Department of Mechanical , CAY- (Odd semester, 2024-25)

	PROGRAM SPECIFIC OUTCOMES [PSO's]
	At the end of the program graduates will be able to:
PSO1	Apply engineering knowledge & analytical skills to design components for applications in the field of machine tools and thermal & fluid systems.
PSO2	Carry out experiments on models & prototypes of mechanical systems to evaluate their performance.
PSO3	Use professional best engineering practices & strategies for operation & maintenance of mechanical systems & processes.

Course Name:	Applied Mathematics III		
Course Code	MEC301		
Faculty Name:	Satya		
Year	2	**Sem**	3

CO Number	Course Outcome
MEC301.1	Apply the concept of Laplace transform to solve the real integrals in engineering problems
MEC301.2	Apply the concept of inverse Laplace transform of various functions in engineering problems
MEC301.3	Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
MEC301.4	Find orthogonal trajectories and analytic function by using basic concepts of complex variable theory.
MEC301.5	Apply Matrix algebra to solve the engineering problems.
MEC301.6	Solve Partial differential equations by applying numerical solution and analytical methods for one dimensional heat and wave equations

Course Name:	Strength of Materials		
Course Code	MEC302		
Faculty Name:	Dr. Padiya		
Year	2	**Sem**	3

CO Number	Course Outcome
MEC302.1	Remember the concept of stress, strain and their relations at various loading.
MEC302.2	Understand the concept of various stresses on loaded member
MEC302.3	Apply concept to find stresses, bending moment and deflection of beam
MEC302.4	Analyze the effect the various loading, impact and internal pressure on beam
MEC302.5	Evaluate safe dimension of member subjected to various load
MEC302.6	Design the basic dimension of loaded member for a given application

Course Name:	Production Process I		
Course Code	MEC303		
Faculty Name:	Shankar W		
Year	2	**Sem**	3

CO Number	Course Outcome
MEC303.1	Define the different primary forming processes like casting, forging, Rolling, welding, PM & polymer processing.
MEC303.2	Explain different type of machine tools, cutting tools, conventional, non-traditional machining processes and manufacturing technologies enabling Industry 4.0
MEC303.3	Identify the manufacturing process suitable for making casting, forged, rolled, welded, PM, polymer, machined and sheet metal products for engineering/domestic application.
MEC303.4	Simplify the different parameters of gating system, riser design & tool life.
MEC303.5	Estimate the force and power requirements of broaching, rolling, forging, wire & tube drawing process by solving numerical.
MEC303.6	Design a gear box casing mould and proper gating system for sand moulding and identify the attributes in bulk processing, fabrication, machining & mapping them to develop preventive monitoring through IoT and Industry 4.0.

Course Name:	Materials and Metallurgy		
Course Code	MEC304		
Faculty Name:	Madan / Rajwade		
Year	2	Sem	3

CO Number	Course Outcome
MEC304.1	Explain various types of materials and their Mechanical and chemical properties
MEC304.2	Discuss different types of microstructural defects in the material and relate them with change in the properties of the material
MEC304.3	Use different phase diagrams drawn for material and illustrate the changes in phases related to temperature and the carbon content.
MEC304.4	Analyze the changes in the properties of material due to changes in cooling rates and composition of alloying elements from the TTT and CCT diagram.
MEC304.5	Choose the appropriate heat treatment process for achieving particular property in the material and choose appropriate NDT method for testing of the given
MEC304.6	Summarise the percentage composition of different phases in different alloys.

Course Name:	Thermodynamics		
Course Code	MEC305		
Faculty Name:	S.Sabnis and Cleta P.		
Year	2	Sem	3

CO Number	Course Outcome
MEC305.1	Define various thermodynamic properties and recall the laws of thermodynamics.
MEC305.2	Interpret the laws of thermodynamics and illustrate their applicability to various real life applications and devices.
MEC305.3	Apply concepts and laws of thermodynamics to systems operating on Vapour power cycles, Gas power cycles and compressible fluid flow.
MEC305.4	Analyse a thermodynamic system from perspective of various laws of thermodynamics and distinguish between theoretical and actual performance of the system based on applied assumptions.
MEC305.5	Estimate numerical values of performance parameters of any thermodynamic system by application of hierarchical process to explain the limitations of real life system moving from simple theories to complex once.
MEC305.6	Design a thermodynamic cycle to operate a device for energy conversion such as engine or refrigerator.

