.3.1	Level 3 Applying	4	Learner will be able to Select appropriate heat treatment process for specific applications.
PO1	1	1.3	1.3.1	Level 2 Understanding	5	Learner will be able to Identify effect of alloying elements on properties of steels
PO4	1	1.3	1.3.1	Level 2 Understanding	6	Learner will be able to find New Materials and their application.

Course Objectives

Sr. No	Description
1	To study basic engineering Materials their Structure ,Properties,performance,deformation and defects.
2	To study various failure mechanisms of materials.
3	To study Iron-Iron carbide Phace Diagram and Microstructre.
4	To study Strengthening process including Heat Treatment process in Order to Enhace Properties
5	To study the role of alloying elements in the development of steels.
6	To study New Materials and their application.

Subject-COMPUTER AIDED MACHINE DRAWING   **Subject Code- MEL301**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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

Subject-STRENGTH OF MATERIAL   **Subject Code- MEL302**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	Level 2 Understanding	1	Analyse the stress - strain behaviour of materials
PO1	1	1.4	1.4.1	Level 4 Analyzing	2	Measure ultimate tensile/compression strength of material
PO1	1	1.4	1.4.1	Level 4 Analyzing	3	To Measure torsional strength of material
PO1	1	1.3	1.3.1	Level 3 Applying	4	Perform impact test using Izod and Charpy method
PO1	1	1.3	1.3.1	Level 2 Understanding	5	To Measure the hardness of materials.
PO4	1	1.3	1.3.1	Level 2 Understanding	6	Perform flexural test with central and three point loading conditions

Course Objectives

Sr. No	Description
1	
2	To acquaint with surface hardness measurement method
3	To familiarise with impact test methods for different materials
4	To Measure torsional strength of material
5	To Measure the hardness of materials.
6	Perform flexural test with central and three point loading conditions

Subject-MATERIAL TECHNOLOGY   **Subject Code- MEL303**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Learners will be able to use of optical laboratory microscope to study microstructure
P0 1	1	1.3	1.3.1	Level 3 (Applying)	2	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)	3	Learner will be able to Interpret different phases present in different plain carbon steels and cast irons.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	4	Learners will be able to Identify effects of heat treatment on microstructure of medium carbon steel.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	5	Learners will be able to determine hardenability of steel using Jominy end Quench test.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Learners will be able to Perform Fatigue Test and draw S-N curve

Course Objectives

Sr. No	Description
1	To familiarise with use of optical laboratory microscope
2	To Prepare metallic samples for studying its microstructure following the appropriate procedure.
3	To acquaint with microstructures of ferrous (steel and cast iron) metals
4	To Identify effects of heat treatment on microstructure of medium carbon steel
5	To determine hardenability of steel using Jominy end Quench test.
6	To Perform Fatigue Test and draw S-N curve

Subject-MACHINE SHOP PRACTICE-I   **Subject Code- MEL304**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Know the specifications, controls and safety measures related to machines and machining operations.
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 resistanceof 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 machiningprocesses
2	To familiarize various machining operations and machineprotocols
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

Subject- APPLIED MATHEMATICS IV   **Subject Code-MEC401**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	1	1.1	1.1.3	3	1	Extend the concept of matrices to eigen value & eigen vector & use it to solve various engineering problem.
1,2,4	2	3.2	3.2.1	3	2	Apply principles of vector calculus to the analysis of engineering problems.
1,2,3 ,4.12	2	2.1	2.1.2	3,4	3	mathematical form & can find optimal solution by graphical or simplex method &
1,2,12	1	2.1	2.1.2	3,4	4	Ability to use probability distribution to analyze & solve real time problem
1,2,3 ,12	1	2.4	2.4.1	2	5	Explain the test of hypothesis for small & large samples by using various test like t-test, z- test & chi- square test.
1,2,3,4	2	3.3	3.3.1	3	6	Develop the concept of ANOVA to measure the effect of extraneous variables.

Course Objectives

Sr. No	Description
1	To inculcate an ability to relate engineering problems to mathematical context.
2	To provide a solid foundation in mathematical fundamentals required to solve engineering problem.
3	To study the basic principles of Vector analyses, complex integration, probability, test of hypothesis and correlation between data.
4	Apply test of hypothesis & Analysis of Variances for solving engineering problems.
5	To study linear programming problem and probability distribution.
6	To identify significance of sampling theory.

Subject- FLUID MECHANICS   **Subject Code-MEC402**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.1	Level 1	1	Define properties of fluids, classify of fluids and evaluate hydrostatic forces on various surfaces.
PO2	2	2.4	2.4.1	Level 2	2	Differenciate velocity potential function and stream function and solve for velocity and accelerataion of fluid
PO1	2	1.4	1.4.1	Level 3	3	Apply Bernoulli's equation to various flow measuring devices
PO2 ,PO1	1	2.1,1.4	2 & 1	Level 2& 3	4	Understand the basic concepts of laminar flow in circuler pipes
PO2	1	2.1	2.1.2	Level 3	5	Apply the concept of Major losses and Minor losses in pipes to solve problems.
PO2	2	2.1	2.1.2	Level 3	6	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 circuler pipes

