



***Course Outcomes of
Mechanical Engineering Department
Academic Year 2022-23***

Subject Code	Subject Name	CO-ID	CO-Statement
SEMESTER – III			



Subject Code	Subject Name	CO-ID	CO-Statement
MEC301	ENGINEERING MATHEMATICS - III	CO1	Learner will be able to apply the concepts of Laplace Transform and inverse Laplace Transform to solve differential equation.
		CO2	Learner will be able to apply the concepts of Fourier series to solve PDE of Heat and Wave Equations.
		CO3	Learner will be able to apply concepts - Complex variable theory to find the orthogonal trajectories.
		CO4	Learner will be able to apply concepts of Matrix operations to solve Mathematical problems.
		CO5	Learner will be able to solve Partial Differential Equations using Numerical method.
		CO6	Learner will be able to use the concept of higher Mathematics to solve Engineering Problems.
MEC302	STRENGTH OF MATERIALS	CO1	A learner will be able to use the concepts of stresses and strain to determine stresses and strains under various loading conditions are applied to mechanical components.
		CO2	Learner will be able to construct the SFD and BMD of various types of beams for different loading and support conditions.
		CO3	Learner will be able to Analyse the bending and shear stresses induced in beams of different cross section.
		CO4	A learner will be able to apply the deflection equation for beams under different types of loading.
		CO5	Learner will be able to use torsion equation to calculate the design variables of shaft based on Strength and Rigidity Criteria.
		CO6	Learner will be able to Determine buckling load by applying Eulers theory and Rankine theory to columns.
MEC303	PRODUCTION PROCESSES	CO1	Learner will be able to determine requirements for casting for a given product.
		CO2	Learner will be able to Identify appropriate joining process for a given application.
		CO3	Learner will be able to determine requirements for forming /sheet metal working for a given application.
		CO4	Learner will be able to Demonstrate various components and their functions in a subtractive production machine.
		CO5	Learner will be able to Demonstrate various components and their functions involved in a non- traditional machining process.
		CO6	Learner will be able to apply knowledge of intelligent manufacturing in the context of industry 4.0.
MEC304	MATERIALS AND METALLURGY	CO1	Learners will be able to interpret effects of crystal defects and dislocations on properties of materials.
		CO2	Learners will be able to apply various phase diagrams, TTT and CCT diagram for engineering applications
		CO3	Learners will be able to select appropriate type of heat treatment for required property development in the material.
		CO4	Learners will be able to predict the probable mode of failure in materials for specific application



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		CO5	Learners will be able to develop new materials for better performance applications
MEC305	THERMODYNAMICS	CO1	Learner will be able to understand fundamental, laws of thermodynamics and thermodynamic relations.
		CO2	Learner will be able to apply the concepts of heat and work interactions in engineering systems.
		CO3	Learner will be able to use steam table and mollier chart to compute thermodynamic interactions.
		CO4	Learner will be able to determine the efficiency of various power cycles.
		CO5	Learner will be able to apply the concepts of compressible fluid flow to engineering systems.
MEL301	MATERIALS TESTING	CO1	Learner will be able to compare microstructure and hardenability of medium carbon steel specimen subjected to different heat treatment processes.
		CO2	Learner will be able to determine the life of a specimen subjected to fluctuating load using Fatigue test.
		CO3	Learner will be able to determine the strength of given specimen under different loading configuration.
		CO4	Learner will be able to determine hardness and toughness of a given specimen.
MEL302	MACHINE SHOP PRACTICE	CO1	Learner will be able to apply knowledge related to specifications, controls and safety measures while working on machines.
		CO2	Learner will be able to demonstrate the skill for facing, plain turning, chamfering, taper turning and thread cutting operations on a lathe machine.
		CO3	Learner will be able to demonstrate the skill for various shaping operation and tool grinding operations
		CO4	Learner will be able to demonstrate the skill to perform welding operation.
MESBL301	CAD - MODELLING	CO1	A learner will be able to use CAD Tools for creating Solid models.
		CO2	A learner will be able to use CAD Tools for creating Surface models.
		CO3	A learner will be able to build assembly models of given objects using CAD tools.
		CO4	A learner will be able to apply the concept of product data exchange for making a model compatible among different CAD systems.
MEPBL301	MINI PROJECT - 1A	CO1	Learner will be able to identify problem based on societal/research needs.
		CO2	Learner will be able to apply knowledge and skill to solve societal problems in a group.
		CO3	Learner will be able to develop interpersonal skills to work as member of a group or leader.
		CO4	Learner will be able to draw the proper inferences from available results through theoretical/experimental/simulations.



