

DEPARTMENT OF MECHANICAL ENGINEERING

SEM-III (R-19)

Course Code:	MEC301		Course Name	ENGINEERING MATHEMATICS-III		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3,5	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	1	2.1	2.1.2	3,4	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	3	Determine and develop Fourier series for real life problems and applications.
1,2,4	1	3.2	3.2.1	3	4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1,2	1	1.1	1.1.3	3	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	6	solve partial differential equations and analytical method for one dimensional heat and wave equations.
Course Code:	MEC302		Course Name	Strength of Materials		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Learners will be able to Apply fundamental knowledge about various types of loading and stresses induced
1	1	1.4	1.4.1	3	2	Learners will be able to Apply Fundamental knowledge of Force and Moment to Draw the SFD and BMD for different types of loads and support conditions
2	1	2.2	2.2.3	4	3	Learners will be able to Analyse the bending Stresses, shear stresses and Direct and Bending Stresses induced in beam.
2	1	2.2	2.2.3	4	4	Learners will be able to Analyse the deflection in beams and stresses in shafts Subjected to Twisting Moment.
2	1	2.2	2.2.3	4	5	Learners will be able to Analyse the Stresses in Thin Cylinders and Thin Spherical Shells and Estimate the strain energy in mechanical elements
2	1	2.2	2.2.4	4	6	Learners will be able to Analyse buckling phenomenon in columns using Euler's and Rankine's Method
Course Code:	MEC303		Course Name	Production Process		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Demonstrate an understanding of casting process
1	1	1.4	1.4.1	3	2	Demonstrate applications of various types of welding processes.
2	1	2.2	2.2.3	4	3	Differentiate chip forming processes such as turning, milling, drilling, etc.
2	1	2.2	2.2.3	4	4	Illustrate principles and working of non-traditional manufacturing
2	1	2.2	2.2.3	4	5	Understand the manufacturing technologies enabling Industry 4.
2	1	2.2	2.2.4	4	6	Illustrate the concept of producing polymer components and ceramic components.

Course Code:	MEC 304		Course Name	MATERIALS AND METALLURGY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	Learner will be able to Identify the various classes of materials and comprehend their properties
1	1	1.4	1.4.1	3	2	Learner will be able to Apply phase diagram concepts to engineering applications
1	1	1.3	1.3.1	3	3	Learner will be able to Apply particular heat treatment for required property development
1	1	1.3	1.3.1	4	4	Learner will be able to Identify the probable mode of failure in materials and suggest measures to prevent them
1	1	1.4	1.4.1	2	5	Learner will be able to Choose or develop new materials for better performance
4	1	4.1	4.1.2	2	6	Learner will be able to Decide an appropriate method to evaluate different components in service
Course Code:	MEC 305		Course Name	Thermodynamics		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.1	2	1	Understand the basic concept of thermodynamics and application of first law of thermodynamics to various systems.
1	1	1.3	1.3.1	2	2	Apply the concept of Second law of thermodynamics and Entropy to solve problems.
2	1	2.1	2.1.2	3	3	understand the classification of grade of energy and various thermodynamic relations
1	1	1.4	1.4.1	3	4	Understand the basic concepts of steam formatioan and vapour power cycles
1	1	1.4	1.4.1	3	5	Apply the concept of various gas power cycle to solve problems.
2	1	2.4	2.4.1	2	6	Understand and apply the fundamentals of thermodyamics in compressible fluid flow to the relevent systems.
Course Code:	MEL301		Course Name	Materials Testing Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Learners will be able to Prepare metallic samples for studying its microstructure following the appropriate procedure.
2	1	2.2	2.2.2	4	2	Learners will be able to Identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test.
2	1	2.2	2.2.3	4	3	Learners will be able to Perform Fatigue Test and draw S-N curve
2	1	2.2	2.2.3	4	4	Learners will be able to Perform Tension test to Analyze the stress - strain behaviour of materials
2	1	2.2	2.2.3	4	5	Learners will be able to Measure torsional strength, hardness and impact resistanceof the material
2	1	2.2	2.2.3	4	6	Learners will be able to Perform flexural test with central and three point loading conditions
Course Code:	MEL302		Course Name	Machine Shop Practice		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Know the specifications, controls and safety measures related to machines and machining operations.
2	1	2.2	2.2.2	4	2	Use the machines for making various engineering jobs.
2	1	2.2	2.2.3	4	3	Perform various machining operations
2	1	2.2	2.2.3	4	4	Perform Tool Grinding
2	1	2.2	2.2.3	4	5	Learners will be able to Measure torsional strength, hardness and impact resistanceof the material
2	1	2.2	2.2.3	4	6	Perform welding operations

