Department of Mechanical Engineering , CAY- (Even semester, 2021-22)

	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 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 variabless.		
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. S.S.Pawar		
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.		
Year	2	Sem	4
CO Number	Course Outcome		
MEC403.1	Define various components of mechanisms.		

MEC403.2	Devlope mechanisms to provide specific motion.		
MEC403.3	Draw velocity and acceleration diagrams for various mechanisms.		
MEC403.4	Draw cam profile for specific follower motion.		
MEC403.5	Analyze forces in various gears.		
MEC403.6	Select appropriate power transmission for specific application.		

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	3
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,		
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		
Course Code	MEC601		
Faculty Name:	Swapnil G		
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		
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:	Tool Engineering
Course Code	MEDLO6022
Faculty Name:	Sudhakar A
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
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		
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	State different terminologies and components used in refrigeration and airconditioning systems
MEL603.2	Explain the different terminologies, components and working principal of refrigeration and air conditioning unit
MEL603.3	Interpret the performance of refrigeration and air conditioning unit at given operating conditions
MEL603.4	Compare the performance of refrigeration and air conditioning unit at different operating conditions
MEL603.5	Select refrigeration and air conditioning unit for given operating conditions
MEL603.6	Design of basic air conditioning systems

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:	Design of Mechanical Systems		
Course Code	MEC801		
Faculty Name:	Dr. Suryavanshi /Johnson N.		
Year	4	Sem	8
CO Number	Course Outcome		
MEC801.1	The students will be able to Identify the different parts of the hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.		
MEC801.2	The students will be able to explain the operating principles of Hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.		
MEC801.3	The students will be able to use the basic components to form a suitable power transmission system to satisfy given requirements.		
MEC801.4	The students will be able to finalize the dimensions of the system components .		
MEC801.5	The students will be able to select appropriate prime movers for the system.		
MEC801.6	The students will be able to deisgn the hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps with a specific application.		

Course Name:	Design of Mechanical Systems		
Course Code	MEL801		
Faculty Name:	Dr. Suryavanshi /Johnson N.		
Year	4	Sem	8
CO Number	Course Outcome		
MEL801.1	The students will be able to Identify and assemble the different elements of the Hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.		
MEL801.2	The students will be able to state the applications of Hoisting mechanism, belt conveyors, gear boxes, diesel & petrol engine and pumps.		
MEL801.3	The students will be to apply the Concepts of system design.		
MEL801.4	The students will be able to finalize the dimensions of hoisting mechanism of EOT crane.		
MEL801.5	The students will be able to select appropriate prime movers for the conveyor.		
MEL801.6	The students will be able to design the system for a specific requirement.		

Course Name:	Industrial Engineering and Management		
Course Code	MEC802		
Faculty Name:	Sandeep D./Sabnis S.		
Year	4	Sem	8
CO Number	Course Outcome		
MEC802.1	Students will be able to list down objective of industrial engineering, various FMS layouts, name the contributors of IE, define productivity & factors influencing productivity, value engg., & value analysis, work study, method study, work measurement, ergonomics and recall concepts of PMTS, MOST etc		

MEC802.2	Students will be able to describe the factors influencing the productivity, explain the productivity improvement techniques, bio-mechanics, anthropometry, compare the value engg.& value analysis, illustrate significance of ergonomics in IE, Group Technology, Flexible manufacturing Lean Manufacturing.
MEC802.3	Students will be able to compute productivity, performance rating, standard time of work, wage of a worker.
MEC802.4	Students will be able to compare value analysis-value engg., job evaluation-merit rating, production-productivity, method study-time study, flexible manufacturing-lean manufacturing.
MEC802.5	Students will be able to develop facility location, wage structure, plant location, ergonomically designed benches in the class.
MEC802.6	Students will be able to justify facility design decision.

Course Name:	Power Engineering		
Course Code	MEC803		
Faculty Name:	Nilesh Gaware / Cleta Pereira		
Year	4	**Sem**	8
CO Number	**Course Outcome**		
MEC803.1	Describe boilers, boiler mountings and accessories, steam, gas and hydraulic turbine and pumps.		
MEC803.2	Differentiate boilers, boiler mountings and accessories.		
MEC803.3	Apply thermodynamics and kinematics principles to turbo machines with applications of impact of jet.		
MEC803.4	Calculate the performance of boiler, steam, gas and hrdraulic turbines and pumps, heat interactions in combustion of reactive mixtures.		
MEC803.5	Analyze characteristic curves of pumps		
MEC803.6	Design the pumping system for an application		

Course Code	MEL802		
Faculty Name:	Nilesh Gaware / Cleta Pereira		
Year	4	**Sem**	8
CO Number	**Course Outcome**		
MEL802.1	Identify boilers, boiler mountings and accessories		
MEL802.2	Compute the performance of boiler		
MEL802.3	Demonstrate the trail of impulse, reaction, Reciprocating and Centrifugal pump		
MEL802.4	Sketch velocity triangles of impulse/reaction turbines.		
MEL802.5	Analyze the characteristic curves of pumps		
MEL802.6	Justify the selection of pump		