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SEMESTER – IV			
MEC401	ENGINEERING MATHEMATICS - IV	CO1	Learner will be able to apply the concept of Vector calculus to evaluate the line integrals.
		CO2	Learner will be able to Use the concepts of Complex Integration to evaluate various contour integrals.
		CO3	Learner will be able to apply the concept of Correlation, Regression and curve fitting to the engineering problems.
		CO4	Learner will be able to illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
		CO5	Learner will be able to apply the concept of the Sampling theory to the engineering problems.
		CO6	Learner will be able to apply the concepts of parametric and nonparametric tests for analyzing practical problems.
MEC402	FLUID MECHANICS	CO1	Learner will be able to apply the basic concepts of fluid mechanics to determine viscous effects of fluid and hydrostatic forces.
		CO2	Learner will be able to apply the concepts of fluid kinematics in a fluid flow.
		CO3	Learner will be able to apply laws of mass, momentum and energy conservation in fluid dynamics.
		CO4	Learner will be able to determine pressure drop in laminar and turbulent flow.
		CO5	Learner will be able to determine major and minor losses in pipes.
		CO6	Learner will be able to apply the concepts of boundary layer to flow over surfaces and around submerged bodies.
MEC403	KINEMATICS OF MACHINERY	CO1	A learner will be able to Identify various components of mechanisms.
		CO2	A learner will be able to Identify an appropriate mechanism to provide specific motion.
		CO3	A learner will be able to use graphical method to get velocity and acceleration of a given mechanism.
		CO4	A learner will be able to Choose a cam profile for the specific follower motion
		CO5	A learner will be able to Identify appropriate power transmission mechanism for a given application.
		CO6	A learner will be able to Identify appropriate braking mechanism for given application.
MEC404	CAD/CAM	CO1	Learner will be able to Identify suitable computer graphics techniques for CAD modeling.
		CO2	Learner will be able to Apply transformations to 2D and 3D geometries, in CAD modeling.
		CO3	Learner will be able to Read and Interpret Bio-medical scan data, for creating geometrical model.
		CO4	Learner will be able to Design the CAM toolpath for specific given operations.
		CO5	Learner will be able to Know rapid prototyping - tooling and



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			Virtual Manufacturing concepts.
MEC405	INDUSTRIAL ELECTRONICS	CO1	Learner will be able apply to identify and use diodes and power electronic switches for different applications.
		CO2	Learner will be able to use different types of rectifiers and inverters for DC/AC motor speed control applications.
		CO3	Learner will be able to select Op-Amp and 555 timer-based circuits for a given application.
		CO4	Learner will be able to select appropriate digital logic gates and devices for given applications.
		CO5	Learner will be able to write program and interface MSP430 microcontroller for different applications.
		CO6	Learner will be able to select suitable DC/AC motor for a given application.
MEL401	INDUSTRIAL ELECTRONICS LAB	CO1	Learner will be able to apply knowledge of electrical and electronic components for different applications from its characteristics.
		CO2	Learner will be able to design and demonstrate the operation of OPAMP and 555 timer applications.
		CO3	Learner will be able to implement different logic gates and microcontroller for different applications.
		CO4	Learner will be able to use features of speed-torque characteristics of electrical machines for speed control.
MEL402	KINEMATICS OF MACHINERY LAB	CO1	A learner will be able determine velocity of a link in a given mechanism using graphical tool.
		CO2	A learner will be able to determine acceleration of a link or point in a given mechanism using graphical tool.
		CO3	A learner will be able to determine maximum velocity and acceleration of follower for specific motion.
		CO4	A learner will be able to develop a prototypes model of mechanism for a specific application.
MEL403	PYTHON PROGRAMMING	CO1	Learner will be able to demonstrate the basic concepts of python programming.
		CO2	Learner will be able to demonstrate coding in python language
		CO3	Learner will be able to use different packages available in python
		CO4	Learner will be able to build python program for different applications.
MESBL 401	CNC & 3-D PRINTING	CO1	Develop manual part program for machining of the parts on CNC turning trainer and milling trainer machine.
		CO2	Demonstrate the ability to acquire CAM tool-path from CAD Data.
		CO3	Develop any given real life object using 3D printing process.
		CO4	Demonstrate the ability to acquire 3D model using available biomedical data.
MEPBL 401	MINI PROJECT 1-B	CO1	Analyse the impact of solutions in societal and environmental context for sustainable development.
		CO2	Use standard norms of engineering practices.