Course Code:	MESBL301		Course Name	CAD MODELLING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Illustrate basic understanding of types of CAD model creation.
2	1	2.2	2.2.2	4	2	Visualize and prepare 2D modeling of a given object using modeling software
2	1	2.2	2.2.3	4	3	Build solid model of a given object using 3D modeling software.
2	1	2.2	2.2.3	4	4	Visualize and develop the surface model of a given object using modeling software.
2	1	2.2	2.2.3	4	5	Generate assembly models of given objects using assembly tools of a modeling software
2	1	2.2	2.2.3	4	6	Perform product data exchange among CAD systems.
Course Code:	MEPBL301		Course Name	MINI PROJECT-IA		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.2	4	2	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
2	1	2.2	2.2.3	4	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.3	4	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
2	1	2.2	2.2.3	4	5	Demonstrate project management principles during project work.
2	1	2.2	2.2.3	4	6	Excel in written and oral communication.

SEM-IV (R 19)

Course Code:	MEC 401		Course Name	ENGINEERING MATHEMATICS-IV		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.1	3	1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
2	1	2.2	2.2.1	5	2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
3	2	3.1	3.1.6	3	3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
4	2	4.2	4.2.2	4	4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
3	1	3.3	3.3.1	3	5	Apply the concept of probability distribution to engineering problems& Testing hypothesis of small samples using sampling theory
2	1	2.4	2.4.1	2	6	Apply the concepts of parametric and nonparametric tests for analysing practical problems
Course Code:	MEC 402		Course Name	FLUID MECHANICS		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.2	1.2.1	1	1	Define properties of fluids, classify of fluids and evaluate hydrostatic forces on various surfaces.
2	2	2.4	2.4.1	2	2	Differentiate velocity potential function and stream function and solve for velocity and accelerataion of fluid
1	2	1.4	1.4.1	3	3	Apply Bernoulli's equation to various flow measuring devices
2	1	2.1	2.1.2	2	4	Understand the basic concepts of laminar flow in circular pipes
2	1	2.1	2.1.3	3	5	Apply the concept of Major losses and Minor losses in pipes to solve problems.
2	2	2.1	2.1.2	3	6	Apply the concept of Boundary layer formation to solve numerical on Boundary layer thickness
Course Code:	MEC403		Course Name	KINEMATICS MACHINERY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Identify various components of mechanisms
2	1	2.2	2.2.2	4	2	Develop mechanisms to provide specific motion
2	1	2.2	2.2.3	4	3	Draw velocity and acceleration diagrams of various mechanisms
2	1	2.2	2.2.3	4	4	Choose a cam profile for the specific follower motion
2	1	2.2	2.2.3	4	5	Predict condition for maximum power transmission in the case of a belt drive
2	1	2.2	2.2.3	4	6	Illustrate requirements for an interference-free gear pair

