

**DEPARTMENT OF MECHANICAL ENGINEERING**

III

<b>Course Code:</b>	<b>MEC301</b>		<b>Course Name</b>	<b>ENGINEERING MATHEMATICS-III</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
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.

<b>Course Code:</b>	<b>MEC 302</b>		<b>Course Name</b>	<b>Strength of</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	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)	CO2	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)	CO3	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)	CO4	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)	CO5	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)	CO6	Learners will be able to Analyse buckling phenomenon in columns using Euler's and Rankine's Method

<b>Course Code:</b>	<b>MEC 303</b>		<b>Course Name</b>	<b>Productio</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Demonstrate an understanding of casting process
PO 1	1	1.4	1.4.1	Level 3 (Applying)	CO2	Demonstrate applications of various types of welding processes.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Differentiate chip forming processes such as turning, milling, drilling, etc.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Illustrate principles and working of non-traditional manufacturing
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	Understand the manufacturing technologies enabling Industry 4.
PO 2	1	2.2	2.2.4	Level 4 (Analysing)	CO6	Illustrate the concept of producing polymer components and ceramic components.

<b>Course Code:</b>	<b>MEC 304</b>		<b>Course Name</b>	<b>MATERIALS AND</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO1	1	1.3	1.3.1	Level 2 (Understanding)	CO1	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)	CO2	Learner will be able to Apply phase diagram concepts to engineering applications
PO1	1	1.3	1.3.1	Level 3 (Applying)	CO3	Learner will be able to Apply particular heat treatment for required property development
PO1	1	1.3	1.3.1	Level 4 (Analyzing)	CO4	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)	CO5	Learner will be able to Choose or develop new materials for better performance
PO4	1	4.1	4.1.2	Level 2 (Understanding)	CO6	Learner will be able to Decide an appropriate method to evaluate different components in service

<b>Course Code:</b>	<b>MEC 305</b>		<b>Course Name</b>	<b>Thermodynamics</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
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.

<b>Course Code:</b>	<b>MEL 301</b>	<b>Course Name</b>	<b>Materials Testing</b>			
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	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)	CO2	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)	CO3	Learners will be able to Perform Fatigue Test and draw S-N curve
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	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)	CO5	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)	CO6	Learners will be able to Perform flexural test with central and three point loading conditions

<b>Course Code:</b>	<b>MEL</b>		<b>Course Name</b>	<b>Machine Shop</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Know the specifications, controls and safety measures related to machines and machining operations.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Use the machines for making various engineering jobs.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Perform various machining operations
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Perform Tool Grinding
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	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)	CO6	Perform welding operations

<b>Course Code:</b>	<b>MES BL3</b>		<b>Course Name</b>	<b>CAD MODELLI</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Illustrate basic understanding of types of CAD model creation.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Visualize and prepare 2D modeling of a given object using modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Build solid model of a given object using 3D modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Visualize and develop the surface model of a given object using modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	Generate assembly models of given objects using assembly tools of a modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO6	Perform product data exchange among CAD systems.



<b>Course Code:</b>	<b>MEP BL3</b>		<b>Course Name</b>	<b>MINI PROJEC</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	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)	CO5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO6	Excel in written and oral communication.

### SEM-IV

Course Code:	MEC 401		Course Name	ENGINEERING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3	1	3.2	3.2.1	3	CO1	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	CO2	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	CO3	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	CO4	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	CO5	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	CO6	Apply the concepts of parametric and nonparametric tests for analysing practical problems

