

Department of Mechanical Engineering , CAY- (Even semester, 2022-23)

PROGRAM SPECIFIC OUTCOMES [PSO's]	
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 IV**	
Course Code	MEC401	
Faculty Name:	Prof. Pallavi	
Year	2	Sem 4
CO Number	Course Outcome	
MEC401.1	Students will be able to obtain Eigen values and Eigen vectors for a given square matrix	
MEC401.2	Students will be able to infer properties of Eigen values and Eigen vectors, check if a matrix is derogatory or not and obtain pdf and cdf of discrete and continuous random variables.	
MEC401.3	Students will be able to Construct diagonal matrices using the concept of similarity, verify Cayley- Hamilton theorem, obtain functions of square matrices and determine nature of the quadratic form and apply it.	
MEC401.4	Students will be able to use Z-test, t- test, F-test and Chi-square test to test hypotheses, find work done by applying divergence and curl.	
MEC401.5	Students will be able to evaluate vector integration using different theorems, use Linear Programming methods to solve optimization problems	
MEC401.6	Students will be able to Chi-square test to test to check independence of attributes and 'goodness of fit', obtain probabilities and z-values for normal distributions, apply Big – M method and Dual Simplex method to optimize an LPP and analyze solutions obtained	
Course Name:	Fluid Mechanics*	
Course Code	MEC402	
Faculty Name:	Dr. Y S Padiya	
Year	2	Sem 4
CO Number	Course Outcome	
MEC402.1	Define properties of fluids, list different types of fluids and flows, and define important non-dimensional numbers.	
MEC402.2	Illustrate methods of analysis of fluid flow systems (dimensional/differential/integral analysis etc.) and explain important concepts (lift/drag/head loss due to friction etc.).	
MEC402.3	Differentiate between velocity potential function and stream function, rotational and irrotational flows, vorticity and circulation etc.	
MEC402.4	Solve for velocity and acceleration of a fluid at a given location in a fluid flow.	
MEC402.5	Calculate hydrostatic forces, resistance to flow of incompressible fluids through closed conduits and over surfaces, pressure drop in laminar and turbulent flow, major and minor losses in pipes etc.	
MEC402.6	Formulate and solve equations of the control volume for fluid flow systems to obtain forces and moments. Derive and Apply Bernoulli equation to various flow measuring devices.	
Course Name:	Kinematics of Machinery	
Course Code	MEC403	
Faculty Name:	Juned A. / Swapnil G.	
Year	SE	Sem 4
CO Number	Course Outcome	
MEC403.1	State basic concepts required in the study of Kinematics of Mechanisms.	
MEC403.2	Express the understanding of basic principles used in the study of mechanisms.	
MEC403.3	Demonstrate graphical solution to determine motion parameters of mechanical components.	
MEC403.4	Link kinematic motion parameters in various mechanisms.	
MEC403.5	Evaluate relative motion parameters between moving components of a mechanism.	
MEC403.6	Write a code in python to support kinematic study of machine components.	

Course Name:	CAD/CAM			
Course Code	MEC404			
Faculty Name:	Shreeprasad S Manohar / Sudhakar Ambhore			
Year	2	Sem	4	
CO Number	Course Outcome			
MEC404.1	Identify proper computer graphics techniques for geometric modelling, CNC terminology and RP techniques for Machining operations			
MEC404.2	Differentiate computer graphics techniques for geometric modelling, CNC machining centers and RP techniques for Machining operations			
MEC404.3	Manipulate graphical data and CNC machine tool to transform or machine objects			
MEC404.4	Categorize the graphical data for geometric modeling, CNC machining and Rapid Prototyping			
MEC404.5	Recommend the suitable technique for geometric modeling, CNC machining and Rapid Prototyping			
MEC404.6	Design an optimized a tool path for a given model			
Course Name:	Industrial Electronics*			
Course Code	MEC405			
Faculty Name:	Madhavi Pednekar			
Year	2	Sem	4	
CO Number	Course Outcome			
MEC405.1	Students will be able to assimilate information on various analog & digital circuits and power electronic semiconductor devices.(Remember)			
MEC405.2	Students will be able to identify and explain the basic functioning of different types of analog & digital integrated circuits, microprocessor and microcontroller with their applications. (Understand)			
MEC405.3	Students will be able to apply and demonstrate the working of digital logical circuits, operational amplifier and timer IC555 in various configurations of analog and digital applications. (Apply)			
MEC405.4	Students will be able to identify and compare the use of selected analog, digital, power electronic semiconductor device, microprocessor and microcontroller for particular applications. (Analyze)			
MEC405.5	Students will be able acquaint with the basics of microcontroller MSP430 programming to analyse the characteristics of electronic semiconductor device, electrical machines, digital circuits for applications like speed control, light dimmer, switching, verification of outputs etc. (Apply) (Analyze)			
MEC405.6	Students will be able to develop small analog and digital circuits/build small projects for a given specifications. (Evaluate)			
Course Name:	Industrial Electronics*			
Course Code	MEL401			
Faculty Name:	Madhavi			
Year	2	Sem	4	
CO Number	Course Outcome			
MEL401.1	Students will be able to identify and operate various electronic instruments and			
MEL401.2	Students will be able to built and test the characteristics/truth table of various			
MEL401.3	Students will be able to identify and verify the use of selected analog, digital and			
MEL401.4	Students will be able to demonstrate the working of operational amplifier and timer			
MEL401.5	Students will be able to analyse the characteristics of electronic semiconductor			
MEL401.6	Students will be able to develop and demonstrate their thinking ability by designing simple applications to built around these components . (Mini project			
Course Name:	Kinematics of Machinery*			
Course Code	MEL402			
Faculty Name:	Juned A.			
Year	2	Sem	4	
CO Number	Course Outcome			
MEL402.1	Find velocity by instantaneous center method.			
MEL402.2	Draw velocity and acceleration diagrams for four bar mechanism by relative method.			
MEL402.3	Draw velocity and acceleration diagrams for Slider crank mechanism by relative method.			
MEL402.4	Draw Cam profile for the specific follower motion.			
MEL402.5	Plot displacement-time, velocity-time, acceleration-time cam profiles.			
MEL402.6	Develop and build mechanisms to provide specific motion.			
Course Name:	Python Programming			
Course Code	MEL403			
Faculty Name:	Shreeprasad Manohar			
Year	2	Sem	4	