Course Code:	MEC404		Course Name	CAD CAM		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Identify suitable computer graphics techniques for 3D modeling.
2	1	2.2	2.2.2	4	2	Transform, manipulate objects & store and manage data.
2	1	2.2	2.2.3	4	3	Develop 3D model using various types of available biomedical data.
2	1	2.2	2.2.3	4	4	Create the CAM Toolpath for specific given operations.
2	1	2.2	2.2.3	4	5	Build and create data for 3D printing of any given object using rapid prototyping and tooling processes.
2	1	2.2	2.2.3	4	6	Illustrate understanding of various cost effective alternatives for manufacturing products.
Course Code:	MEC405		Course Name	INDUSTRIAL ELECTRONICS		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Illustrate constructional, working principles and applications of Power Electronics switches.
2	2	2.2	2.2.2	2	2	Understand working of controlled Rectifiers and Inverters for DC and AC motor speed control
4	1	4.1	4.1.2	4	3	Develop circuits using op-amp parameters.
2	1	2.1	2.1.2	1	4	Identify use of different basic gates and use digital circuits for industrial applications
5	1	5.1	5.1.1	3	5	Demonstrate the knowledge of basic functioning of microcontroller
2	1	2.2	2.2.3	4	6	Analyze speed torque characteristic of electrical machines for speed control
Course Code:	MEL401		Course Name	INDUSTRIAL ELECTRONICS LAB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	1	1.3,2.1	1.31 2.1.2	3	1	Demonstrate characteristic of various electrical and electronics Components.
2	1	2.1	2.1.2	4	2	Develop simple applications built around rectifiers and Inverters components
3	2	3.2	3.2.1	6	3	Create and build circuits built around op-amp parameters.
2	1	2.2	2.2.2	4	4	Identify and use of different basic gates and digital circuits for industrial applications
5	1	5.1	5.1.1	2	5	Understand and demonstrate basic parameters measurement using microcontroller
2	2	2.1	2.1.2	4	6	Test and Analyse speed torque characteristic of electrical machines for speed control

Course Code:	MEL402		Course Name	KINEMATICS MACHINERY LAB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	3	1	Draw velocity diagram using Instantaneous Centre method
2	1	2.1	2.1.2	4	2	Find velocity and acceleration of a point on a four-bar mechanism by using Relative method.
3	2	3.2	3.2.1	6	3	Analyze velocity and acceleration of a specific link of a slider crank mechanism using graphical approach by Relative method.
2	1	2.2	2.2.2	4	4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower motion.
5	1	5.1	5.1.1	2	5	Draw cam profile for the specific follower motion.
2	2	2.1	2.1.2	4	6	Develop and build mechanisms to provide specific motion.
Course Code:	MESBL401		Course Name	CNC 3D PRINTING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Illustrate basic understanding of types of CAD model creation.
2	1	2.2	2.2.2	4	2	Visualize and prepare 2D modeling of a given object using modeling software
2	1	2.2	2.2.3	4	3	Build solid model of a given object using 3D modeling software.
2	1	2.2	2.2.3	4	4	Visualize and develop the surface model of a given object using modeling software.
2	1	2.2	2.2.3	4	5	Generate assembly models of given objects using assembly tools of a modeling software
2	1	2.2	2.2.3	4	6	Perform product data exchange among CAD systems.
Course Code:	MEPBL401		Course Name	MINI PROJECT-IB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.2	4	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
2	1	2.2	2.2.3	4	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.3	4	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
2	1	2.2	2.2.3	4	5	Demonstrate project management principles during project work.
2	1	2.2	2.2.3	4	6	Excel in written and oral communication.

SEM-V (R16)						
Course Code:	MEC501		Course Name	INTERNAL COMBUSTION ENGINES		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Apply Air standards, Fuel Air & Actual Cycles concept to solve problems
2	1	2.1	2.1.3	4	2	Apply SI engine components, Ignition system & Combustion process that applies to given problem
2	1	2.1	2.1.2	4	3	Identify CI engine variables & parameters to solve the CI engine problems
2	1	2.4	2.4.1	4	4	Apply engine lubrications & cooling system & parameters to solve the problems
2	1	2.2	2.2.3	4	5	Illustrate engine performance characteristics processes for solving problems
3	1	3.1	3.1.6	5	6	Determine IC engine design objectives, functional requirements and arrive at specifications
Course Code:	MEC502		Course Name	MECHANICAL MEASUREMENTS AND CONTROL		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.2	1.2.1	1	1	Classify various types of static characteristics and types of errors occurring in the system
3	1	3.1	3.1.3	3	2	Classify and select proper measuring instrument for linear and angular displacement
2	1	2.3	2.3.2	3	3	Classify and select proper measuring instrument for pressure and temperature measurement
2	1	2.3	2.3.2	2	4	Design mathematical model of system/process for standard input responses
5	1	5.3	5.3.1	5	5	Analyse error and differentiate various types of control systems and time domain specifications
3	1	3.1	3.1.3	5	6	Analyse the problems associated with stability
Course Code:	MEC503		Course Name	HEAT TRANSFER		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Identify the three modes of heat transfer (conduction, convection and radiation).
2	1	2.2	2.2.2	4	2	Illustrate basic modes of heat transfer
2	1	2.2	2.2.3	4	3	Develop mathematical model for each mode of heat transfer
2	1	2.2	2.2.3	4	4	Develop mathematical model for transient heat transfer
2	1	2.2	2.2.3	4	5	Demonstrate and explain mechanism of boiling and condensation
2	1	2.2	2.2.3	4	6	Analyse different heat exchangers and quantify their performance
Course Code:	MEC504		Course Name	DYNAMICS OF MACHINERY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	To apply acquaint with working principles and applications of Governors / Gyroscope
1	1	1.3	1.3.1	3	2	To apply study static and dynamic force analysis in the mechanisms
2	1	2.4	2.4.1	3	3	To apply familiarise with basics of mechanical vibrations
3	1	3.4	3.4.2	4	4	To analyse the vibration isolation of Mechanical system
3	1	3.3	3.3.2	3	5	To solve the vibration response of Mechanical system
1	1	1.4	1.4.1	4	6	To analyse the vibration isolation of Mechanical system