<b>Course Code:</b>	<b>MEC 402</b>	<b>Course Name</b>	<b>FLUID MECHAN</b>			
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO1	1	1.2	1.2.1	1	C01	Define properties of fluids, classify of fluids and evaluate hydrostatic forces on various surfaces.
PO2	2	2.4	2.4.1	2	C02	Differentiate velocity potential function and stream function and solve for velocity and accelerataion of fluid
PO1	2	1.4	1.4.1	3	C03	Apply Bernoulli's equation to various flow measuring devices
PO2	1	2.1	2.1.2	2	C04	Understand the basic concepts of laminar flow in circular pipes
PO2	1	2.1	2.1.3	3	C05	Apply the concept of Major losses and Minor losses in pipes to solve problems.
PO2	2	2.1	2.1.2	3	C06	Apply the concept of Boundary layer formation to solve numerical on Boundary layer thickness

<b>Course Code:</b>	<b>MEC 403</b>	<b>Course Name</b>	<b>KINEMATICS</b>			
<b>PO</b>	<b>PSO</b>	<b>Competency</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Identify various components of mechanisms
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Develop mechanisms to provide specific motion
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Draw velocity and acceleration diagrams of various mechanisms
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Choose a cam profile for the specific follower motion
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	Predict condition for maximum power transmission in the case of a belt drive
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO6	Illustrate requirements for an interference-free gear pair

<b>Course Code:</b>	<b>MEC 404</b>		<b>Course Name</b>	<b>CAD CAM</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Identify suitable computer graphics techniques for 3D modeling.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Transform, manipulate objects & store and manage data.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Develop 3D model using various types of available biomedical data.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Create the CAM Toolpath for specific given operations.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	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)	CO6	Illustrate understanding of various cost effective alternatives for manufacturing products.

<b>Course Code:</b>	<b>MEC</b>		<b>Course Name</b>	<b>INDUSTRIAL</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO1	PSO 1	1.3	1.3.1	L3	CO1	Illustrate constructional, working principles and applications of Power Electronics switches.
PO2	PSO 2	2.2	2.2.2	L2	CO2	Understand working of controlled Rectifiers and Inverters for DC and AC motor speed control
PO4	PSO 1	4.1	4.1.2	L4	CO3	Develop circuits using op-amp parameters.
PO2	PSO 1	2.1	2.1.2	L1	CO4	Identify use of different basic gates and use digital circuits for industrial applications
PO5	PSO 1	5.1	5.1.1	L3	CO5	Demonstrate the knowledge of basic functioning of microcontroller
PO2	PSO 1	2.2	2.2.3	L4	CO6	Analyze speed torque characteristic of electrical machines for speed control

<b>Course Code:</b>	<b>MEL 401</b>	<b>Course Name</b>	<b>INDUSTRIAL</b>			
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO1 PO2	PSO 1	1.3	1.31 2.1.2	L3	CO1	Demonstrate characteristic of various electrical and electronics Components.
PO2	PSO 1	2.1	2.1.2	L4	CO2	Develop simple applications built around rectifiers and Inverters components
PO3	PSO 2	3.2	3.2.1	L6	CO3	Create and build circuits built around op-amp parameters.
PO2	PSO 1	2.2	2.2.2	L4	CO4	Identify and use of different basic gates and digital circuits for industrial applications
PO5	PSO 1	5.1	5.1.1	L2	CO5	Understand and demonstrate basic parameters measurement using microcontroller
PO2	PSO 2	2.1	2.1.2	L4	CO6	Test and Analyse speed torque characteristic of electrical machines for speed control

<b>Course Code:</b>	<b>MEL 402</b>	<b>Course Name</b>	<b>KINEMATICS</b>			
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO2	PSO 1	1.3	1.31 2.1.2	L3	CO1	Draw velocity diagram using Instantaneous Centre method
PO2	PSO 1	2.1	2.1.2	L4	CO2	Find velocity and acceleration of a point on a four-bar mechanism by using Relative method.
PO3	PSO 2	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	PSO 1	2.2	2.2.2	L4	CO4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower motion.
PO5	PSO 1	5.1	5.1.1	L2	CO5	Draw cam profile for the specific follower motion.
PO2	PSO 2	2.1	2.1.2	L4	CO6	Develop and build mechanisms to provide specific motion.