CO Number	Course Outcome			
MEL403.1	Demonstrate basic concepts of python programming			
MEL403.2	Select appropriate statements and functions to write a python program			
MEL403.3	Execute python programs for specific applications			
MEL403.4	Solve real-world engineering problems by writing python programs			
MEL403.5	Evaluate optimum programming strategy to write programs			
MEL403.6	Create application programs to modify geometric properties of entities			
Course Name:	CNC and 3-D Printing			
Course Code	MESBL401			
Faculty Name:	Shreeprasad Manohar/ Johnson			
Year	2	Sem	4	
CO Number	Course Outcome			
MESBL401.1	Demonstrate CAM Tool path and prepare NC-G code			
MESBL401.2	Develop and execute part programing for any given specific operation.			
MESBL401.3	Build any given object using various CNC operations.			
MESBL401.4	Convert 2D images into 3D model			
MESBL401.5	Develop 3D model using available biomedical data			
MESBL401.6	Build any given real life object using 3D printing process			
Course Name:	Mini Project – 1 B			
Course Code	MEPBL401			
Faculty Name:	Sachin / Johnson.			
Year	2	Sem	4	
CO Number	Course Outcome			
MEPLB 401.1	Identify problems based on societal /research needs.			
MEPLB 401.2	Apply Knowledge and skill to solve societal problems in a group.			
MEPLB 401.3	Develop interpersonal skills to work as member of a group or leader.			
MEPLB 401.4	Analyse the impact of solutions in societal and environmental context for sustainable development.			
MEPLB 401.5	Demonstrate capabilities of self-learning in a group, which leads to life long learning.			
MEPLB 405.6	Demonstrate project management principles and design skills during project work.			
Course Name:	Machine Design-1			
Course Code	MEC601			
Faculty Name:				
Year	3	Sem	6	
CO Number	Course Outcome			
MEC601.1	State basic considerations and standards required in designing basic machine components.			
MEC601.2	Describe the modes of failure of a component subjected to various loading conditions.			
MEC601.3	Calculate the size of the machine components subjected to static loads like, knuckle joint, cottar joint, bolted and welded joints etc.			
MEC601.4	Calculate the size of the machine components subjected to fluctuating loads shafts, couplings			
MEC601.5	Correlate the design parameters determined from design calculations to select standard machine components like bearings, flat, v belt sizes etc.			
MEC601.6	Illustrate the design solution through preparation of working drawings.			
Course Name:	Turbo Machinery			
Course Code	MEC602			
Faculty Name:	Cleta Pereira /Nilesh Gaware			
Year	3	Sem	6	

