

DEPARTMENT OF MECHANICAL ENGINEERING

List of Course Outcomes for Academic year 2023-2024

Regulation-2021 Course Outcomes

S. No	Year/ Sem	Course Code	Course Name	Course Outcome
1	II/III	MA3351	Transforms and Partial Differential Equations	 CO1: Understand how to solve the given standard partial differential equations CO2: Solve differential equations using Fourier series analysis which plays a vital role in engineering applications CO3: Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations. CO4: Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. CO5: Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
2	II/III	ME3351	ENGINEERING MECHANICS	 CO1: Illustrate the vector and scalar representation of forces and moments CO2: Analyse the rigid body in equilibrium CO3: Evaluate the properties of distributed forces CO4: Determine the friction and the effects by the laws of friction. CO5: Calculate dynamic forces exerted in rigid body
3	II/III	ME3391	ENGINEERING THERMODYNAM ICS	CO1: Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems. CO2: Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations. CO3: Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart CO4: Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations. CO5: Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.

				CO1. Us devete a d the
4	II/III	CE3391	FLUID MECHANICS AND MACHINERY	CO1: Understand the properties and behavior in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics. CO2: Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface. CO3: Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies CO4: Explain the working principles of various turbines and design the various types of turbines. CO5:Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps
5	II/III	ME3392	ENGINEERING MATERIALS AND METALLURGY	 CO1: Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. CO2: Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. CO3: Clarify the effect of alloying elements on ferrous and non-ferrous metals. CO4: Summarize the properties and applications of nonmetallic materials. CO5: Explain the testing of mechanical properties.
6	II/III	ME3393	MANUFACTURIN G PROCESSES	CO1: Explain the principle of different metal casting processes.CO2: Describe the various metal joining processes.CO3: Illustrate the different bulk deformation processes.CO4: Apply the various sheet metal forming process.CO5: Apply suitable molding technique for manufacturing of plastics components.
7	II/III	ME3381	COMPUTER AIDED MACHINE DRAWING	CO1: Prepare standard drawing layout for modelled assemblies with BoM. CO2: Model orthogonal views of machine components. CO3: re standard drawing layout for modelled parts
8	II/III	ME3382	MANUFACTURIN G TECHNOLOGY LABORATORY	CO1: Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW. CO2: The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling. CO3: The students become make the gears using gear making machines and analyze the defects in the cast and machined components

9	II/III	GE3361	Professional Development	CO1: Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements CO2: Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding CO3:Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.
10	II/IV	ME3491	THEORY OF MACHINES	 CO1: Discuss the basics of mechanism. CO2: Solve problems on gears and gear trains. CO3: Examine friction in machine elements. CO4: Calculate static and dynamic forces of mechanisms. CO5: Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.
11	II/IV	ME3451	THERMAL ENGINEERING	 CO1: Apply thermodynamic concepts to different air standard cycles and solve problems. CO2: To solve problems in steam nozzle and calculate critical pressure ratio. CO3: Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems. CO4: Explain the functioning and features of IC engine, components and auxiliaries. CO5: Calculate the various performance parameters of IC engines
12	II/IV	ME3492	HYDRAULICS AND PNEUMATICS	 CO1: Apply the working principles of fluid power systems and hydraulic pumps. CO2: Apply the working principles of hydraulic actuators and control components. CO3: Design and develop hydraulic circuits and systems. CO4: Apply the working principles of pneumatic circuits and power system and its components. CO5: Identify various troubles shooting methods in fluid power systems.
13	II/IV	ME3493	MANUFACTURIN G TECHNOLOGY	 CO1: Apply the mechanism of metal removal process and to identify the factors involved in improving machinability. CO2: Describe the constructional and operational features of centre lathe and other special purpose lathes. CO3: Describe the constructional and operational features of reciprocating machine tools. CO4: Apply the constructional features and working principles of CNC machine tools. CO5:Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.