<b>Course Code:</b>	<b>MES</b>		<b>Course Name</b>	<b>CNC 3D PRINTIN</b>		
<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Illustrate basic understanding of types of CAD model creation.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO2	Visualize and prepare 2D modeling of a given object using modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Build solid model of a given object using 3D modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	Visualize and develop the surface model of a given object using modeling software.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO5	Generate assembly models of given objects using assembly tools of a modeling software
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO6	Perform product data exchange among CAD systems.



**SEM-V  
Scheme (R-**

Course Code:	MEC 501	Course Name	MECHANIC AL			
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 Code:	MEC 502		Course Name	THERMAL ENGG		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	2.4	2.4.1	Level 4 Analyzing	CO1	Analyze the three modes of heat transfer in engineering application.
PO2	1	3.1	3.1.3	Level 6 Creating	CO2	Develop mathematical models for different modes of heat transfer.
PO3	1	2.4	2.4.4	Level 4 Analyzing	CO3	Analyze performance parameters of different types of heat exchangers.
PO2	1	2.1,2.4	2.1.2,2.4.1	Level 2 and Level 4, Understand ing and Analyzing	CO4	Identify and analyze the Transient heat Transfer in engineering applications.
PO4	1	5.3	5.3.1	Level 2 Understand ing	CO5	Explain construction and working of different components of internal combustion engines.
PO4	1	2.2	2.2.2	Level 5 Evaluating	CO6	Evaluate engine performance and emission characteristics.

Course Code:	MEC 503		Course Name	DYNAMICS OF		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.3	1.3.1	Level 4 Analyse	C01	Demonstrate working principle of different types of governors and Gyroscopic effects on the mechanical systems
PO2	1	1.4	1.4.1	Level 2 Understand	C02	Illustrate basic of static and dynamic forces
PO1	1	2.1	2.1.2	Level 3 Apply	C03	Determine natural frequency of systems
PO3	1	2.1	2.1.3	Level 3 Apply	C04	Determine vibration response of mechanical systems
PO4	1	3.3	3.3.1	Level 4 Analyse	C05	Design vibration isolation system for a specific application
PO1	1	3.3	3.3.1	Level 4 Analyse	C06	Demonstrate basic concepts of balancing of forces and couples

Course Code:	MEC 504		Course Name	FINITE ELEMENT		
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	C02	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	C03	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	C04	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	C05	Apply the basic finite element formulation techniques to solve Vector Variable Problems
PO2	1	2.6	2.6.2	Level 3 Apply	C06	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system

Course Code:	MEC		Course Name	OPTIMIZATION		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	2.1	2.1.2	Level2	C01	Identify the types of optimization problems and apply the calculus method to single variable problems..
PO2	1	2.1	2.1.3	Level3	C02	Formulate the problem as Linear Programming problem and analyse the sensitivity of a decision variable.
PO3	1	2.3	2.4.1	Level3	C03	Apply various linear and non-linear techniques for problem solving in various domain.
PO4	1	4.1	4.1.2	Level3	C04	Apply multi-objective decision making methods for problem in manufacturing environment and other domain.
PO3	1	3.3	3.3.1	Level3	C05	Apply multi criterion decision making methods for problem in manufacturing environment and other domain.
PO4	1	4.2	4.2.1.	Level3	C06	Apply Design of Experiments method for Optimization

Course Code:	MEL5 01	Course Name	THERMAL ENGG LAB
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<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
PO2	1	4.3	4.3.1	Level 3 Apply	C01	Estimate thermal conductivity of engineering materials.
PO2	1	4.3	4.3.1	Level 3 Apply	C02	Evaluate performance parameters of extended surfaces.
PO3	1	4.3	4.3.2	Level 4 Analyze	C03	Analyze heat transfer parameters in various engineering applications.
PO3	1	4.3	4.3.2	Level 4 Analyze	C04	Analyze engine performance and emission parameters at different operating conditions.
PO2	1	3.1	3.1.3	Level 3 Apply	C05	Evaluate heat load for confine space
PO1	1	2.2	2.2.3	Level 1 Understand	C06	Identify different thermal engineering processes in real world