Course Code:	MEDLO5012		Course Name	MACHINING SCIENCES AND TOOL DESIGN		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Use basics of machining sciences and various force measuring equipments
1	1	1.2	1.2.1	3	2	Describe the distribution of temperature in machining process and use of cutting fluids
4	2	4.1	4.1.1	4	3	Discuss various cutting tool materials and estimate machining induced surface integrity
3	2	3.3	3.3.1	4	4	Examine tool life considering different types of wears with optimized economical aspect of machining
3	2	3.1	3.1.6	6	5	Design the single point cutting tool and identify the tool nomenclature
3	2	3.1	3.1.6	6	6	Design multipoint cutting tools and its industrial applications
Course Code:	MEL501		Course Name	IC ENGINES LAB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	Dismantle engine assembly
1	1	1.4	1.4.1	2	2	Perform load test/speed test on engine setup
2	1	2.3	2.3.2	5	3	Calculate performance of multi cylinder engine
2	1	2.3	2.3.2	5	4	Analyse engine performance and draw heat balance sheet
2	1	2.3	2.3.2	5	5	Perform exhaust gas analysis
2	1	2.3	2.3.2	5	6	Overhaul and Assemble engine components
Course Code:	MEL502		Course Name	Mechanical Measurements and controls Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	To Calibrate displacement sensors
2	1	2.3	2.3.2	2	2	To Calibrate pressure and vacuum gauges
2	1	2.3	2.3.2	2	3	To Measure torque using strain gauges
3	1	3.1	3.1.1	3	4	Identify system/process characteristics for standard input responses
3	1	3.3	3.3.1	5	5	Identify various types of control systems and time domain specifications
3	1	3.1	3.1.3	5	6	Analyse the problems associated with stability
Course Code:	MEL503		Course Name	Heat Transfer Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.3	2.3.2	5	1	Estimate thermal conductivity of engineering materials.
2	1	2.3	2.3.2	5	2	Evaluate performance parameters of extended surfaces
2	1	2.3	2.3.2	5	3	Evaluate performance of parallel/Counter flow heat exchanger
2	1	2.3	2.3.2	5	4	Identify and analyze the Transient heat Transfer in engineering Analyze engine performance and emission parameters at different operating conditions
2	1	2.3	2.3.2	5	5	analyze emissivity of test material
2	1	2.3	2.3.2	5	6	Estimate Heat transfer Coefficient for natural/Forced Convection