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		CO3	Excel in written and oral communication.
		CO4	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
		CO5	Demonstrate project management principles during project work.
SEMESTER – V			
MEC 501	MECHANICAL MEASUREMENTS AND CONTROLS	CO1	Learner will be able to apply the concept of limits, fits and tolerance of interchangeable manufacture to design Go and No Go Gauges.
		CO2	Learner will be able to describe the concept of interference for measurement of various surface roughness parameters.
		CO3	Learner will be able to identify the various static characteristics and different types of inputs associated with measuring instruments.
		CO4	Learner will be able to select and use appropriate measuring instruments for displacement/ pressure/flow/temperature and strain measurement.
		CO5	measuring instruments for displacement/ pressure/flow/temperature and strain measurement.
MEC502	THERMAL ENGINEERING	CO1	Learner will be able to apply the concepts of heat and mass transfer to real life problems for steady and unsteady state.
		CO2	Learner will be able to develop mathematical model for different modes of heat transfer.
		CO3	Learner will be able to evaluate performance of heat exchanger and extended surface.
		CO4	Learner will be able to describe the construction and working features of S.I. and C.I. Engine and its sub systems.
		CO5	Learner will be able to evaluate engine performance and emission characteristics.
MEC503	DYNAMICS OF MACHINERY	CO1	Learner will be able to illustrate working principles of different types of governors and gyroscopic effects on the mechanical systems
		CO2	Learner will be able to illustrate basics of static and dynamic forces of slider-crank mechanism
		CO3	Learner will be able to determine natural frequency of single degree of freedom system/element.
		CO4	Learner will be able to determine vibratory response of mechanical system/element.
		CO5	Learner will be able to determine parameters for vibration isolation of the given system.
		CO6	Learner will be able to analyse and balance the given rotary system.
MEC504	FINITE ELEMENT ANALYSIS	CO1	Learner will be able to solve differential equations using weighted residual methods.
		CO2	Learner will be able to develop the finite element equations to model engineering problems governed by second order differential equations.
		CO3	Learner will be able to solve engineering problems using one dimensional elements.