Course Code:	MEL		Course Name	DYNAMICS OF		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	4.3	4.3.2	Level 4 Analyze	C01	Plot and analyze governor characteristics
PO2	1	4.3	4.3.2	Level 4 Analyze	C02	Analyze gyroscopic effect on laboratory model
PO1	1	3.1	3.1.3	Level 3 Apply	C03	Estimate natural frequency of mechanical systems
PO3	1	4.3	4.3.2	Level 4 Analyze	C04	Analyze vibration response of mechanical systems
PO4	1	3.1	3.1.3	Level 3 Apply	C05	Determine damping coefficient of a system
PO1	1	3.1	3.1.3	Level 3 Apply	C06	Balance rotating mass

Course Code:	MEL		Course Name	FINITE ELEMENT		
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	C02	Select suitable meshing and perform convergence test
PO2	1	2.1	2.1.3	Level 4 Analyse	C03	Select appropriate solver for given problem
PO2	1	2.4	2.4.1	Level 2 Understand	C04	Interpret the result
PO2	1	2.1	2.5.2	Level 3 Apply	C05	Apply basic aspects of FEA to solve engineering problems
PO2	1	2.6	2.6.2	Level 5 Evaluate	C06	Validate FEA solution

Course Code:	MESB L501	Course Name	PCE II			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	2.4	2.4.1	Level 2 Understood	CO1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
PO2	1	1.3	1.3.2	Level 3 (Applying)	CO2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
PO2	1	1.3	1.3.3	Level 3 (Applying)	CO3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
PO2	1	1.3	1.3.4	Level 3 (Applying)	CO4	Deliver persuasive and professional presentations.
PO2	1	1.3	1.3.5	Level 3 (Applying)	CO5	Develop creative thinking and interpersonal skills required for effective professional communication.
PO2	1	1.3	1.3.1	Level 3 (Applying)	CO6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.

Course Code:	MEP BL50	Course Name	MINIPROJE CT ( 2A )			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Identify problems based on societal /research needs.
PO 1	1	1.3	1.3.1	Level 3 (Applying)	CO2	Use standard norms of engineering practices
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	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)	CO5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO6	Draw the proper inferences from available results through theoretical/ experimental/simulations.



**SEM VI**

Course Code:	MEC 602		Course Name	TURBOMA CHINERY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO 1	1.3	1.3.1	L1	1	Define various parameters associated with steam generators and turbo machines
PO3		3.1	3.1.1	L2	2	Identify various components and mountings of steam generators with
PO3	PSO 1	3.1	3.1.1	L2	3	Identify various turbo machines and explain their significance.
PO2		2.1	2.1.3	L2	4	Apply principles of thermodynamics and fluid mechanics to estimate various parameters like mass flow rate power, torque, efficiency, temperature, etc
PO3	PSO 1	3.1	3.1.1	L2	5	Evaluate performance of SG and Turbo machines and apply various techniques to enhance performance.
PO1		1.3	1.3.1	L2	6	Evaluate various phenomena related to performance like cavitation, choking, surging.

Course Code:	MEC 601		Course Name	MACHINE DESIGN		
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 basic design concept to design the machine elements against static load
PO2	2	3.3	3.3.1	Level 3 (Apply)	3	Apply the basic Design concept to design the machine elements against fluctuating load
Po5	1	3.1	3.1.4	Level 1 (Remember)	4	Select the Rolling Contact bearing from Manufacturers Catalogue
Po4	1	3.2	3.2.3	Level 6 (Create)	5	Design the belt, flywheel and select roller Chain
PO3	2	3.2	3.2.3	Level 3 (Apply)	6	Apply the basic design concept to design springs, clutches and Brakes.