Course Name:	Power Plant Engineering		
Course Code	MEDLO8041		
Faculty Name:	Nilesh Gaware		
Year	4	**Sem**	8
CO Number	**Course Outcome**		
MEDLO8041.1	Identify boilers, boiler mountings and accessories		
MEDLO8041.2	Compute the performance of boiler		
MEDLO8041.3	Demonstrate the trail of impulse, reaction, Reciprocating and Centrifugal pump		
MEDLO8041.4	Sketch velocity triangles of impulse/reaction turbines.		
MEDLO8041.5	Analyze the characteristic curves of pumps		
MEDLO8041.6	Justify the selection of pump		

Course Name:	Renewable Energy Systems		
Course Code	MEDLO8043		
Faculty Name:	Pawan K		
Year	4	Sem	8
CO Number	Course Outcome		
MEDLO8043.1	Students are able to state and define various terms in renewable energy sources		
MEDLO8043.2	Students are able to exemplify and illustrate global and national scenario, potential, hurdles, policies of renewable energy sources, considerations in design, basic principle, features of renewable sources		
MEDLO8043.1	Students are able to apply the theory to determine parameters related to a renewable energy system		
MEDLO8043.2	Students are able to read and plot the performance curves of renewable systems		
MEDLO8043.1	Students are able to compare and conclude on the system giving best performance under given conditions		
MEDLO8043.2	Students are able to determine parameters related to design of renewable energy systems.		

Course Name:	Energy Management in Utility Systems		
Course Code	MEDLO8044		
Faculty Name:	Dr. Padiya		
Year	4	Sem	8
CO Number	Course Outcome		
MEDLO8044.1	Remembers various Energy policy, Conservation Act and its standards		
MEDLO8044.2	Understand the process of Energy Audit		
MEDLO8044.3	Apply suitable Energy conservation techniques		
MEDLO8044.4	Consolidate various options for Energy conservation for given requirement.		
MEDLO8044.5	Evaluate the performance of Energy consuming equipments		
MEDLO8044.6	Estimate the energy Saving potential and related costing		

Course Name:	Project Management		
Course Code	ILO8021		
Faculty Name:	Sandeep Sabnis		
Year	4	Sem	8
CO Number	Course Outcome		
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:	Finance Management
Course Code	ILO8022
Faculty Name:	sandeep dasgupta

Year	4	Sem	8

CO Number	Course Outcome
ILO8022.1	Students will be able to describe Indian Financial System, its components and functions, concept of risk and return, various financial statements, factors of working capital and dividend.
ILO8022.2	Students will be able to distinguish between money market-capital market, share-denture, compounding-discounting, balance sheet-income statement, liquidity ratio-efficiency ratio, IRR-MIRR.
ILO8022.3	Students will be able to compute future value-present value of money flow, return from single and two securities with risk, financial ratios, IRR, EOQ, dividend using various theories.
ILO8022.4	Students will be able to examine risk associated with portfolio, financial performance from balance sheet, financial position from income statement, capital budgeting decisions, working capital requirement, dividend policy decisions
ILO8022.5	Students will be able to prepare trading account, balance sheet, cash flow account, P&L account, optimal capital structure.
ILO8022.6	Students will be able to justify investment decision, financing decision, dividend decision, capital budgeting decision, dividend decision.

Course Name:	Entrepreneurship Development and Management
Course Code	ILO8023
Faculty Name:	Punit D'souza
Year	4	Sem	8

CO Number	Course Outcome
ILO8023.1	To understand and define management, business and entrepreneurship
ILO8023.2	To identify the elements in the macro and micro business environment
ILO8023.3	To relate tools with the preparation of business plans and new product development

Course Name:	Environmental Management
Course Code	ILO8029
Faculty Name:	Kartiki Bhave, Anice Mathew, Dr. Vinod Gokarna, Sameer Hadkar
Year	4	Sem	8

CO Number	Course Outcome
ILO8029.1	Students will develop an insight of Global crisis and Environmental concerns in India and will be able r to discuss the goal, significance ,characteristics of environment management principles .The student will be able to list
ILO8029.2	Students will be able to discuss the causes for and the consequences of the global environmental problems such as pollution, global warming, ozone depletion, acid rain, hazardous wastes, endangered life-species, loss of
ILO8029.3	Students will be able to recall the structure of the ecosystems and interactions of organisms with their environment for food, habitat and other resources and will be able to explain the ecosystem processes, limiting factors, carrying capacity.
ILO8029.4	Students will be able to understand the benefits of EM and explain the role & the functions of government for planning & regulating EM
ILO8029.5	Students will be able to discuss ISO 14000 EM system & identify its certification procedure and to understand how it helps organizations implement & improve their EM system.
ILO8029.6	Students will be able to explain the evolution of environment policies & laws and discuss the implication of international policies & laws for India