Subject-INDUSTRIAL ELECTRONICS **Subject Code-MEC403**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	L3	CO1	Illustrate constructional, working principles and applications of Power Electronics switches.
PO2	1	2.2	2.2.2	L2	CO2	Understand working of controlled Rectifiers and Inverters for DC and AC motor speed control
PO4	2	4.1	4.1.2	L4	CO3	Develop circuits using op-amp parameters.
PO2	1	2.1	2.1.2	L1	CO4	Identify use of different basic gates and use digital circuits for industrial applications
PO5	1	5.1	5.1.1	L3	CO5	Demonstrate the knowledge of basic functioning of microcontroller
PO2	2	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
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

Subject- PRODUCTION PROCESS II   **Subject Code-MEC404**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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.
PO 2	1	2.2	2.2.4	Level 4 (Analysing)	6	Illustrate the concept of producing polymer components and ceramic components. 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.

Subject- KINEMATICS OF MACHINERY   **Subject Code-MEC405**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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

Subject- DATA BASE & INFORMATION RETRIEVAL   **Subject Code-MEL401**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Identify data models and schemes in DBMS
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	To Demonstrate the features of database management systems and Relational database
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	To Use SQL- the standard language of relational databases
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	To Demonstrate understanding of functional dependencies and design of the database
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	To Design graphical user Interface for specific application
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	To Create visual software entities

Course Objectives

Sr. No	Description
1	To acquaint with data modelling/database design using the entity-relationship
2	To study use of Structured Query Language (SQL) and learn SQL syntax
3	To familiarise Graphical User Interface techniques to retrieve information from database
4	To study needs of database processing and controlling the consequences of concurrent data access
5	To Design graphical user Interface for specific application
6	To Demonstrate understanding of functional dependencies and design of the database

Subject- FLUID MECHANICS   **Subject Code-MEL402**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	To Calibrate different gauges
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	To Verify the Archimedes Principle
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	To Measure hydrostatic forces
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Calibrate Venturimeter, Orificemeter and Pitot tube
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	To Verify the Bernoulli's Principle
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	To Read manometers and maintain them

Course Objectives

Sr. No	Description
1	To study measurement as well as calibration principles
2	To practically verify the concepts learnt in theory course
3	To Measure hydrostatic forces
4	To Verify the Archimedes Principle
5	To Verify the Bernoulli's Principle
6	To Calibrate different gauges

Subject- INDUSTRIAL ELECTRONICS   **Subject Code-MEL403**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	1	1.3	1.31 2.1.2	L3	1	Demonstrate characteristic of various electrical and electronics Components.
PO2	1	2.1	2.1.2	L4	2	Develop simple applications built around rectifiers and Inverters components
PO3	2	3.2	3.2.1	L6	3	Create and build circuits built around op-amp parameters.
PO2	1	2.2	2.2.2	L4	4	Identify and use of different basic gates and digital circuits for industrial applications
PO5	1	5.1	5.1.1	L2	5	Understand and demonstrate basic parameters measurement using microcontroller
PO2	2	2.1	2.1.2	L4	6	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 characterstics 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 characterstics of industrial electricals motors .

Subject- KINEMATICS OF MACHINERY   **Subject Code-MEL404**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	1.3	1.3.1 2.1.2	L3	1	Draw velocity diagram usingInstantaneous Centre method
PO2	1	2.1	2.1.2	L4	2	Find velocity and acceleration of a point on a four-bar mechanism by using Relative method.
PO3	2	3.2	3.2.1	L6	3	Analyze velocity and acceleration of a specific link of a slider crank mechanism using graphical approach by Relative
PO2	1	2.2	2.2.2	L4	4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower motion.
PO5	1	5.1	5.1.1	L2	5	Draw cam profile for the specific follower motion.
PO2	2	2.1	2.1.2	L4	6	Develop and build mechanisms to provide specific motion.

Course Objectives

Sr. No	Description
1	Draw velocity diagram usingInstantaneous 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.

Subject- MACHINE SHOP PRACTICE-II   **Subject Code-MEL405**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Know the specifications, controls and safety measures related to machines and machining operations.
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 machiningprocesses
2	To familiarize various machining operations and machineprotocols
3	Know the specifications, controls and safety measures related to machines and machining oper
4	Learners will be able to Measure torsional strength, hardness and impact resistanceof the mat
5	Perform various machining operations
6	Perform welding operations

SEM-V

Subject-INTERNAL COMBUSTION ENGINES   **Subject Code-MEC501**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 3 (APPLYING)	1	Apply Air standards, Fuel Air & Actual Cycles concept to solve problems
2	1	2.1	2.1.3	Level 4 (ANALYSING)	2	Apply SI engine components, Ignitation system & Combustion process that applies to given problem
2	1	2.1	2.1.2	Level 4 (ANALYSING)	3	Identify CI engine variables & parameters to solve the CI engine problems
2	1	2.4	2.4.1	Level 4 (ANALYSING)	4	Apply engine lubrications & cooling system & parameters to solve the problems
2	1	2.2	2.2.3	Level 4 (ANALYSING)	5	Illustrate engine performance charachteristics processess for solving problems
3	1	3.1	3.1.6	Level 5 (EVALUATING)	6	Determine IC engine design objectives, functional requirements and arrive at specifications