Course Code:	MEC 603		Course Name	HEATING VENTILATI		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	Level 3 Apply	1	1. Illustrate the fundamental principles and applications of refrigeration and air conditioning systems and evaluate performance of each cycle.
PO1,PO2	1	2.8	2.8.1.2.8.2,2 .8.3	Level 4 Analyse	2	2. Study of various refrigeration cycles and evaluate performance of each cycle.
PO1,PO4	1	1.3	1.3.1	Level 5 Evaluate	3	3.Evaluate performanc e of various cooling and heating loads for an air conditioning system.
PO5	1	5.1, 5.2	5.1.1,5.1.2,5 .2.2	Level 6 Create	4	4.Select air handling unit & design air distribution system
PO2	1	2.1	2.5.2	Level 2 Understan d	5	5. Identify various HVAC&R components
PO12,PO7	1	7.1.7.2	7.1.1,7.1.2,7 .2.1,7.2.2	Level 2 Understan d	6	6.Apply the knowledge of HVAC for the sustainable development airconditioning systems

Course Code:	MED LO60		Course Name	METAL FORMING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.2	1.2.1	3	1	Understand concept of different metal forming processes
1,2,3	1	3.3	3.3.1	4	2	Illustrate design process for Rolling operation
1,2,3	1	3.3	3.3.1	4	3	Illustrate design process for Forging operation
1,2,3	1	1.3	1.3.1	4	4	Illustrate design process for Extrusion operation
1,2,3	1	1.4	1.4.1	4	5	Illustrate design process for Drawing operation
1	1	1.4	1.3.1	2	6	Demonstrate different sheet metal forming processes in detail

Course Code:	MEL6 01	Course Name	MACHINE DESIGN			
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	5.1	5.1.1	Level 3 (Apply)	2	Apply the basic design concept to design the Cotter Joint against static load and do software analysis o components
PO2	1	5.1	5.1.1	Level 3 (Apply)	3	Apply the basic design concept to design the Coupling and draw it with its part by any drafting software
PO5	1	3.1	3.1.4	Level 1 (Remember)	4	Select the Rolling Contact bearing from Manufacturers Catalogue
PO4	1	3.2	3.2.3	Level 6( Create)	5	Design the belt, flywheel and select roller Chain
PO3	2	3.2	3.2.3	Level 3 (Apply)	6	Apply the basic design concept to design springs, clutches and Brakes.

Course Code:	MEL6 02	Course Name	TURBOMA CHINERY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO 1	1.3	1.3.1	L1	1	Define various parameters associated with steam generators and turbo machines
PO3		3.1	3.1.1	L2	2	Identify various components and mountings of steam generators with
PO3	PSO 1	3.1	3.1.1	L2	3	Identify various turbo machines and explain their significance.
PO2		2.1	2.1.3	L2	4	Apply principles of thermodynamics and fluid mechanics to estimate various parameters like mass flow rate power, torque, efficiency, temperature, etc
PO3	PSO 1	3.1	3.1.1	L2	5	Evaluate performance of SG and Turbo machines and apply various techniques to enhance performance.
PO1		1.3	1.3.1	L2	6	Evaluate various phenomena related to performance like cavitation, choking, surging.

Course Code:	MEL6 03	Course Name	HVAC LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO6	1	6.2	6.2.1	L1	1	1. Aware of the roles and ethics of HVAC &R engineers in related industries.
PO7,PO8,	1	7.1 ,8.1	7.1.1,8.1.2	L2	2	2. Present the impact of professional engineering solutions in societal and environmental contexts.
PO6	1	6.1,6.2	6.1.1,6.2.1	L5	3	3. Evaluate performance of HVAC &R systems
PO3	1	3.1	3.1.1	L1	4	4. Develop awareness of the engineering and technological aspects in the HVAC &R industries.
PO3	1	3.1	3.1.1	L2	5	5. Communicate effectively through the preparation of report and practical presentation.
PO1	1	1.3	1.3.1	L4	6	6. Analyse of HVAC&R in various application