Course Code:	MEL504		Course Name	Dynamics Of Machines Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	To apply acquaint with working principles and applications of Governors / Gyroscope
1	1	1.2	1.2.1	3	2	To apply study static and dynamic force analysis in the mechanisms
4	2	4.1	4.1.1	4	3	To apply familiarise with basics of mechanical vibrations
3	2	3.3	3.3.1	4	4	To analyse the vibration isolation of Mechanical system
3	2	3.1	3.1.6	6	5	To solve the vibration response of Mechanical system
3	2	3.1	3.1.6	6	6	To analyse the vibration isolation of Mechanical system
Course Code:	MEL505		Course Name	MANUFACTURING SCIENCES LAB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Study conventional machining operations
1	1	1.2	1.2.1	3	2	Study Lathe machine and its operations
4	2	4.1	4.1.1	2	3	Estimate machining time for Taper turning operation
3	2	3.3	3.3.1	4	4	Perform NC,DNC, CNC machining operations
3	2	3.3	3.3.1	4	5	Perform CNC programming for Turning/Drilling Operation
3	2	3.1	3.1.6	4	6	Identify machining parameters for non traditional machining operations using process parameters
Course Code:	MEL506		Course Name	BCE		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Plan and prepare effective business/ technical documents which will in turn provide solid
1	1	1.2	1.2.1	3	2	Strategize their personal and professional skills to build a professional image and meet the
4	2	4.1	4.1.1	4	3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in
3	2	3.3	3.3.1	4	4	Deliver persuasive and professional presentations.
3	2	3.1	3.1.6	6	5	Develop creative thinking and interpersonal skills required for effective professional
3	2	3.1	3.1.6	6	6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour

SEM VI (R 16)

Course Code:	MEC601		Course Name	Metrology and Quality Engineering		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	Demonstrate inspection methods and different gauges
1	1	1.4	1.4.1	2	2	Illustrate working principle of measuring instruments and calibration methodology
2	1	2.3	2.3.2	5	3	Illustrate basic concepts and statistical methods in quality control
2	1	2.3	2.3.2	5	4	Demonstrate characteristics of screw threads, gear profile, and tool profile
2	1	2.3	2.3.2	5	5	Illustrate the different sampling techniques in quality control
2	1	2.3	2.3.2	5	6	Illustrate different nondestructive techniques used for quality evaluation
Course Code:	MEC602		Course Name	Machine Design-I		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Apply Mechanical engineering concepts to solve engineering problems.
3	1	3.3	3.3.1	3	2	Apply the bending concept to solve curve beam problems
3	2	3.3	3.3.1	3	3	Apply the basic design concept to design the machine elements against static load
3	2	3.3	3.3.1	4	4	Apply the basic Design concept to design the machine elements against fluctuating load
3	2	3.4	3.4.1	4	5	Apply the strength /rigidity concept to Design the shaft and coupling problems.
3	2	3.4	3.4.1	6	6	Apply the basic design concept to design the helical and leaf springs against static and fluctuating load
Course Code:	MEC603		Course Name	Finite Element Analysis		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Solve differential equations using weighted residual methods
2	1	2.1	2.1.3	3	2	Apply the finite element equations to model engineering problems governed by second order differential equations
2	1	2.1	2.1.3	3	3	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements
2	1	2.4	2.4.1	3	4	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements
2	1	2.1	2.5.2	3	5	Apply the basic finite element formulation techniques to solve Vector Variable Problems
2	1	2.6	2.6.2	3	6	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system
Course Code:	MEC604		Course Name	Refridgeration and Airconditioning		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	Demonstrate fundamental principles of refrigeration and air conditioning
1	1	1.4	1.4.1	2	2	Identify and locate various important components of the refrigeration and air conditioning system
2	1	2.3	2.3.2	5	3	Illustrate various refrigeration and air conditioning processes using psychometric chart
2	1	2.3	2.3.2	5	4	Design Air Conditioning system using cooling load calculations
2	1	2.3	2.3.2	5	5	Estimate air conditioning system parameters
2	1	2.3	2.3.2	5	6	Demonstrate understanding of duct design concepts