Course Objectives

Sr. No	Description
1	To study & apply Air stdanards, Fuel Air & Actual Cycles concept to solve problems
2	To study & apply SI engine components, Ignitation system & Combustion process that applies to given problem
3	To study & Identify CI engine variables & parameters to solve the CI engine problems
4	To study & apply engine lubrications & cooling system & parameters to solve the problems
5	To study & illustrate engine performance charachteristics processess for solving problems
6	To familiarise with IC engine design objectives, functional requirements and arrive at specifications

Subject- MECHANICAL MEASUREMENTS AND CONTROL

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.2	1.2.1	Level 1 Remember	1	Classify various types of static characteristics and types of errors occurring in the system
3	1	3.1	3.1.3	Level 3 APPLYING	2	Classify and select proper measuring instrument for linear and angular displacement
1	1	2.3	2.3.2	Level 3 APPLYING	3	Classify and select proper measuring instrument for pressure and temperature measurement
1	1	2.3	2.3.2	Level 2 UNDERSTANDING	4	Design mathematical model of system/process for standard input responses
5	1	3.3	1.3.1	Level 5 EVALUATING	5	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 impart knowledge of architecture of the measurement system.
2	To familiarize with the displacement methods and linear measurements
3	To familiarize with the pressure methods and temperature measurements
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.

Subject- HEAT TRANSFER   **Subject Code-MEC503**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Identify the three modes of heat transfer (conduction, convection and radiation).
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Illustrate basic modes of heat transfer
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Develop mathematical model for each mode of heat transfer
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Develop mathematical model for transient heat transfer
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Demonstrate and explain mechanism of boiling and condensation
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Analyse different heat exchangers and quantify their performance

Course Objectives

Sr. No	Description
1	To Study basic heat transfer concepts applicable for steady state and transient conditions
2	To Study mathematical modelling and designing concepts of heat exchangers
3	Analyse different heat exchangers and quantify their performance
4	Demonstrate and explain mechanism of boiling and condensation
5	Develop mathematical model for each mode of heat transfer
6	Identify the three modes of heat transfer (conduction, convection and radiation).

Subject- DYNAMICS OF MACHINERY   **Subject Code-MEC504**

Course Outcomes

PO	PSO	Competancy	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 apply the study the balancing of mechanical systems
5	To slove the vibration response of Mechanical system
6	To analyse the vibration isolation of Mechanical system

Subject- MACHINING SCIENCES AND TOOL DESIGN   **Subject Code-MEDLO5012**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	3- Apply	1	Use basics of machining sciences and various force measuring equipments
PO1	1	1.2	1.2.1	3- Apply	2	Describe the distribution of temperature in machining process and use of cutting fluids
PO4	2	4.1	4.1.1	4- Analyze	3	Discuss various cutting tool materials and estimate machining induced surface integrity
PO3	2	3.3	3.3.1	4- Analyze	4	Examine tool life considering different types of wears with optimized economical aspect of machining
PO3	2	3.1	3.1.6	6- Create	5	Design the single point cutting tool and identify the tool nomenclature
PO3	2	3.1	3.1.6	6- Create	6	Design multipoint cutting tools and its industrial applications

Course Objectives

Sr. No	Description
1	To familiarise with concepts of mechanics of machining processes
2	To analyze heat generation in machining operations and use of coolants
3	To illustrate properties of different cutting tool materials and selection of appropriate tool for particular machining operation
4	To demonstrate the inter relationship between cutting parameters and machining performance measures
5	To design various single point cutting tools
6	To design various multi point cutting tools

Subject-IC ENGINES   **Subject Code-MEL501**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 (UNDERSTANDING)	1	Dismantle engine assembly
1	1	1.4	1.4.1	Level 2 (UNDERSTANDING)	2	Perform load test/speed test on engine setup
2	1	2.3	2.3.2	Level 5 (EVALUATING)	3	Calculate performance of multi cylinder engine
2	1	2.3	2.3.2	Level 5 (EVALUATING)	4	Analyse engine performance and draw heat balance sheet
2	1	2.3	2.3.2	Level 5 (EVALUATING)	5	Perform exhaust gas analysis
2	1	2.3	2.3.2	Level 5 (EVALUATING)	6	Overhaul and Assemble engine components

Course Objectives

Sr. No	Description
1	To familiarize the concept of Thermal conductivity, heat transfer coefficient through
2	To familiarize experimental verifications of the concept of heat transfer

Subject-MMC   **Subject Code-MEL502**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	Level 2 UNDERSTANDING	1	To Calibrate displacement sensors
1	1	2.3	2.3.2	Level 2 UNDERSTANDING	2	To Calibrate pressure and vacuum gauges
1	1	2.3	2.3.2	Level 2 UNDERSTANDING	3	To Measure torque using strain gauges
4	1	3.1	3.1.1	Level 3 APPLY	4	Identify system/process characteristics for standard input responses
5	1	3.3	1.3.1	Level 5 EVALUATING	5	Identify 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 calibration of different measuring instruments
2	To study working of mechanical measurement system
3	To familiarise with different types of control systems
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.