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		CO4	Learner will be able to solve engineering problems using two dimensional elements.
		CO5	Learner will be able to solve engineering problems based on equations of elasticity using finite element formulation techniques.
		CO6	Learner will be able to find natural frequency of single degree of vibration system using finite element formulation techniques.
MEDLO 5011	OPTIMIZATION TECHNIQUES	CO1	Identify the types of optimization problems and apply the calculus method to single variable.
		CO2	Analyze Linear Programming problem and perform sensitivity analysis.
		CO3	Apply various linear and non-linear techniques for problem solving in various domain.
		CO4	Apply multi-objective decision making methods for problem in manufacturing environment and other domain.
		CO5	Apply multi criterion decision making methods for problem in manufacturing environment and other domain.
		CO6	Apply Design of Experiments method for Optimization.
MEDLO 5013	COMPUTATIONAL METHODS	CO1	A learner will be able to Calculate, quantify, and minimize errors in solving complex engineering problems using numerical methods with respect to an exact solution.
		CO2	Learner will be able to apply numerical methods to obtain solutions for an engineering problem with linear algebraic equations.
		CO3	A learner will be able to determine the roots of a nonlinear equation using open and bracketing methods.
		CO4	A learner will be able to analyse and predict data using numerical interpolation and regression.
		CO5	A learner will be able to solve integral and ordinary differential equations appropriate using numerical methods.
		CO6	A learner will be able to apply an appropriate numerical technique to solve realistic engineering problems.
MEL501	THERMAL ENGINEERING LAB	CO1	Learner will be able to Estimate thermal conductivity of engineering materials.
		CO2	Learner will be able to evaluate performance parameters of extended surfaces.
		CO3	Learner will be able to analyze heat transfer parameters in various engineering applications.
		CO4	Learner will be able to analyze engine performance and emission parameters at different operating conditions.
MEL502	DYNAMICS OF MACHINERY LAB	CO1	Analyze governor characteristics
		CO2	Analyze gyroscopic effect on laboratory model.
		CO3	Evaluate different parameters and vibration response of single degree of freedom vibratory system
		CO4	Demonstrate balancing of the rotary system
MEL503	FINITE ELEMENT ANALYSIS LAB	CO1	Learner will be able to analyze one dimensional structural problem using bar and truss elements.



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		CO2	Learner will be able to analyze two dimensional problems using constant strain triangular element and axisymmetric element.
		CO3	Learner will be able to perform forced vibration response analysis of a beam element on a commercial software package.
		CO4	Learner will be able to perform thermal analysis using a commercial software package.
MESBL 501	PROFESSIONAL COMMUNICATION AND ETHICS - II	CO1	Learner will be able to communicate effectively and ethically in both oral and written forms.
		CO2	Learner will be able to possess the skill set required for successful employability and exhibit leadership skills.
		CO3	Learner will be able to develop an acumen to prepare for various competitive exams, as also prepare reports and presentations on topics pertaining to the wellbeing of society and the environment.
		CO4	Learner will be able to demonstrate knowledge of professional and personal etiquettes & ethics in the global environment.
MEPBL 501	MINI PROJECT – 2 A	CO1	Learner will be able to identify the problems based on societal / research needs.
		CO2	Learner will be able to apply knowledge and skill to solve societal problems in a group.
		CO3	Learner will be able to develop interpersonal skills to work as a member of a group or leader.
		CO4	Learner will be able to draw the proper inferences from available results through theoretical / experimental solutions.
SEMESTER – VI			
MEC601	MACHINE DESIGN	CO1	Learner will be able to Demonstrate the understanding of various design considerations
		CO2	Learner will be able to Design Machine elements on the basis of strength concept
		CO3	Learner will be able to Design machine elements subjected to fluctuating loads
		CO4	Learner will be able to design power transmitting elements such as shafts, couplings, Clutches, Belts, Chains and Flywheels
		CO5	Learner will be able to Design springs subject to static and dynamic loads
		CO6	Learner will be able to Select bearings for a given applications from the manufacturers catalogue
MEC602	TURBO MACHINERY	CO1	Learner will be able to differentiate the boilers, boiler mountings & accessories.
		CO2	Learner will be able to determine parameters of hydraulic machines.
		CO3	Learner will be able to predict problems associated with performance of turbo machinery.
		CO4	Learner will be able to determine performance parameters of Steam Turbines and Gas Turbines.
		CO5	Learner will be able to apply various techniques to enhance performance of Turbo machines
MEC603	HEATING	CO1	A learner will be able to Apply the fundamental principles and