Course Name:	Computer Aided Drawing Modelling		
Course Code	MESBL301		
Faculty Name:	B.S Chavan		
Year	2	Sem	3

CO Number	Course Outcome
MESBL301.1	Identify the different Conventional representation of different section lines w.r.t.materials. and threaded designation and to prepare 2D drawing, Nuts, Bolts, Keys, Cotter screw,springs etc.
MESBL301.2	Illustrate curves of intersection for different solids which penetrate each other w.r.t. their axis and Illustrate true shape and size of inclined surface on the Auxiliary pl
MESBL301.3	Preparation of detail drawing and assembly drawing of joints, shaft couplings, Bearings, Pulleys and pipe joints, Valves and IC Engine parts, Jigs and fixtures with ge
MESBL301.4	Inspection of actual dimensions from a physical model (e.g. cotter joint and other machine element) and preparing 2D and 3D models from those dimensions.
MESBL301.5	Construct 3D model assembly in Solid Works platform and decide the tolerance values for the mating parts.
MESBL301.6	Perform product data exchange among CAD systems.

Course Name:	Mechanical Measurements and Control		
Course Code	MEC501		
Faculty Name:	Mahesh R		
Year	3	Sem	5

CO Number	Course Outcome
MEC501.1	Recall the basic concepts learnt in Industrial electronics, applied mechanics and math's as applicable to transistors, diodes, microcontrollers, mass, work energy principles, velocity, accelerations, levers and Laplace transform along with differential equations.
MEC501.2	Distinguish the basic methodologies to measure Displacement motion due to (linear, rotary, turbulence, thermal and as feedback to control the output etc) and classification of these transducers based on various parameters and systems.
MEC501.3	Choose the appropriate transducer to measure the required system parameters like (displacement, speed, acceleration, force, flow, temperatures etc) validating the specifications and handshaking between the interfacing components.
MEC501.4	Examine the fundamental laws, governing equations and working principles to deduce the equations for (Displacement sensed by Transducers, input to output stability relation between intermediate elements, feedback errors, work, power, etc) for analysis of the given system.
MEC501.5	Judge between different criteria's in a given system to help map a suitable component to get expected results by solving for various parameter's like (analog output setting, fluctuating resistance current and voltages to represent Displacement in a transduced form etc) in the analysis of transfer function numerically.
MEC501.6	Build new updated and comparative data between various measuring elements to derive a better control incorporating feedback so as to easily correlate different criteria's and parameters to provide a stable system (using Transfer function, performance curves, S-plots, stability criteria's, Specifications from manufacturer etc) to predict/obtain system performance.

Course Name:	Thermal Engineering		
Course Code	MEC502		
Faculty Name:	Dr. Padiya and Cleta P		
Year	3	Sem	5

CO Number	Course Outcome
MEC502.1	Learner is able to define various terms related to Heat transfer and I.C. Engines and able to state modes of heat transfer and types of I.C. Engines
MEC502.2	Learner is able to explain the laws of various modes of heat transfer and the working principles of different types of I.C. Engines
MEC502.3	Learner is able to relate laws of heat transfer and working principles of I.C. Engines to derive solutions for cases pertaining to conduction, convection, radiation, and the operations of different types of I.C. Engines.
MEC502.4	Learner is able to analyse performance of various types of heat transfer applications and internal combustion engines.
MEC502.5	Learner is able to compare and choose heat transfer application and internal combustion engines.
MEC502.6	Learner is able to determine various design related parameters in heat transfer and internal combustion engines

Course Name:	Dynamics of Machinery		
Course Code	MEC503		
Faculty Name:	Juned / Dr. Manju		
Year	3	Sem	5

CO Number	Course Outcome
MEC503.1	State Basic Concepts of Dynamics of Machinery.
MEC503.2	Convert the physical mechanical system into mathematical model to represent dynamic system and derive its governing equation of motion.

MEC503.3	Apply methods to solve differential equations and determine natural frequency of mechanical systems.
MEC503.4	Investigate the Static and Dynamic forces in mechanical systems.
MEC503.5	Evaluate vibration transmissibility and measure motion parameters using vibration measuring instruments.
MEC503.6	Develop a program in SCILAB to plot the response of free vibration of a mechanical system.