Subject-HT   **Subject Code-MEL503**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.3	2.3.2	Level 5 (EVALUATING)	1	Estimate thermal conductivity of engineering materials.
2	1	2.3	2.3.2	Level 5 (EVALUATING)	2	Evaluate performance parameters of extended surfaces
2	1	2.3	2.3.2	Level 5 (EVALUATING)	3	Analyze heat transfer parameters in various engineering applications
2	1	2.3	2.3.2	Level 5 (EVALUATING)	4	Identify and analyze the Transient heat Transfer in engineering Analyze engine performance and emission parameters at different operating conditions

Course Objectives

Sr. No	Description
1	To familiarize the concept of various modes of heat transfer through experimental approaches.
2	To make conversant of the concept of heat transfer mechanisms in various engineering applications.
3	To acquaint with the various methods for measurement of engine performance and emission parameters.

Subject-DOM   **Subject Code-MEL504**

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	2	3.1	3.1.6	6- Create	CO5	To solve the vibration response of Mechanical system
PO3	2	3.1	3.1.6	6- Create	C06	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

Subject-MANUFACTURING SCIENCES LAB   **Subject Code-MEL505**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	3- Apply	CO1	Study conventional machining operations
PO1	1	1.2	1.2.1	3- Apply	CO2	Study Lathe machine and its operations
PO4	2	4.1	4.1.1	2-Understand	CO3	Estimate machining time for Taper turning operation
PO3	2	3.3	3.3.1	4- Analyze	CO4	Perform NC,DNC, CNC machining
PO3	2	3.3	3.3.1	4- Analyze	CO5	Perform CNC programming for Turning/Drilling Operation
PO3	2	3.1	3.1.6	4- Analyze	C06	Identify machining parameters for non traditional machining operations using process parameters

Course Objectives

Sr. No	Description
1	To study different conventional machining operations
2	To study lathe machining operations
3	To estimate machining time for taper turning operation
4	To perform NC,DNC,CNC machining operations
5	To perform CNC programming for Turning/Drilling operations
6	To identify non traditional machining operations using process parameters

Subject-BCE   **Subject Code-MEL506**

Course Outcomes

PO	PSO	Competancy	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 foundation for their future managerial roles.
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	2	3.1	3.1.6	6- Create	CO5	Develop creative thinking and interpersonal skills required for effective professional communication.
PO3	2	3.1	3.1.6	6- Create	C06	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.

Subject-MQE   **Subject Code-MEC601**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	1	Demonstrate inspection methods and different gauges
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	2	Illustrate working principle of measuring instruments and calibration methodology
2	1	2.3	2.3.2	Level 5 EVALUATING	3	Illustrate basic concepts and statistical methods in quality control
2	1	2.3	2.3.2	Level 5 (EVALUATING)	4	Demonstrate characteristics of screw threads, gear profile, and tool profile
2	1	2.3	2.3.2	Level 5 (EVALUATING)	5	Illustrate the different sampling techniques in quality control
2	1	2.3	2.3.2	Level 5 (EVALUATING)	6	Illustrate different nondestructive techniques used for quality evaluation

Course Objectives

Sr. No	Description
1	To acquaint with measuring equipment used for linear and angular measurements.
2	To familiarize with different classes of measuring instruments and scope of measurement in
3	To acquaint with operations of precision measurement, instrument/equipment for
4	To inculcate the fundamentals of quality concepts and statistics in metrology
5	Illustrate different nondestructive techniques used for quality evaluation
6	Demonstrate characteristics of screw threads, gear profile, and tool profile

Subject-MD-I   **Subject Code-MEC602**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 (Apply)	1	Apply Mechanical engineering concepts to solve engineering problems.
PO2	1	3.3	3.3.1	Level 3 (Apply)	2	Apply the bending concept to sove curve beam problems
PO2	2	3.3	3.3.1	Level 3 (Apply)	3	Apply the basic design concept to design the machine elements against static load
PO2	2	3.3	3.3.1	Level 4(Analysing)	4	Apply the basic Design concept to design the machine elements against fluctuating load
PO2	2	3.4	3.4.1	Level 4(Analysing)	5	Apply the strength /rigidity concept to Design the shaft and coupling problems.
PO2	2	3.4	3.4.1	Level6(Create)	6	Apply the basic design concept to design the helical and leaf springs against static and fluctuating load

Course Objectives

Sr. No	Description
1	To study basic principles of machine design
2	To acquire the concepts of bending and stress induced due to bending
3	To familiarize with use of design data books & various codes of practice
4	To make conversant with preparation of working drawings based on designs
5	To acquaint with the concepts of design based on strength & rigidity
6	To study types of spring and stresses induced in it.