CO Number	Course Outcome			
MEC602.1	Describe various parameters associated with steam generators, gas turbines and turbo machines.			
MEC602.2	Identify various components and mountings of steam generators with their significance.			
MEC602.3	Identify various turbo machines and explain their significance.			
MEC602.4	Apply principles of thermodynamics and fluid mechanics to estimate various parameters like mass flow rate power, torque, efficiency, temperature, etc.			
MEC602.5	Evaluate performance of SG and Turbo machines and apply various techniques to enhance performance.			
MEC602.6	Evaluate various phenomena related to performance like cavitation, choking, surging.			
Course Name:	Heating, Ventilation, Air conditioning and Refrigeration			
Course Code	MEC603			
Faculty Name:	Pawan K			
Year	3	Sem	6	
CO Number	Course Outcome			
MEC603.1	State different terminologies and components used in refrigeration and airconditioning systems			
MEC603.2	Explain the different terminologies, components and working principle of refrigeration and air conditioning unit			
MEC603.3	Interpret the performance of refrigeration and air conditioning unit at given operating conditions.			
MEC603.4	Compare the performance of refrigeration and air conditioning unit at different operating conditions			
MEC603.5	Select refrigeration and air conditioning unit for given operating conditions			
MEC603.6	Design of basic air conditioning systems			
Course Name:	Automation and Artificial			
Course Code	MEC604			
Faculty Name:	Buddhipriy C			
Year	3	Sem	6	
CO Number	Course Outcome			
MEC604.1	Introduce fundamental elements of automation system.			
MEC604.2	Design and Develop pneumatic and Hydraulic circuits using FluidSim software			
MEC604.3	Design and Develop Electro-Pneumatic and PLC Ladder Circuits.			
MEC604.4	Identify different anatomy of a robot and its control system for given application.			
MEC604.5	Describe various AI and machine learning algorithms to elevate automation system to Industry 4.0			
MEC604.6	Illustrate an application to demonstrate Industry 4.0 environment.			
Course Name:	Press Tool Design			
Course Code	MEDLO60221			
Faculty Name:	Rajwade			
Year	3	Sem	6	
CO Number	Course Outcome			
MEDLO6021.1	Student will be able to define, list and state generation in machining operation and coolant operations			
MEDLO6021.2	Student will be able to identify machining science like mechanics of machining, tool wear, tool life and surface roughness, single and multipoint cutting tools.			
MEDLO6021.3	Student will be able to explain and describe Metal Cutting Theory, Dynamometry Cutting tool materials, machining induced surface integrity, Tool life & machining economics.			
MEDLO6021.4	Student will be able to recognize and classify the inter-relationship between cutting parameters and machining performance measures like power requirement, cutting time, tool life and surface finish.			
MEDLO6021.5	Student will be able to demonstrate the properties of various cutting tool materials and hence use an appropriate tool material for particular machining application, derive optimum cutting speed & and maximum production rate corresponding tool life for minimum cost			
MEDLO6021.6	Student will be able to Design Single, Multi point cutting tool and solve various forces involved in the machining operations, analyse economics of machining operations using Taylor's tool life equation.			

Course Name:	Machine Design			
Course Code	MEL601			
Faculty Name:	Swapnil G			
Year	3	Sem	6	
CO Number	Course Outcome			
MEL601.1	Design shaft under various conditions.			
MEL601.2	Design Knuckle and cottar joints.			
MEL601.3	Design Screw jack			
MEL601.4	Design Flexible flange coupling and Leaf springs.			
MEL601.5	Convert design dimensions into working drawing.			
MEL601.6	Use design data book to standardize the designed dimensions.			
MEL601.7	Turbo Machinery			
Course Code	MEL602			
Faculty Name:	Cleta P/Nilesh G			
Year	3	Sem	6	
CO Number	Course Outcome			
MEL602.1	Identify boilers, boiler mountings and accessories			
MEL602.2	Compute the performance of boiler, gas turbine, water turbine and pumps			
MEL602.3	Demonstrate the trail of reciprocating compressor.			
MEL602.4	Demonstrate the trail of impulse/reaction turbines and analyse its performance.			
MEL602.5	Demonstrate the trail of reciprocating pump and centrifugal pump and analyse its performance.			
MEL602.6	Analyse the characteristic curves of pumps			
Course Name:	Heating, Ventilation, Air conditioning and Refrigeration			
Course Code	MEL603			
Faculty Name:	Dr. Padiya			
Year	3	Sem	6	
CO Number	Course Outcome			
MEL603.1	Identify various experimental set ups and identify components			
MEL603.2	Describe the procedure for the Experiment			
MEL603.3	Carry out experiments as per procedure on different experimental setups and apply equations to do the calculations			
MEL603.4	Analyze experimental data and analyse by plotting curves from the data gathered to interpret results.			
MEL603.5	Draw conclusion from on the data obtained through experiments and correlate with theoretical predictions			
MEL603.6	Device new experiments on given setups or design new setups to study parameters of interest from HVAC domain			
Course Name:	Measurements and Automation			
Course Code	MESBL601			
Faculty Name:	Mahesh R			
Year	3	Sem	6	
CO Number	Course Outcome			
MEL604.1	Remember various components used in and functioning of refrigeration and airconditioning system			
MEL604.2	Explain the proper process to carry out experiment, do measurements, use of p-h diagram and use of psychrometric chart			
MEL604.1	Apply thermodynamic principles to determine parameters such as COP, TR, power, pulldown period			
MEL604.3	Analyze the system by plotting the curves and making conclusion			
MEL604.1	Compare the system for set of readings			
MEL604.4	Determine parameters related to design of refrigeration and airconditioning svstems			
Course Name:	Mini Project – 1 B			
Course Code	MEPBL401			
Faculty Name:	Sachin / Johnson.			
Year	2	Sem	4	