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	VENTILATION AIR CONDITIONING AND REFRIGERATION		applications of refrigeration and Heat pump
		CO2	A learner will be able to Analyse performance of various refrigeration systems.
		CO3	A learner will be able to illustrate various psychrometric processes associated with air conditioning using psychrometry chart.
		CO4	A learner will be able to design an air conditioning system.
		CO5	A learner will be able to Select appropriate air handling unit and design air distribution system
		CO6	A learner will be able to Apply HVACR concepts for Selecting appropriate HVAC&R components for a given industrial application.
MEC604	AUTOMATION AND ARTIFICIAL INTELLIGENCE	CO1	Learner will be able to identify various elements in an automated system and Interpret relevance of AI in mechanical engineering.
		CO2	Learner will be able to design and develop pneumatic / hydraulic circuit for a given application.
		CO3	Learner will be able to design and develop electro-pneumatic circuits using PLC Ladder Logic.
		CO4	Learner will be able to select Industrial Robots for specific applications.
		CO5	Learner will be able to illustrate the various AI and Machine Learning Technologies.
MEDLO 6021	PRESS TOOL DESIGN	CO1	A learner will be able to illustrate various press working operations for mass production of sheet metal parts.
		CO2	A learner will be able to identify press tool requirements pertaining to design of press tools.
		CO3	A learner will be able to prepare working drawings and setup for economic production of sheet metal components.
		CO4	A learner will be able to illustrate the principles and blank development in bent & drawn components.
		CO5	A learner will be able to identify suitable materials for different elements of press tools.
		CO6	A learner will be able to understand safety aspects and automation in press working.
MEDLO 6023	METAL FORMING TECHNOLOGY	CO1	Learner will be able to understand the Metallurgical aspects of metal forming processes.
		CO2	Learner will be able to differentiate different metal forming processes.
		CO3	Learner will be able to analyze forces involved in the different metal forming processes.
		CO4	Learner will be able to identify appropriate metal forming processes for a particular application.
		CO5	Learner will be able to identify appropriate sheet metal forming processes for a particular application.
MEL601	MACHINE DESIGN LAB	CO1	Learner will be able to Design shaft under various conditions
		CO2	Learner will be able to Design Knuckle Joint / cotter joint



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		CO3	Learner will be able to Design Screw Jack
		CO4	Learner will be able to Design Flexible flange couplings/ Leaf spring
		CO5	Learner will be able to Convert design dimensions into working/manufacturing drawing
		CO6	Learner will be able to Use design data book/standard codes to standardize the designed dimensions.
MEL602	TURBO MACHINERY LAB	CO1	Learner will be able to identify boiler, boiler mountings and accessories.
		CO2	Learner will be able to analyze performance of flow systems.
		CO3	Learner will be able to analyze performance of reciprocating air compressor.
		CO4	Learner will be able to analyze performance of Hydraulic Machinery.
MEL603	HEATING VENTILATION AIR CONDITIONING AND REFRIGERATION LAB	CO1	Learner will be able to identify various HVAC&R components and controls.
		CO2	Learner will be able to describe the impact of ozone layer depletion and global warming considering societal and environmental contexts.
		CO3	Learner will be able to Analyze the performance of a refrigerator.
		CO4	Learner will be able to Analyze the performance of an Air Conditioning system.
MESBL 601	MEASUREMENTS AND AUTOMATION	CO1	Learner will be able to acquire signals from different transducers for measuring physical quantities.
		CO2	Learner will be able to design and develop pneumatic / electro-pneumatic circuit for a given application
		CO3	Learner will be able to design and develop hydraulic / electro-hydraulic circuit for a given application
		CO4	Learner will be able to check surface roughness parameters using measuring instruments.
MEPBL 601	MINI PROJECT – 2B	CO1	Learner will be able to analyze the impact of solutions in societal and environmental context for sustainable development.
		CO2	Learner will be able to use standard norms of engineering practices.
		CO3	Learner will be able to excel in written and oral communication.
		CO4	Learner will be able to demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
		CO5	Learner will be able to demonstrate project management principles during project work.
SEMESTER – VII			
MEC701	DESIGN OF MECHANICAL SYSTEM	CO1	Learner should be able to Apply the concept of system design.
		CO2	Learner should be able to design an appropriate gear pair for power transmission on the basis of given load and speed.