Subject-FEA   **Subject Code-MEC603**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	C01	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	1	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	1	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	1	2.1	2.5.2	Level 3 Apply	CO5	Apply the basic finite element formulation techniques to solve Vector Variable Problems
PO2	1	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	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

Subject-RAC   **Subject Code-MEC604**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	1	Demonstrate fundamental principles of refrigeration and air conditioning
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	2	Identify and locate various important components of the refrigeration and air conditioning system
2	1	2.3	2.3.2	Level 5 EVALUATING	3	Illustrate various refrigeration and air conditioning processes using psychometric chart
2	1	2.3	2.3.2	Level 5 EVALUATING	4	Design Air Conditioning system using cooling load calculations
2	1	2.3	2.3.2	Level 5 EVALUATING	5	Estimate air conditioning system parameters
2	1	2.3	2.3.2	Level 5 EVALUATING	6	Demonstrate understanding of duct design concepts

Course Objectives

Sr. No	Description
1	To study working and operating principles of Air Refrigeration, Vapour Compression and
2	To study components of refrigeration and air conditioning systems
3	To study controls and applications of refrigeration and air conditioning
4	Design Air Conditioning system using cooling load calculations
5	Demonstrate understanding of duct design concepts
6	Estimate air conditioning system parameters

Subject-MXTC   **Subject Code-MEDLO6021**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.3	2.3.1	Level 2 Understand	C01	Identify the suitable sensor and actuator for a mechatronics system
PO2	1	2.4	2.4.2	Level 2 Understand	CO2	Select suitable logic controls
PO5	1	2.2	2.2.1	Level 4 Analyze	CO3	Analyse continuous control logics for standard input conditions
PO4	1	2.1	2.1.3	Level 6 Creat/develop	CO4	Develop ladder logic programming
PO5	1	2.2	2.2.3	Level 6 Creat/develop	CO5	Design hydraulic/pneumatic circuits
PO5	1	2.2	2.2.3	Level 6 Creat/develop	CO6	Design a mechatronic system

Course Objectives

Sr. No	Description
1	To study key elements of Mechatronics system and its integration
2	To familiarise concepts of sensors characterization and its interfacing with microcontrollers
3	Analyse continuous control logics for standard input conditions
4	To acquaint with concepts of actuators and its interfacing with microcontrollers
5	To study continuous control logics i.e. P, PI, PD and PID
6	To study discrete control logics in PLC systems and its industrial applications

Subject-MQE   **Subject Code-MEL601**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	1	To Measure linear and angular dimensions
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	2	To Measure surface roughness
2	1	2.3	2.3.2	Level 5 EVALUATING	3	To Measure various parameters of gear tooth profile
2	1	2.3	2.3.2	Level 5 EVALUATING	4	Use optical profile projector for measurement
2	1	2.3	2.3.2	Level 5 EVALUATING	5	Use various instruments for measurement of screw threads
2	1	2.3	2.3.2	Level 5 EVALUATING	6	Measure flatness by Autocollimator / Interferometry method

Course Objectives

Sr. No	Description
1	To familiarise with working of gauge
2	To acquaint with gear parameter measurement
3	To acquaint with operations of precision measurement, instrument/equipment for measureme
4	To inculcate the fundamentals of quality concepts and statistics in metrology
5	Use various instruments for measurement of screw threads
6	To Measure linear and angular dimensions

Subject-MD-I   **Subject Code-MEL602**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.3	2.3.1	Level 2 Understand	C01	Design shaft under various conditions
PO2	1	2.4	2.4.2	Level 2 Understand	CO2	Design Knuckle Joint / cotter joint
PO5	1	2.2	2.2.1	Level 4 Analyze	CO3	Design Screw Jack/C-clamp along with frame
PO4	2	2.1	2.1.3	Level 6 Creat/develop	CO4	Design Flexible flange couplings/ Leaf spring
PO5	2	2.2	2.2.3	Level 6 Creat/develop	CO5	Convert design dimensions into working/manufacturing drawing
PO5	2	2.2	2.2.3	Level 6	CO6	Use design data book/standard codes to standardise the designed dimensions

Course Objectives

Sr. No	Description
1	To study the basic design principles
2	To familiarize with use of design data books & various codes of practice
3	To make conversant with preparation of working drawings based on designs
4	Design Knuckle Joint / cotter joint
5	Design Flexible flange couplings/ Leaf spring
6	Use design data book/standard codes to standardise the designed dimensions

Subject-FEA   **Subject Code-MEL603**

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	1	2.1	2.1.3	Level 4 Analyse	CO3	Select appropriate solver for given problem
PO2	1	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

Subject-RAC   **Subject Code-MEL604**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	2	2.3	2.3.1	Level 2 Understand	C01	Demonstrate fundamental principles of refrigeration and air conditioning
PO2	2	2.4	2.4.2	Level 2 Understand	CO2	Identify and locate various important components of the refrigeration and air conditioning system
PO5	1	2.2	2.2.1	Level 4 Analyze	CO3	Represent various refrigeration and air conditioning processes using psychometric chart
PO4	1	2.1	2.1.3	Level 6 Creat/develop	CO4	Operate and maintain refrigeration system
PO5	1	2.2	2.2.3	Level 6 Creat/develop	CO5	Operate and maintain air conditioning system
PO5	2	2.2	2.2.3	Level 6 Creat/develop	CO6	Simulate VCRS