Course Code:	MEL		Course Name	MEASURE MENT AND		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.3	2.3.1	Level 3 (Apply)	1	Apply inspection gauge to check or measure surface parameters
PO2	1	2.4	2.4.2	Level 4 (Analysing)	2	Measure surface parameters using precision measurement tools and equipment.
PO5	1	2.2	2.2.1	Level 4 (Analysing)	3	Measure different mechanical parameters by using sensors.
PO4	1	2.1	2.1.3	Level 4 (Analysing)	4	Analyse the response of a control systems
PO5	1	2.2	2.2.3	Level 4 (Analysing)	5	Demonstrate use of automated controls using pneumatic and hydraulic systems.
PO5	1	2.2	2.2.3	Level 3 (Apply)	6	Implement program on PLC system and demonstrate its application

Course Code:	MEC		Course Name	A & AI		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.3	2.3.1	Level 2 Understand	1	understanding of fundamentals of industrial automation and AI
PO2	1	2.4	2.4.2	Level 6( Create)	2	Design & develop pneumatic / hydraulic circuits
PO5	1	2.2	2.2.1	Level 6( Create)	3	Design and develop electropneumatic circuits and PLC ladder logics.
PO4	1	2.1	2.1.3	Level 2 Understand	4	understanding of robotic control systems and their applications.
PO5	1	2.2	2.2.3	Level 2 Understand	5	understanding of various AI and machine learning technologies
PO5	1	2.2	2.2.3	Level 4 Analyse	6	study, concept and analysis of ANN

Course Code:	MEP BL60		Course Name	MINIPROJECT ( 2B )		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO1	Identify problems based on societal /research needs.
P0 1	1	1.3	1.3.1	Level 3 (Applying)	CO2	Use standard norms of engineering practices
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO3	Analyse the impact of solutions in societal and environmental context for sustainable development.
PO 2	1	2.2	2.2.3	Level 4 (Analysing)	CO4	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)	CO5	Demonstrate project management principles during project work.
PO 2	1	2.2	2.2.2	Level 4 (Analysing)	CO6	Draw the proper inferences from available results through theoretical/ experimental/simulations.

Course

Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	CO1	Apply Mechanical engineering concepts to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO2	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO3	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO4	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO5	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO6	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems

Course

Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	Level 3 Apply	CO1	Apply Mechanical engineering concepts to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO2	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO3	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO4	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO5	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems
PO3,PO5	1	3.2,5.1	3.2.3, 5.1.2	Level 4 Analyze, Level 6 Create	CO6	Identify & select suitable criteria for the evaluation of alternate design solutions, Creating techniques to solve engineering problems



Course Course

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	1	1.4	1.4.1	L2(Understand)	CO1	understand the fundamentals of supply chain management and Logistics
PO2	1	2.1	2.2.1	L6 (Create)	CO2	develop an understanding related to Supply Chain Performance and related aspects
PO3	1	3.3	3.3.1	L2(Understand)	CO3	understand Inventory management in supply chain
PO5	1	5.2	5.2.1 5.2.2	L2(Understand)	CO4	Understand tools and techniques used in logistics, transportation, warehousing and outsourcing decisions.
PO5	1	5.2	5.2.1 5.2.2	L6 (Create)	CO5	develop critical understanding towards digitization in supply chain management and sustainability
PO6	1	6.2	6.1.2	L6 (Create)	CO6	Develop analytical and critical understanding for planning and designing supply chain network.

Course Course

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	1	1.3	1.31 2.1.2	L3	CO1	Demonstrate need of different Renewable Energy Sources
PO2	1	2.1	2.1.2	L4	CO2	Discuss the storage and application of Solar Energy
PO3	1	3.2	3.2.1	L6	CO3	Discuss various types of Solar photovoltaic systems
PO2	1	2.2	2.2.2	L4	CO4	Calculate and analyse utilization of Wind Energy
PO5	1	5.1	5.1.1	L2	CO5	Illustrate Design of Biogas plant.
PO2	1	2.1	2.1.2	L4	CO6	Demonstrate Basics of Geothermal and Ocean Energy.