Course Code:	MEDLO6021		Course Name	Mechatronics		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.3	2.3.1	2	1	Identify the suitable sensor and actuator for a mechatronics system
2	1	2.4	2.4.2	2	2	Select suitable logic controls
5	1	5.2	5.2.1	4	3	Analyse continuous control logics for standard input conditions
4	1	4.1	4.1.3	6	4	Develop ladder logic programming
2	1	2.2	2.2.3	6	5	Design hydraulic/pneumatic circuits
2	1	2.2	2.2.3	6	6	Design a mechatronic system
Course Code:	MEL601		Course Name	Metrology & Quality Engineering Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	To Measure linear and angular dimensions
1	1	1.4	1.4.1	2	2	To Measure surface roughness
2	1	2.3	2.3.2	5	3	To Measure various parameters of gear tooth profile
2	1	2.3	2.3.2	5	4	Use optical profile projector for measurement
2	1	2.3	2.3.2	5	5	Use various instruments for measurement of screw threads
2	1	2.3	2.3.2	5	6	Measure flatness by Autocollimator / Interferometry method
Course Code:	MEL602		Course Name	Machine Design-1 Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.3	2.3.1	2	1	Design shaft under various conditions
2	1	2.4	2.4.2	2	2	Design Knuckle Joint / cotter joint
5	1	2.2	2.2.1	4	3	Design Screw Jack/C-clamp along with frame
4	2	4.1	4.1.3	6	4	Design Flexible flange couplings/ Leaf spring
5	2	5.2	5.2.3	6	5	Convert design dimensions into working/manufacturing drawing
2	2	2.2	2.2.3	6	6	Use design data book/standard codes to standardise the designed dimensions
Course Code:	MEL603		Course Name	Finite Element Analysis Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	4	1	Select appropriate element for given problem
2	1	2.1	2.1.3	4	2	Select suitable meshing and perform convergence test
2	1	2.1	2.1.3	4	3	Select appropriate solver for given problem
2	1	2.4	2.4.1	2	4	Interpret the result
2	1	2.1	2.5.2	3	5	Apply basic aspects of FEA to solve engineering problems
2	1	2.6	2.6.2	5	6	Validate FEA solution

Course Code:	MEL604		Course Name	RAC Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.3	2.3.1	2	1	Demonstrate fundamental principles of refrigeration and air conditioning
2	2	2.4	2.4.2	2	2	Identify and locate various important components of the refrigeration and air conditioning system
5	1	5.2	5.2.1	4	3	Represent various refrigeration and air conditioning processes using psychometric chart
4	1	4.1	4.1.3	6	4	Operate and maintain refrigeration system
5	1	5.1	5.1.2	6	5	Operate and maintain air conditioning system
5	2	5.1	5.1.1	6	6	Simulate VCRS
Course Code:	MEL605		Course Name	Mechatronics Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.3	2.3.1	2	1	Demonstrate implementation of interfacing sensors and actuators using microcontrollers
2	1	2.4	2.4.2	2	2	Demonstrate of interfacing various utilities with microcontrollers
5	2	5.1	5.1.1	4	3	Demonstrate discrete control system using PLC microcontroller
4	2	4.2	4.2.1	6	4	Design and develop a control system for specific use
5	1	5.2	5.2.1	6	5	Implement program to PLC system and demonstrate its application
5	1	5.2	5.2.2	6	6	Develop pneumatic circuits for a specific system

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Course Code:	MEC701		Course Name	Machine Design-II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Identify & select suitable criteria for the evaluation of alternate
3	1	3.2	3.2.3	2	2	Extract engineering requirements from relevant engineering Codes
5	1	5.1	5.1.2	4	3	Creating techniques to solve engineering problems
1	1	1.4	1.4.1	3	4	Identify & select suitable criteria for the evaluation of alternate
3	1	3.1	3.1.4	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	6	6	Creating techniques to solve engineering problems
Course Code:	MEC702		Course Name	CAD/CAM/CAE		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Apply computer graphics techniques for geometric modelling
1	1	1.4	1.4.1	3	2	Apply transformation concepts to manipulate objects as well as store and manage data
1	2	1.4	1.4.1	3	3	Apply CAM concepts to prepare NC- G code
5	2	5.1	5.1.1	1	4	Identify the tools for Analysis of a complex engineering component
5	1	5.2	5.2.2	2	5	Explain concept of CIM
5	1	5.2	5.2.2	2	6	Discuss rapid prototyping and tooling concepts
Course Code:	MEC703		Course Name	Production Planning and Control		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	Illustrate production planning functions and manage manufacturing functions in a better way
2	1	2.1	2.1.1	2	2	Forecast the demand of the product and prepare an aggregate plan
2	2	2.3	2.3.2	3	3	Develop the skills of Inventory Management and cost effectiveness
2	2	2.2	2.2.4	3	4	Create a logical approach to Line Balancing in various production systems
2	1	2.4	2.4.1	5	5	Develop competency in scheduling and sequencing of manufacturing operations
3	1	3.1	3.1.3	3	6	Implement techniques of manufacturing planning and control
Course Code:	MEDLO7032		Course Name	Automobile Engineering		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	Understand the importance of Transmission system with troubleshooting and remedies in Automobile
2	1	2.2	2.2.3	2	2	Understand the working of Steering System in Automobile
1	1	1.4	1.4.1	2	3	Understand the various types of Wheel and Tyres in Automobile
1	1	1.3	1.3.2	2	4	Understand the different types of Electrical Charging system of Automobile
1	2	1.3	1.3.2	2	5	Identify and understand the various types of Body and Chasis system of Automobile
2	1	2.1	2.1.2	3	6	Familiarise with Latest Technological development in automotive technology