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		CO3	Learner should be able to design hoisting mechanism of an EOT crane
		CO4	Learner should be able to design belt conveyor systems for given specification
		CO5	Learner should be able to design engine components such as cylinder, piston, connecting rod and crankshaft
		CO6	Learner should be able to design pump for the given applications
MEC702	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	CO1	Analyze the important strategies of Logistics and Supply Chain Management to conclude decision regarding make or buy.
		CO2	To determine the order quantity and identify the appropriate selective inventory control technique for Inventory management.
		CO3	To identify the important elements of logistics, transportation, warehousing and outsourcing management
		CO4	Understand the role of digitization in supply chain management leading to sustainability
		CO5	Apply various mathematical models/tools to design the supply chain network
		CO6	Identify the drivers of supply chain performance and risks in supply chain management.
MEDLO 7032	RENEWABLE ENERGY SYSTEMS	CO1	Learner will be able to Describe present prospectus of renewable energy sources and energy economics for the sustainable development.
		CO2	Learner will be able to describe the working principle of various solar collectors and Analyse different solar geometrical parameters, performance of collectors for generation of energy from solar radiation.
		CO3	Learner will be able to describe the features, working principles of various solar thermal energy conversion systems and photovoltaic system..
		CO4	Learner will be able to describe working principles of various renewable energy conversion systems and their utilities.
		CO5	Learner will be able to understand the working features, and parameters related to production of bioenergy from the organic waste.
MEDLO 7042	VIBRATION CONTROLS	CO1	Apply basic concepts of vibration isolation and damping.
		CO2	Identify suitable Vibration Absorber.
		CO3	Identify suitable Vibration Isolator.
		CO4	Illustrate working principles of active vibration control systems.
		CO5	Illustrate working principles of semi-active vibration control systems.
MEL701	DESIGN OF MECHANICAL SYSTEM LAB	CO1	Learner will be able to design an appropriate gear pair for power transmission on the basis of given load and speed
		CO2	Learner will be able to design of material handling system such as hoisting mechanism of EOT crane, belt conveyor system.
		CO3	Learner will be able to design engine components such as cylinder, piston, connecting rod and crankshaft
		CO4	Learner will be able to design pumps for the given applications.



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MEL702	MAINTENANCE ENGINEERING LAB	CO1	Learner will be able to Identify different tools used for maintenance.
		CO2	Learner will be able to Apply different maintenance strategies.
		CO3	Learner will be able to Demonstrate the process of servicing a machine.
		CO4	Learner will be able to Identify common faults in Machinery using Vibration spectrum.
		CO5	Learner will be able to Interpret the Vibration Signals for Monitoring and Prognosis.
MEL703	INDUSTRIAL SKILLS LAB	CO1	Learner will be able to create and modify documents and slides on MS Word, MS Excel and MS PowerPoint.
		CO2	Learner will be able to use different functions and execute task in Latex and G-Suite.
		CO3	Learner will be able to develop critical thinking and problem-solving abilities for efficient team and project outcomes.
		CO4	Learner will be able to convince and summarise for campus placements by practicing group discussion and personal interview rounds.
MEP701	PROJECT-I	CO1	Learner will be able to Identify problem based on societal/research needs.
		CO2	Learner will be able to Select and apply appropriate modern tools and methods to analyse the identified problem.
		CO3	Learner will be able to Apply knowledge and skill to solve societal problems.
		CO4	Learner will be able to Analyse impact of solutions in societal and environmental context for sustainable development.
ILO7012	RELIABILITY ENGINEERING	CO1	A learner will be able to apply the concept of Probability theory to engineering problems.
		CO2	A learner will be able to apply various reliability concepts to calculate different reliability parameters.
		CO3	A learner will be able to illustrate the understanding of System Reliability.
		CO4	A learner will be able to illustrate reliability improvement techniques and System Reliability Analysis.
		CO5	A learner will be able to illustrate the various aspects of Maintainability, Availability and Failure Mode Effect and Criticality Analysis.
ILO7015	OPERATION RESEARCH	CO1	Apply and Summarize workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.
		CO2	Analyze, Identify and Solve specialized LPP like transportation, assignment and dynamic programming problems.
		CO3	Select, Apply and Find the usage of Queuing Theory for solving engineering problems.



