Department of Mechanical Engineering , CAY- (Even semester, 2023-24)

	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:	Engineering Mathematics IV**		
Course Code	MEC401		
Faculty Name:	Prof. Manisha Seksaria		
Year	2	**Sem**	4
CO Number	**Course Outcome**		
MEC401.1	Students will know the definition of Karl Pearson's and Spearman's rank correlation coefficient, Dot and Cross product of vectors.		
MEC401.2	Students will understand the closed connected region and integration over it; Singularities and zeros of complex valued function; pdf and cdf of discrete and continuous random variables; finding Karl Pearson's and Spearman's Rank Correlation Coefficient, probabilities and conditional probabilities; find gradient of a scalar field, curl and divergence of vector fields.		
MEC401.3	Students will use Cauchy's integral theorem and residue theorem to evaluate complex integrals; check whether a given field is irrotational or solenoidal, find work done in any vector field, and find scalar potential for the irrotational field; Obtain probabilities and z-values for normal distributions; Z-test, t- test, F-test and Chi-square test to test hypotheses; Use Bayes' theorem to obtain conditional probabilities; Obtain the regression lines using correlation coefficient and by the method of least squares; Obtain unknown constants, expectation and variance and moment generating function of a given random variable.		
MEC401.4	Students will obtain series expansion and residue of a complex valued function; Fit curves to estimate values of random variables; Chi-square test to check independence of attributes and 'goodness of fit'; Analyze the result using probability distributions; Identify respective regression lines and the regression coefficients and correlation coefficient ; Obtain moments using the moment generating function ; evaluate integrals using Green's theorem and Stoke's theorem.		
MEC401.5	Students will identify applications of Green's and Stoke's theorem. Identify y on x and x on y regression lines and also if given lines represent regression lines or not. identifying sampling method.		
MEC401.6	Develop linear regression equations for a given data and forecast values (through mini project).		

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:	Freda Carvalho		
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		
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.		
MEC405.3	Students will be able to apply and demonstrate the working of digital logical circuits, operational amplifier and timer IC555 in various		
MEC405.4	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		
MEC405.5	Students will be able to identify, suggest and compare the use of selected analog, digital, power electronic semiconductor device, microprocessor and microcontroller for particular applications		
MEC405.6	Students will be able to create microcontroller programs for certain applications		

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 electronic components efficiently with an ease & thorough understanding to perform well in the laboratory.		
MEL401.2	Students will be able to built and test the characteristics/truth table of various analog & digital circuits and power electronic semiconductor devices.		
MEL401.3	Students will be able to use selected analog, digital and power electronic semiconductor devices to assemble circuits and study their working .		
MEL401.4	Students will be able to analyse the characteristics of electronic semiconductor device, electrical machines, digital circuits using basic programming of microcontroller MSP430 for various applications like motor speed control, light dimmer, switching, verification of truth table etc.		
MEL401.5	Students will be able to evaluate the working of operational amplifier, MOSFET and timer IC555 in various configurations of analog applications.		
MEL401.6	Students will be able create circuits using gates, operational amplifiers, IC555,BJT,etc		
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 / Swapnil Gujarathi		
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	Introducte fundamental elements of automation system.		
MEC604.2	Design and Develp 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 macine learning algorithms to elevate automation system to Industry 4.0		
MEC604.6	Illustrate an application to demonstate 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 equati		
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 sytems		
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**		
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		
Course Name:	Industrial Skills	**Sem**	7
Course Code	MEL 703		
Faculty Name:	Sachin Sugave		
Year	BE A.Y. 2022-23		
CO Number	**Course Outcome**		
MEL703.1	Skilfully prepare and edit documents and slides on MS Word and MS PowerPoint		
MEL703.2	Excute functions on MS Excel.		
MEL703.3	Practise soft skills and communication to be industry-ready.		
MEL703.4	Hone team building and leadership skills.		
MEL703.5	Familiarising students with basiccomputer/IT skillsin the industry		
MEL703.6	Understand and practice metacognitive skillsof creativity and problem solving.		