Course Objectives

Sr. No	Description
1	To study operating principles of Vapour Compression system
2	To study components of refrigeration and air conditioning systems
3	To study controls and applications of refrigeration and air conditioning
4	Demonstrate fundamental principles of refrigeration and air conditioning
5	Represent various refrigeration and air conditioning processes using psychometric chart
6	To Operate and maintain air conditioning system

Subject-MXTC LAB   **Subject Code-MEL605**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.3	2.3.1	Level 2 Understand	C01	Demonstrate implementation of interfacing sensors and actuators using microcontrollers
PO2	1	2.4	2.4.2	Level 2 Understand	CO2	Demonstrate of interfacing various utilities with microcontrollers
PO5	2	2.2	2.2.1	Level 4 Analyze	CO3	Demonstrate discrete control system using PLC microcontroller
PO4	2	2.1	2.1.3	Level 6 Creat/develop	CO4	Design and develop a control system for specific use
PO5	1	2.2	2.2.3	Level 6 Creat/develop	CO5	Implement program to PLC system and demonstrate its application
PO5	1	2.2	2.2.3	Level 6 Creat/develop	CO6	Develop pneumatic circuits for a specific system

Course Objectives

Sr. No	Description
1	To study sensors and actuators
2	To study automation
3	To study control systems

Subject-MD-II   **Subject Code-MEC701**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 3	1	Identify & select suitable criteria for the evaluation of alternate
3	1	3.2	3.2.3	Level 2	2	Extract engineering requirements from relevant engineering Codes
5	1	5.1	5.1.2	Level 4	3	Creating techniques to solve engineering problems
1	1	1.4	1.4.1	Level 3	4	Identify & select suitable criteria for the evaluation of alternate
3	1	3.1	3.1.4	Level 5	5	Select & analyze engineering requirements from relevant engineering Codes and Standards such as ASME, ASTM, BIS, ISO and ASHRAE.
5	1	5.1	5.1.4	Level 6	6	Creating techniques to solve engineering problems

Course Objectives

Sr. No	Description
1	Select & design appropriate gear for power transmission on the basis of given load and speed
2	To study & select rolling contact bearings
3	To study & design sliding contact bearing
4	To study & design cam & follower
5	To study & design belts drive, chain drive & flywheel for given appilcation.
6	To study & design clutches & single shoe brake

Subject-CAD/CAM/CAE   **Subject Code-MEC702**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	1	Apply computer graphics techniques for geometric modelling
PO1	1	1.4	1.4.1	Level 3 Apply	2	Apply transformation concepts to manipulate objects as well as store and manage data
PO1	2	1.4	1.4.1	Level 3 Apply	3	Apply CAM concepts to prepare NC- G code
PO5	2	5.1	5.1.1	Level 1 Remember	4	Identify the tools for Analysis of a complex engineering component
PO5	1	5.2	5.2.2	Level 2 Understand	5	Explain concept of CIM
PO5	1	5.2	5.2.2	Level 2 Understand	6	Discuss rapid prototyping and tooling concepts

Course Objectives

Sr. No	Description
1	To apply computer graphics techniques for geometric modelling
2	To apply transformation concepts to manipulate objects as well as store and manage data
3	To apply CAM concepts to prepare NC- G code
4	To identify the tools for Analysis of a complex engineering component
5	To explain concept of CIM
6	To discuss rapid prototyping and tooling concepts

Subject-PPC   **Subject Code-MEC703**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	Level 2 Understand	C01	Illustrate production planning functions and manage manufacturing functions in a better way
PO2	1	2.1	2.1.1	Level 2 Understand	CO2	Forecast the demand of the product and prepare an aggregate plan
PO2	2	2.3	2.3.2	Level 3 Apply	CO3	Develop the skills of Inventory Management and cost effectiveness
PO2	2	2.2	2.2.4	Level 3 Apply	CO4	Create a logical approach to Line Balancing in various production systems
PO2	1	2.4	2.4.1	Level 5 Evaluate	CO5	Develop competency in scheduling and sequencing of manufacturing operations
PO3	1	3.1	3.1.3	Level 3 Apply	CO6	Implement techniques of manufacturing planning and control

Course Objectives

Sr. No	Description
1	To provide an exposure to Production Planning & Control (PPC) and its significance in Manufacturing Industries
2	To give an aggregate plan and forecast demand and product
3	To develop skill of inventory management and cost effectiveness.
4	To appraise about need and benefits of planning functions related to products
5	To give exposure to production scheduling and sequencing so as to optimise resources
6	To provide an exposure to MRP, MRP II, ERP

Subject-AE   **Subject Code-MEDLO7032**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 Understand	1	Understand the importance of Transmission system with
2	1	2.2	2.2.3	Level 2 Understand	2	Understand the working of Steering System in Automobile
1	1	1.4	1.4.1	Level 2 Understand	3	Understand the various types of Wheel and Tyres in
1	1	1.3	1.3.2	Level 2 Understand	4	Understand the different types of Electrical Charging system
2	2	1.3	1.3.2	Level 2 Understand	5	Identify and understand the various types of Body and Chasis
3	1	2.1	2.1.2	Level 3 Apply	6	Familirise with Latest Technological development in

Course Objectives

Sr. No	Description
1	To impart the understanding of important mechanical systems of an automobile
2	To provide insight into the electrical systems of an automobile
3	To familiarize with the latest technological developments in automotive technology