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		CO4	Apply simulation method and usage of simulation in managerial decision-making problems.
		CO5	Apply and solve given problems using Game Theory.
		CO6	Select and apply appropriate models and infer the outcome.
ILO7016	CYBER SECURITY AND LAWS	CO1	To be aware about cybercrimes, information security and IndianIT Act 2000.
		CO2	To understand different types of cyberattacks and security measures to mitigate the attacks
		CO3	To understand different types of attacks and its countermeasures
		CO4	To interpret IT laws in various legal issues
		CO5	To recognize and apply Indian IT Act and its amendments
		CO6	To recognize and apply information security compliances.
ILO7017	DISASTER MANAGEMENT & MITIGATION MEASURES	CO1	students will be able to comprehend hazards ,risk, vulnerability, capacities from social and technological perspectives.
		CO2	Students will be able to recognize manmade as well natural disaster and their extent with possible effects and dynamics of management
		CO3	Students will be able to comprehend national structures of development of planning and disaster management based on previous history
		CO4	Students will be able to describe government policies acts and various organizational structures associated with emergency.
		CO5	Students will be able to explain the simple dos and donts in the extreme event and climate change for efficient management of disaster
ILO7018	ENERGY AUDIT AND MANAGEMENT	CO1	To know about energy conservation Act-2001 and its features towards enhancement of energy security
		CO2	To use basic concept of energy optimization techniques and analyze its role in the energy audit process
		CO3	To apply various data information and financial analysis techniques to check feasibility of project in the energy audit process
		CO4	To apply energy conservation opportunities in energy systems,to enhance efficiency
		CO5	To analyse energy performance of various electrical and mechanical systems
SEMESTER – VIII			
MEC801	Operations Planning and Control	CO1	The learner will be able to illustrate operations functions and manage operations in a better way.
		CO2	The learner will be able to apply various strategies to develop an aggregate production plan based on demand forecasting.
		CO3	The learner will be able to apply various algorithms in scheduling and sequencing of manufacturing and service operations.



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		CO4	The learner will be able to develop Material Requirements Plans (MRP) to estimate the planned order releases and demonstrate the importance of Enterprise Resource Planning (ERP) in managing the operations functions effectively.
		CO5	The learner will be able to apply various techniques for facility layout planning and line balancing to optimize the resources.
		CO6	The learner will be able to demonstrate the importance of implementation of JIT, lean, agile and synchronous manufacturing in manufacturing and service organizations.
MEDLO-8051	COMPOSITE MATERIALS	CO1	The learner will be able to illustrate composite material based on fibre and matrix for specified application in a better way.
		CO2	The learner will be able to apply the stress-strain relation through the elastic constants for a unidirectional lamina.
		CO3	The learner will be able to predict failure of a lamina under the different loading condition
		CO4	The learner will be able to develop laminate design and predict properties of lamina based on fiber and matrix.
		CO5	The learner will be able to apply various techniques of damage detection and testing methodology.
		CO6	The learner will be able to study basics of composite repairing techniques with surface preparation.
MEDLO-8053	MICRO ELECTRO MECHANICAL SYSTEMS	CO1	The learner will able to apply the knowledge of MEMS and scaling laws for the development of MEMS products
		CO2	Learners will be able to know the materials, their structure, and their manufacturing processing to make MEMS devices.
		CO3	The learner will be able to choose appropriate microfabrication techniques for the development of microsystems.
		CO4	Learners will be able to know the various sensors and the selection of appropriate ones for the development of microsystem products.
		CO5	Learners will be able to know the various actuator and the selection of appropriate ones for the development of microsystem products.
		CO6	Learners will be able to know the significance of the impact of materials, processes and design, in the field of, biomedical device and micropumps
MEDLO-8061	PRODUCT DESIGN AND DEVELOPMENT	CO1	The learner will be able to illustrate the need of the stakeholder/customer for development of new products.
		CO2	The learner will be able to apply engineering, scientific, and mathematical principles to develop and execute a design project from a concept to a finished product.
		CO3	The learner will be able to analyze voice of customer using QFD for engineering requirement.
		CO4	The learner will be able to develop creative thinking methodology for product design & development.
		CO5	The learner will be able to acquaint with applicability of product design & development in industrial application.