Course Code:	ILO 7017		Course Name	DM		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	2	1	Get to know natural as well as manmade disaster and their extent and possible effects on the
1	1	1.4	1.4.1	2	2	Plan of national importance structures based upon the previous history.
2	1	2.3	2.3.2	5	3	Get acquainted with government policies, acts and various organizational structure associated
2	1	2.3	2.3.2	5	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	5	5	To study and understand the means of losses and methods to overcome /minimize it.
2	1	2.3	2.3.2	6	6	To understand role of individual and various organization during and after disaster
Course Code:	MEL701		Course Name	Machine Design-II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Apply Mechanical engineering concepts to solve engineering problems.
3	1	3.3	3.3.1	3	2	Apply the bending concept to solve curve beam problems
3	2	3.3	3.3.1	3	3	Apply the basic design concept to design the machine elements against static load
3	1	3.3	3.3.1	3	4	Apply the basic Design concept to design the machine elements against fluctuating load
2	1	2.4	2.4.1	3	5	Apply the strength /rigidity concept to Design the shaft and coupling problems.
4	2	4.1	4.1.2	3	6	Apply the basic design concept to design the helical and leaf springs against static and fluctuating load
Course Code:	MEL702		Course Name	CAD/CAM/CAE		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.4	1.4.1	3	1	Apply computer graphics techniques for geometric modelling
1	1	1.4	1.4.1	3	2	Apply transformation concepts to manipulate objects as well as store and manage data
1	2	1.4	1.4.1	3	3	Apply CAM concepts to prepare NC- G code
5	2	5.1	5.1.1	1	4	Identify the tools for Analysis of a complex engineering component
5	1	5.2	5.2.2	2	5	Explain concept of CIM
5	1	5.2	5.2.2	2	6	Discuss rapid prototyping and tooling concepts
Course Code:	MEL703		Course Name	Production Planning and Control		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	1	5.1	5.1.1	6	1	Prepare a process sheet
5	1	5.1	5.1.1	6	2	Prepare a Gantt Chart
2	2	2.4	2.4.1	5	3	Forecast the demand of the product and prepare an aggregate plan
1	1	1.4	1.4.1	3	4	Perform ABC analysis of a given problem
5	1	5.1	5.1.1	6	5	Develop the skills of Inventory Management and cost effectiveness
5	2	5.1	5.1.1	6	6	Create a logical approach to Line Balancing for various production systems

Course Code:	MEL704		Course Name	PROJECT-I		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.2	4	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
2	1	2.2	2.2.3	4	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.3	4	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
2	1	2.2	2.2.3	4	5	Demonstrate project management principles during project work.
2	1	2.2	2.2.3	4	6	Excel in written and oral communication.