Subject-DM   **Subject Code-ILO 7017**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	1	Get to know natural as well as manmade disaster and their extent and possible effects on the economy.
1	1	1.4	1.4.1	Level 2 UNDERSTANDING	2	Plan of national importance structures based upon the previous history.
2	1	2.3	2.3.2	Level 5 EVALUATING	3	Get acquainted with government policies, acts and various organizational structure associated with an emergency.
2	1	2.3	2.3.2	Level 5 EVALUATING	4	Get to know the simple do's and don'ts in such extreme events and act accordingly.
2	1	2.3	2.3.2	Level 5 EVALUATING	5	To study and understand the means of losses and methods to overcome /minimize it.
2	1	2.3	2.3.2	Level 6 Create	6	To understand role of individual and various organization during and after disaster

Course Objectives

Sr. No	Description
1	To understand physics and various types of disaster occurring around the world
2	To identify extent and damaging capacity of a disaster
3	To study and understand the means of losses and methods to overcome /minimize it.
4	To understand role of individual and various organization during and after disaster
5	To understand application of GIS in the field of disaster management
6	To understand the emergency government response structures before, during and after disaster

Subject-MD-II   **Subject Code-MEL701**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 (Apply)	1	Apply Mechanical engineering concepts to solve engineering problems.
PO2	1	3.3	3.3.1	Level 3 (Apply)	2	Apply the bending concept to sove curve beam problems
PO2	2	3.3	3.3.1	Level 3 (Apply)	3	Apply the basic design concept to design the machine elements against static load
PO2	1	3.3	3.3.1	Level 3 (Apply)	4	Apply the basic Design concept to design the machine elements against fluctuating load
PO2	1	3.4	3.4.1	Level 3 (Apply)	5	Apply the strength /rigidity concept to Design the shaft and coupling problems.
PO2	2	3.4	3.4.1	Level 3 (Apply)	6	Apply the basic design concept to design the helical and leaf springs against static and fluctuating load

Course Objectives

Sr. No	Description
1	To study basic principles of machine design
2	To acquire the concepts of bending and stress induced due to bending
3	To familiarize with use of design data books & various codes of practice
4	To make conversant with preparation of working drawings based on designs
5	To acquaint with the concepts of design based on strength & rigidity
6	To study types of spring and stresses induced in it.

Subject-CAD/CAM/CAE   **Subject Code-MEL702**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	1	Apply computer graphics techniques for geometric modelling
PO1	1	1.4	1.4.1	Level 3 Apply	2	Apply transformation concepts to manipulate objects as well as store and manage data
PO1	2	1.4	1.4.1	Level 3 Apply	3	Apply CAM concepts to prepare NC- G code
PO5	2	5.1	5.1.1	Level 1 Remember	4	Identify the tools for Analysis of a complex engineering component
PO5	1	5.2	5.2.2	Level 2 Understand	5	Explain concept of CIM
PO5	1	5.2	5.2.2	Level 2 Understand	6	Discuss rapid prototyping and tooling concepts

Course Objectives

Sr. No	Description
1	To apply computer graphics techniques for geometric modelling
2	To apply transformation concepts to manipulate objects as well as store and manage data
3	To apply CAM concepts to prepare NC- G code
4	To identify the tools for Analysis of a complex engineering component
5	To explain concept of CIM
6	To discuss rapid prototyping and tooling concepts

Subject-PPC   **Subject Code-MEL703**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO5	1	5.1	5.1.1	Level 6 Create	C01	Prepare a process sheet
PO5	1	5.1	5.1.1	Level 6 Create	CO2	Prepare a Gantt Chart
PO2	2	2.4	2.4.1	Level 5 Evaluate	CO3	Forecast the demand of the product and prepare an aggregate plan
PO1	1	1.4	1.4.1	Level 3 Apply	CO4	Perform ABC analysis of a given problem
PO5	1	5.1	5.1.1	Level 6 Create	CO5	Develop the skills of Inventory Management and cost effectiveness
PO5	2	5.1	5.1.1	Level 6 Create	CO6	Create a logical approach to Line Balancing for various production systems

Course Objectives

Sr. No	Description
1	To prepare a process sheet
2	To prepare a Gantt Chart
3	To forecast the demand of the product and prepare an aggregate plan
4	To perform ABC analysis of a given problem
5	To develop the skills of Inventory Management and cost effectiveness
6	To create a logical approach to Line Balancing for various production systems

Subject-PROJECT-I   **Subject Code-MEL704**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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				
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.				

Subject-DMS   **Subject Code-MEC801**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.3	Level 4	1	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.2	Level 6	2	Apply fundamental engineering concepts to solve engineering problems
1	1	1.4	1.4.1	Level 4	3	Creating techniques to solve engineering problems
3	1	3.2	3.2.1	Level 3	4	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.1	Level 5	5	Identify & select suitable criteria for the evaluation of alternate design solutions
3	1	3.2	3.2.3	Level6	6	Creating techniques to solve engineering problems

Course Objectives

Sr. No	Description
1	To study system concepts and methodology of system design.
2	To study & design snatch block assembly in EOT cranes.
3	To study & design flat belt & trough belt conveyor system
4	To study & design internal combustion engine system.
5	To study & design centrifugal pump & gear pump system
6	To study & design machine tool gearbox.