Subject Code	Subject Name	CO-ID	CO-Statement
		CO6	The learner will be able to select appropriate manufacturing process using DFMA for the product.
MEDLO-8063	TOTAL QUALITY MANAGEMENT	CO1	Learner will be able to apply QM and principles of TQM in organizational development process.
		CO2	Learner will be able to apply the QC & QM tools in process improvement.
		CO3	Learner will be able to apply SQC techniques to improve process quality.
		CO4	Learner will be able to apply Six Sigma project in TQM Implementation.
		CO5	Learner will be able to apply QMS and Certification for Quality Accreditation.
		CO6	Learner will be able to apply the advanced tools for Quality Sustainability.
ILO8021	PROJECT MANAGEMENT-1 & PROJECT MANAGEMENT-2	CO1	Learner will be able to illustrate Project Life Cycles and PM Knowledge areas as per Project Management Institute.
		CO2	Learner will be able to apply different selection criteria to select an appropriate project from different options.
		CO3	Learner will be able to develop work break down structure for a Project and schedule based on it.
		CO4	Learner will be able to identify opportunities and threats to the project and decide an approach to deal with them strategically.
		CO5	Learner will be able to apply Earned Value Technique, determine and predict the status of the Project.
		CO6	Learner will be able to understand various types of Project termination methods and ethics in Projects.
ILO8021	PROJECT MANAGEMENT-3	CO1	State Basic Concepts and areas of Project Management.
		CO2	Apply selection criteria and select an appropriate project from different options.
		CO3	Illustrate work break down structure for a project and develop a schedule based on it.
		CO4	Identify opportunities and threats to the project and decide an approach to deal with them strategically.
		CO5	Use Earned value technique and determine & predict status of the project.
		CO6	Capture lessons learned during project phases and document them for future reference
ILO8023	ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT	CO1	Learner will be able to define the roles, responsibilities and functions to become a successful entrepreneur.
		CO2	Learner will be able to summarize business plans, business development and Importance of Capital to Entrepreneurship.
		CO3	Learner will be able to summarize Social and Women entrepreneurship.
		CO4	Learner will be able to summarize different Acts and government



Subject Code	Subject Name	CO-ID	CO-Statement
			policies for entrepreneurship.
		CO5	Learner will be able to summarize effective management of small and micro business.
ILO8028	DIGITAL BUSINESS MANAGEMENT	CO1	Students should be able to comprehend the concept of e -business contemporary trends and technology in digital business
		CO2	Students should be able to describe various agents of Ecommerce
		CO3	Students should be able to describe Digital business support services
		CO4	Students should be able to address security issues in Ecommerce and their counter measure s
		CO5	Students should be able to examine e-business strategy formulation for the development of a successful plan and presentation of digital transformation
MEL801	PRODUCT DESIGN AND DEVELOPMENT LAB	CO1	Learner will be able to identify the need for redeveloping products.
		CO2	Learner will be able to identify the customer requests and generate engineering requirements for developing the product
		CO3	Learner will be able to apply creativity & industrial design methods to improve the chosen product.
		CO4	Learner will be able to select suitable PD&D processes and apply DFMA to complete the redesign of the product
MEL802	LABORATORY BASED ON IOT	CO1	The learner will be able to understand the architecture of microcontrollers 8051 and Arduino and demonstrate its working by performing experiments
		CO2	The learner will be able to Demonstrate interfacing of peripheral devices to a micro controller
		CO3	The learner will be able to demonstrate exchange of data using wireless communication
		CO4	The learner will be able to demonstrate setting up of cloud platform and log sensor data
CSP805	PROJECT-II	CO1	Learner will be able to use norms of engineering practices and follow professional ethics while attempting solutions.
		CO2	Learner will be able to develop interpersonal skills to work as a member of a team or leader.
		CO3	Learner will be able to excel in written and oral communication.
		CO4	Learner will be able to demonstrate understanding of principles of project management during project work.
		CO5	Learner will be able to inculcate a habit of learning and solving problems through appropriate process, which leads to lifelong learning.