Course Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1, PO2, PO12	1	1.4,2.1,12.2	1.4.1,2.21, 12.2.1	L2	CO1	1.Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study1 and PDM implementation.
PO2,PO11, PO9	1	2.1,9.1,11.1	2.2.1,9.1.1,1 1.1.1	L6	CO2	2. Illustrate various approaches and techniques for designing and developing products.
PO3,PO4	1	3.3,4.2	3.3.1,4.2.1,4 .2.2	L2	CO3	3. Apply product engineering guidelines / thumb rules in designing products for moulding, machining,sheet metal working etc.
PO2,PO4	1	4.2	4.2.1 4.2.2	L2	CO4	4. Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant
PO7	1	7.2	7.2.1 7.2.2	L6	CO5	5.To give insights into integration of environmental aspects in product design
PO8	1	8.2	8.1.1	L6	CO6	6. To familiarize the students with life cycle assessment & life cycle cost analysis

Course Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO10	1	10.1	10.1.1, 10.1.3	6	1	Create and edit documents and slides on MS Word and MS Powerpoint
PO2,PO5	1	2.2,2.4,5.2	2.2.2, 2.4.4, 5.2.2	3	2	Execute functions in MS Excel
PO5,PO9	1	5.3,9.1	5.3.2, 9.1.1	2	3	Understand navigation of tasks and function execution in G-suite
PO2,PO9	1	2.1, 9.2	2.1.1, 9.2.1	2	4	Understand metacognitive skills of creativity and problem solving
PO9,PO10	1	9.2, 10.2	9.2.1, 10.2.1	6	5	Develop team building and leadership skills
PO1, PO2	1	1.1, 2.1	1.1.1, 2.1.3	5	6	Evaluate different assessment rounds for campus placements

Course Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	1	1	Do literature survey/industrial visit and identify the problem
2	2	2.3	2.3.1	2	2	Apply basic engineering fundamental in the domain of
4	1	1.3	1.3.1	1	3	Cultivate the habit of working in a team
4	1	2.3	2.3.1	2	4	Attempt a problem solution in a right approach
11	1	1.2	1.2.1	1	5	Correlate the theoretical and experimental/simulations results
12	1	2.3	2.3.1	2	6	Prepare report as per the standard guidelines.

Course Course Name:

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.4	1.4.1	L1	CO1	1. Identify different tools used for maintenance.
PO2	1	2.1	2.2.1	L2	CO2	2. Apply different maintenance strategies.
PO3	1	3.3	3.3.1	L2	CO3	3. Demonstrate the process of servicing a machine.
PO3,PO5	1	3.3,5.2	3.3.1,5.2.1 5.2.2	L2	CO4	4. Identify common faults in Machinery using Vibration Spectrum.
PO5	1	5.2	5.2.1 5.2.2	L4	CO5	5. Interpret the Vibration Signals for Monitoring and Prognosis.
PO5	1	5.2	5.2.1 5.2.2	L6	CO6	6.Acquaint with the process of Condition Monitoring and Machinery Fault Diagnosis.

Course Course

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	1	1.3	1.31 2.1.2	L3	CO1	Relate basic concepts of Machinery Diagnostic
PO2	1	2.1	2.1.2	L4	CO2	Describe the working of Vibration Measuring Instruments
PO3	1	3.2	3.2.1	L6	CO3	Apply different Signal Processing Techniques in Vibration Measurement
PO2	1	2.2	2.2.2	L4	CO4	Identify common faults in Machinery using Vibration Spectrum
PO5	1	5.1	5.1.1	L2	CO5	Interpret the Vibration Signals for Monitoring and Prognosis
PO2	1	2.1	2.1.2	L4	CO6	Understand different applications of Condition Monitoring