Subject-IEM   **Subject Code-MEC802**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	L3	1	Illustrate the need for optimization of resources and its significance
PO2	1	2.1	2.1.2	L4	2	Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
PO3	2	3.2	3.2.1	L6	3	Demonstrate the concept of value analysis and its relevance.
PO2	1	2.2	2.2.2	L4	4	Manage and implement different concepts involved in method study and understanding of work
PO5	1	5.1	5.1.1	L2	5	Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
PO2	2	2.1	2.1.2	L4	6	Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing

Course Objectives

Sr. No	Description
1	To familiarise with concept of integration of various resources and the significance of optimizing
2	To acquaint with various productivity enhancement techniques
3	Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
4	Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing

Subject-PE   **Subject Code-MEC803**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	Level 2 UNDERSTANDING	1	Compute heat interactions in combustion of reactive mixtures
3	1	3.1	3.1.3	Level 3 APPLYING	2	Differentiate boilers, boiler mountings and accessories
1	1	2.3	2.3.2	Level 3 APPLYING	3	Calculate boiler efficiency and assess boiler performance
1	1	2.3	2.3.2	Level 2 UNDERSTANDING	4	Demonstrare working cycles ofgas turbines
5	1	3.3	1.3.1	Level 5 EVALUATING	5	Draw velocity triangles of impulse/reaction turbines and calculate performance parameters/efficiency
3	1	3.1	3.1.3	Level 5 EVALUATING	6	Demonstrate basic working of pumps

Course Objectives

Sr. No	Description
1	To study boilers, boiler mountings and accessories
2	To study utilization of thermal and hydraulic energy
3	To study gas turbine and its applications
4	Calculate boiler efficiency and assess boiler performance
5	Demonstrate basic working of pumps
6	Demonstrare working cycles ofgas turbines

Subject-RES   **Subject Code-MEDLO8043**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	1	1.3	1.31 2.1.2	L3	1	Demonstrate need of different renewable energy sources
PO2	1	2.1	2.1.2	L4	2	Discuss importance of renewable energy sources
PO3	1	3.2	3.2.1	L6	3	Discuss various renewable energy sourses in Indian context
PO2	1	2.2	2.2.2	L4	4	Calculate and analyse utilization of solar and wind energy
PO5	1	5.1	5.1.1	L2	5	Illustrate design of biogas plant
PO2	1	2.1	2.1.2	L4	6	Demonstrate basics of hydrogen energy

Course Objectives

Sr. No	Description
1	To study working principles of various renewable energy sources and their utilities.
2	To study economics of harnessing energy from renewable energy sources
3	Discuss importance of renewable energy sources
4	To Demonstrate need of different renewable energy sources
5	To Calculate and analyse utilization of solar and wind energy
6	To Discuss importance of renewable energy sources

Subject-EDM   **Subject Code-ILO8023**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Understand the concept of business plan and ownerships
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Interpret key regulations and legal aspects of entrepreneurship in India
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Understand government policies for entrepreneurs
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	To familiarise principles of energy management and concept of energy management in utility systems
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	To study energy economics and auditing
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	To study electrical energy management, cogeneration and waste heat recovery

Course Objectives

Sr. No	Description
1	To acquaint with entrepreneurship and management of business
2	Understand Indian environment for entrepreneurship
3	Idea of EDP, MSME
4	Apply selection criteria and select an appropriate project from different options.
5	Write work break down structure for a project and develop a schedule based on it.
6	Identify opportunities and threats to the project and decide an approach to deal with them strategically.

Subject-DMS   **Subject Code-MEL801**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.3	Level 4	1	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.2	Level 6	2	Apply fundamental engineering concepts
1	1	1.4	1.4.1	Level 4	3	Creating techniques to solve engineering problems
3	1	3.2	3.2.1	Level 3	4	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.1	Level 5	5	Identify & select suitable criteria for the evaluation of alternate design solutions
3	1	3.2	3.2.3	Level6	6	Creating techniques to solve engineering problems

Course Objectives

Sr. No	Description
1	To study & apply concepts of system design.
2	To study & design snatch block assembly in EOT cranes.
3	To study & design flat belt & trough belt conveyor system
4	To study & design internal combustion engine system.
5	To study & design centrifugal pump & gear pump system
6	To study & design machine tool gearbox.

Subject-PE **Subject Code-MEL802**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	1	Differentiate boilers
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	2	Differentiate boiler mountings and accessories
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	3	Conduct a trial on impilse turbine and analyse its performance
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	4	Conduct a trail on reaction turbine and analyse its performance
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	5	Conduct a trial on Centrifugal pump and analyse its perfromance
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	6	Conduct a trial on Reciprocating pump and analyse its perfromance

Course Objectives

Sr. No	Description
1	To familiarisewith boilers, boiler mountings and accessories using models/cut sections
2	To familiarise with hydraulic energy conversion device

Subject-PROJECT-II   **Subject Code-MEP801**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 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 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.