Course Name:	Finite Element Analysis		
Course Code	MEC504		
Faculty Name:	Shreeprasad Manohar & Johnson Varghese		
Year	3	**Sem**	5

CO Number	Course Outcome
MEC504.1	Identify methods to solve differential equations using weighted residual methods
MEC504.2	Describe the finite element equations of engineering problems governed by second order differential equations
MEC504.3	Solve the engineering problems by using 1D & 2D Finite element methods
MEC504.4	Investigate field variables of finite element domain using jacobian matrix
MEC504.5	Examine field variables for their optimum values within finite element domain
MEC504.6	Design the system using optimized finite element field variables

Course Name:	Computational Methods		
Course Code	MEDLO5013		
Faculty Name:	Swapnil Gujarathi & Shreeprasad Manohar		
Year	3	**Sem**	5

CO Number	Course Outcome
MEDLO5013.1	State various concepts used in applying various computational methods.
MEDLO5013.2	Convert the given set of equations into suitable form for using numerical method.
MEDLO5013.3	Apply various computational methods to solve linear and non-linear equations.
MEDLO5013.4	Examine given algebraic or differential equation to find approximate solution.
MEDLO5013.5	Assess the given data points for fitting a curve to data using interpolation and regression techniques.
MEDLO5013.6	Develop 1-D wave equation using Crank Nicolson method

Course Name:	Business Communication and Ethics		
Course Code	MESBL501		
Faculty Name:			
Year	3	**Sem**	5

CO Number	Course Outcome
MEL501.1	Identify issues related to society, health, safety and prepare a comprehensive report in a pre-specified format gathering information from primary and secondary sources using
MEL501.2	Evaluate the social situation, identify business opportunities, and propose business offers in the prescribed format
MEL501.3	Demonstrate conceptual awareness of interpersonal skills through the given activities
MEL501.4	Plan and execute a meeting with the help of agenda
MEL501.5	Identify and solve professional and ethical problems in the given sample business situations and demonstrate knowledge of table etiquette and a sense of presentability in terms of
MEL501.6	Prepare their employability through resume, presentation skills, group discussions and mock interviews.

Course Name:	Design of Mechanical System		
Course Code	MEC701		
Faculty Name:	Dr Suryawanshi & Johnson Varghese		
Year	4	Sem	7

CO Number	Course Outcome
MEC701.1	List the different elements of the hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engines and pumps.
MEC701.2	: State the applications of hoisting mechanisms, belt conveyors, gear boxes, diesel and petrol engines and pumps.
MEC701.3	Apply the concepts of system design and estimate the parameters for hoisting mechanisms, belt conveyors, gear boxes, diesel and petrol engines and pumps.
MEC701.4	Finalize the parameters for the machine element and the type of bearing for the mechanical systems.
MEC701.5	: Select appropriate channel section, steps on shaft, prime mover and transmission system for the mechanical systems.
MEC701.6	Design the system for a specific requirement.

Course Name:	Logistics and Supply ChainManagement		
Course Code	MEC702		
Faculty Name:	Nilesh G		
Year	4	Sem	7

CO Number	Course Outcome
MEC702.1	Describe the Logistics and Supply Chain Management concepts and their role in today's business environment.
MEC702.2	Explain the drivers of supply chain performance and risks in supply chain management.
MEC702.3	Apply various techniques of inventory management and rank the items using inventory management technique
MEC702.4	Analyze various strategies and techniques to minimize overall logistics cost
MEC702.5	Determine the role of digitization in supply chain management leading to sustainability
MEC702.6	Design various mathematical models/tools to design the supply chain network

Course Name:	Renewable Energy Systems		
Course Code	MEDLO7032		
Faculty Name:	Pawan k		
Year	4	Sem	7

CO Number	Course Outcome
MEC702.1	Define various terms in renewable energy sources
MEC702.2	explain Solar Geometry and Solar Radiation and working principles of various Solar Thermal systems, Solar PV Sytems and wind Energy Systems
MEC702.3	apply the theory to determine parameters related to different renewable energy system
MEC702.4	analyze renewable energy systems in terms of parameters and impact of operating conditions on outputs
MEC702.5	compare relative merits and demerits of different renewable energy systems under given conditions
MEC702.6	design simple systems operating with renewable energy systems in domains like Solar Thermal, Solar PV, wind energy or biomass energy