CO Number	Course Outcome			
MEPLB 401.1	Identify problems based on societal /research needs.			
MEPLB 401.2	Apply Knowledge and skill to solve societal problems in a group.			
MEPLB 401.3	Develop interpersonal skills to work as member of a group or leader.			
MEPLB 401.4	Analyse the impact of solutions in societal and environmental context for sustainable development.			
MEPLB 401.5	Demonstrate capabilities of self-learning in a group, which leads to life long learning.			
MEPLB 405.6	Demonstrate project management principles and design skills during project work.			
Course Name:	Operation Planning and Control			
Course Code	MEC801			
Faculty Name:	Cleta Pereira			
Year	4	Sem	8	
CO Number	Course Outcome			
MEC801.1	The learner will be able to Illustrate operations functions to manage operations in a manufacturing or service sectors in an effective way.			
MEC801.2	and capacity planning.			
MEC801.3	The learner will be able to Apply various methods to calculate forecasting, scheduling and sequencing of manufacturing and service operations.			
MEC801.4	resources.			
MEC801.5	The learner will be able to Compare the techniques of implementation of JIT, Lean, Agile and Synchronous manufacturing in manufacturing and service organizations.			
MEC801.6	The learner will be able to Prepare Material Requirements Plans (MRP) to estimate the planned order releases.			
Course Name:	Composite Materials			
Course Code	MEDLO8051			
Faculty Name:	Madan S Kulkarni			
Year	4	Sem	8	
CO Number	Course Outcome			
MEDLO8051.1	Select the type of material for the fibres and matrix in a composite material for the given application.			
MEDLO8051.2	Relate stresses and strains through the elastic constants for a given lamina.			
MEDLO8051.3	Evaluate elastic properties of a lamina based on the properties of its constituents.			
MEDLO8051.4	Predict failure of a lamina under the given loading condition.			
MEDLO8051.5	Select the number of laminae and their stacking sequence in a composite material for the given loading condition.			
MEDLO8051.6	Identify the type of damage occurring in a composite structure and select an appropriate method to repair it.			
Course Name:	Product Design and Development			
Course Code	MEDLO8061			
Faculty Name:	Sandeep P. Sabnis			
Year	4	Sem	8	
CO Number	Course Outcome			
MEDLO8061.1	Learner will be able to describe the product design and development process and list the step by step procedure of concept development.			
MEDLO8061.2	Learner will be able to interpret the customer need for developing product, relevance of product life-cycle issues and societal considerations.			
MEDLO8061.3	Learner will be able to apply concepts of product architecture, voice of customer, creative thinking and industrial design to the process of product development			
MEDLO8061.4	Learner will be able to analyze hierarchy of human needs, competitive benchmarking, quality function deployment and Industrial design principles in the context of product design and development.			
MEDLO8061.5	Learner will be able to estimate the hierarchy of customer needs, concepts and competitive performance through techniques like Pugh Matrix, House of Quality, Creative thinking methods etc.			
MEDLO8061.6	Learner will be able to design and make model/prototype of a product based on principles of product design and development.			

Course Name:	Project Management		
Course Code	ILO8021		
Faculty Name:	Sandeep P. Sabnis		
Year	4	Sem	8
CO Number	Course Outcome	Student Will be able to...	
ILO8021.1	Remember the definitions and concepts related to project management foundation at various stages.		
ILO8021.2	Understanding the principles, processes, different tools and techniques of project management.		
ILO8021.3	Apply the risk management plan, Project Procurement plan, contract management and analyse the role of stakeholders.		
ILO8021.4	Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.		
ILO8021.5	Evaluate project progress with PMIS and techniques like Earned value management and Control ratios.		
ILO8021.6	Create WBS, Budget and Time Plan for a project and learn to apply various monitoring and control techniques that are practiced in Industry.		
Course Name:	Laboratory based on IoT		
Course Code	MEL802		
Faculty Name:			
Year	4	Sem	8
CO Number	Course Outcome	Student Will be able to...	
MEL802.1	Remember simple functions for microcontrollers 8051 and Arduino		
MEL802.2	Understanding the simple peripheral devices to a Microcontroller.		
MEL802.3	Apply the microcontroller based embedded platforms in IoT.		
MEL802.4	Analyze the learning and understand the wireless peripherals for exchange of data.		
MEL802.5	Evaluate project progress with cloud platform and log sensor data.		
MEL802.6	Create the system using Arduino system		