SEM VIII (R 16)

Course Code:	MEC801		Course Name	Design Of Mechanical Systems		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.3	4	1	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.2	6	2	Apply fundamental engineering concepts to solve engineering problems
1	1	1.4	1.4.1	4	3	Creating techniques to solve engineering problems
3	1	3.2	3.2.1	3	4	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.1	5	5	Identify & select suitable criteria for the evaluation of alternate design solutions
3	1	3.2	3.2.3	6	6	Creating techniques to solve engineering problems
Course Code:	MEC802		Course Name	Industrial Engineering Management		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Illustrate the need for optimization of resources and its significance
2	1	2.1	2.1.2	4	2	Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various
3	2	3.2	3.2.1	6	3	Demonstrate the concept of value analysis and its relevance.
2	1	2.2	2.2.2	4	4	Manage and implement different concepts involved in method study and understanding of work
5	1	5.1	5.1.1	2	5	Describe different aspects of work system design and facilities design pertinent to manufacturing
2	2	2.1	2.1.2	4	6	Illustrate concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing
Course Code:	MEC803		Course Name	Power Engineering		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	Compute heat interactions in combustion of reactive mixtures
3	1	3.1	3.1.3	3	2	Differentiate boilers, boiler mountings and accessories
2	1	2.3	2.3.2	3	3	Calculate boiler efficiency and assess boiler performance
2	1	2.3	2.3.2	2	4	Demonstrate working cycles of gas turbines
5	1	5.2	5.2.1	5	5	Draw velocity triangles of impulse/reaction turbines and calculate performance parameters/efficiency
3	1	3.1	3.1.3	5	6	Demonstrate basic working of pumps
Course Code:	MEDLO8043		Course Name	Renewable Energy Systems		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	1	1.3,2.1	1.31 2.1.2	3	1	Demonstrate need of different renewable energy sources
2	1	2.1	2.1.2	4	2	Discuss importance of renewable energy sources
3	1	3.2	3.2.1	6	3	Discuss various renewable energy sources in Indian context
2	1	2.2	2.2.2	4	4	Calculate and analyse utilization of solar and wind energy
5	1	5.1	5.1.1	2	5	Illustrate design of biogas plant
2	1	2.1	2.1.2	4	6	Demonstrate basics of hydrogen energy

Course Code:	ILO8023		Course Name	EDM		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Understand the concept of business plan and ownerships
2	1	2.2	2.2.2	4	2	Interpret key regulations and legal aspects of entrepreneurship in India
2	1	2.2	2.2.3	4	3	Understand government policies for entrepreneurs
2	1	2.2	2.2.3	4	4	To familiarise principles of energy management and concept of energy management in utility systems
2	1	2.2	2.2.3	4	5	To study energy economics and auditing
2	1	2.2	2.2.3	4	6	To study electrical energy management, cogeneration and waste heat recovery
Course Code:	MEL801		Course Name	Design Of Mechanical Systems Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.3	4	1	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.2	6	2	Apply fundamental engineering concepts
1	1	1.4	1.4.1	4	3	Creating techniques to solve engineering problems
3	1	3.2	3.2.1	3	4	Identify & select suitable criteria for the evaluation of alternate design solutions
5	1	5.1	5.1.1	5	5	Identify & select suitable criteria for the evaluation of alternate design solutions
3	1	3.2	3.2.3	6	6	Creating techniques to solve engineering problems
Course Code:	MEL802		Course Name	Power Engineering Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Differentiate boilers
2	1	2.2	2.2.2	4	2	Differentiate boiler mountings and accessories
2	1	2.2	2.2.3	4	3	Conduct a trial on impulse turbine and analyse its performance
2	1	2.2	2.2.3	4	4	Conduct a trial on reaction turbine and analyse its performance
2	1	2.2	2.2.3	4	5	Conduct a trial on Centrifugal pump and analyse its performance
2	1	2.2	2.2.3	4	6	Conduct a trial on Reciprocating pump and analyse its performance
Course Code:	MEP801		Course Name	PROJECT-II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.2	4	2	Draw the proper inferences from available results through theoretical/experimental/simulations.
2	1	2.2	2.2.3	4	3	Analyse the impact of solutions in societal and environmental context for sustainable development.
2	1	2.2	2.2.3	4	4	Demonstrate capabilities of self-learning in a group, which leads to life long learning
2	1	2.2	2.2.3	4	5	Demonstrate project management principles during project work.
2	1	2.2	2.2.3	4	6	Excel in written and oral communication.