Course Name:	Vibration Controls		
Course Code	MEDLO7042		
Faculty Name:	Junaid		
Year	4	Sem	7

CO Number	Course Outcome
MEDLO7031.1	State Basic Concepts of Vibration Control.
MEDLO7031.2	Convert the physical mechanical system into mathematical model to represent vibratory system and derive its governing equation of motion.
MEDLO7031.3	Apply basic concepts of Vibration Isolation and Damping.
MEDLO7031.4	Investigate and identify suitable Vibration Absorber.
MEDLO7031.5	Evaluate and suggest suitable Vibration Isolator.
MEDLO7031.6	Create a suitable method to Control the vibrations to the acceptable level.

Course Name:	Energy Audit and Management		
Course Code	ILO7018		
Faculty Name:	Sabnis S		
Year	4	Sem	7

CO Number	Course Outcome
MEDLO7032.1	Describe Global and Indian Energy scenario and define Energy Audit principles and needs in various energy applications.
MEDLO7032.2	Interpret the data obtained from various energy consuming devices from Electrical, Lighting, Thermal and HVAC applications.
MEDLO7032.3	Apply concepts of energy efficiency to systems consuming energy and prepare improvement plan for reducing consumption.
MEDLO7032.4	Estimate numerical values of performance parameters related to usage of energy in present and proposed improvement for an energy consumer.
MEDLO7032.5	Analyse audit results and point out steps for improvement based on technical and financial calculations
MEDLO7032.6	Prepare a project proposal for improving energy efficiency, environmental impact and cost saving for system producing or consuming energy.

Course Name:	Design of MechanicalSystem		
Course Code	MEL701		
Faculty Name:	Johnson		
Year	4	Sem	7

CO Number	Course Outcome
MEDLO7033.1	1. Identify the elements of the hoisting mechanism, belt conveyors, gear boxes, diesel &petrol engine and pumps
MEDLO7033.2	State the working principle of hoisting mechanism, belt conveyors,gear boxes, diesel and petrol engine and pumps.
MEDLO7033.3	Apply the appropriate standard codes for the systems.
MEDLO7033.4	Finalize the layout for various systems
MEDLO7033.5	Select appropriate critical component for various systems.
MEDLO7033.6	Design the system with detailed assembly drawing.

Course Name:	Maintenance Engineering		
Course Code	MEL702		
Faculty Name:	Rajwade		
Year	4	Sem	7

CO Number	Course Outcome
MEDLO7034.1	State advantages and limitations of CFD as compared to experimental and theoretical methods and show working of typical commercial software.
MEDLO7034.2	Derive the governing equations, relate mathematical expressions with physical boundary conditions and explain their numerical implementation.
MEDLO7034.3	Do classification of differential equations, explain different types of grids (structured and unstructured) and discretization methods (FDM,FVM and FEM).
MEDLO7034.4	Derive the stream function-vorticity formulation (pressure-velocity decoupling), RANS equations and compare different turbulence models.
MEDLO7034.5	Solve steady and unsteady, one, two and three dimensional, diffusion and convection-diffusion problems using FVM.
MEDLO7034.6	Analyze different fluid flow and heat transfer problems computationally, using commercial CFD software and writing code (in any programming language e.g. C, C++, etc.) for simple geometries.

Course Name:	Industrial Skills		
Course Code	MEL703		
Faculty Name:	Manju / Sabnis		
Year	4	**Sem**	7

CO Number	Course Outcome
ILO 7018.1	Students will be able to: illustrate application of MS office, G-suite and LETEX
ILO 7018.2	Students will be able to: Interprete aptitute and logical reasoning problems
ILO 7018.3	Students will be able to: articulate skill of GD-PI
ILO 7018.4	Students will be able to: analyze and practice metacognitive skills
ILO 7018.5	Students will be able to: assess the qualities of team building and leadership skill
ILO 7018.6	Students will be able to: Write technical report using various tools (MS Office, LETEX)