14	II/IV	CE3491	STRENGTH OF MATERIALS	 CO1: Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. CO2: Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment. CO3: Apply basic equation of torsion in designing of shafts and helical springs CO4: Calculate slope and deflection in beams using different methods. CO5: Analyze thin and thick shells for applied pressures.
15	II/IV	GE3451	ENVIRONMENTA L SCIENCES AND SUSTAINABILIT Y	 CO1: To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation. CO2: To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society. CO3: To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. CO4: To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development CO5: To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
16	II/IV	CE3481	STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY	CO1: Determine the tensile, torsion and hardness properties of metals by testing CO2: Determine the stiffness properties of helical and carriage spring CO3: Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe CO4: Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet CO5: Determine the performance characteristics of turbine, roto dynamic pump and positive displacement pump.
17	II/IV	ME3461	THERMAL ENGINEERING LABORATORY	 CO1: Conduct tests to evaluate performance characteristics of IC engines CO2: Conduct tests to evaluate the performance of refrigeration cycle CO3: Conduct tests to evaluate Performance and Energy Balance on a Steam Generator.

18	III/V	ME3591	DESIGN OF MACHINE ELEMENTS	 CO1: Explain the design machine members subjected to static and variable loads. CO2: Apply the concepts design to shafts, key and couplings. CO3: Apply the concepts of design to bolted, Knuckle, Cotter, riveted and welded joints. CO4: Apply the concept of design helical, leaf springs, flywheels, connecting rods and crank shafts. CO5: Apply the concepts of design and select sliding and rolling contact bearings, seals and gaskets.
19	III/V	ME3592	METROLOGY AND MEASUREMENT S	 CO1: Discuss the concepts of measurements to apply in various metrological instruments. CO2: Apply the principle and applications of linear and angular measuring instruments, assembly and transmission elements. CO3: Apply the tolerance symbols and tolerance analysis for industrial applications. CO4: Apply the principles and methods of form and surface metrology. CO5: Apply the advances in measurements for quality control in manufacturing Industries.
20	III/V	CME339	Additive Manufacturing	 CO1: Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities. CO2: Acquire knowledge on process of transforming a concept into the final product in AM technology. CO3: Elaborate the vat polymerization and direct energy deposition processes and its applications. CO4: Acquire knowledge on process and applications of powder bed fusion and material extrusion. CO5: Evaluate the advantages, limitations, applications of binder jetting, material jetting and sheet lamination processes.
21	III/V	CME380	Automobile Engineering	 CO1: Recognize the various parts of the automobile and their functions and materials. CO2: Discuss the engine auxiliary systems and engine emission control. CO3: Distinguish the working of different types of transmission systems. CO4: Explain the Steering, Brakes and Suspension Systems. CO5: Predict possible alternate sources of energy for IC Engines.
22	III/V	CME365	RENEWABLE ENERGY TECHNOLOGIES	 CO1: Discuss the Indian and global energy scenario. CO2: Describe the various solar energy technologies and its applications. CO3: Describe the various solar energy technologies and its applications. CO4: Explore the various bio-energy technologies. CO5:Discuss the ocean and geothermal technologies.

23	III/V	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT	CO1: To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR) CO2: To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction CO3: To develop disaster response skills by adopting relevant tools and technology CO4: Enhance awareness of institutional processes for Disaster response in the country and CO5:Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity
24	III/V	ME3581	METROLOGY AND DYNAMICS LABORATORY	CO1: The students able to measure the gear tooth dimensions, angle using sine bar, straightness. CO2: Determine mass moment of inertia of mechanical element, governor effort and range of sensitivity. CO3:Determine the natural frequency and damping coefficient, critical speeds of shafts.
25	IV/VI	ME3691	Heat and Mass Transfer	 CO1: Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems. CO2: Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems. CO3: Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems. CO4: Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems. CO5: Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.
26	IV/VI	ME3681	CAD/CAM Laboratory	CO1: Design experience in handling 2D drafting and 3D modelling software systems CO2: Design 3 Dimensional geometric model of parts, sub- assemblies, assemblies and export it to drawing CO3:Demonstrate manual part programming and simulate the CNC program and Generate part programming using G and M code through CAM software.
27	IV/VII	ME3682	Heat Transfer Laboratory	 CO1: Conduct experiment on Predict the thermal conductivity of solids and liquids CO2: Conduct experiment on Estimate the heat transfer coefficient values of various fluids. CO3: Conduct experiment on Test the performance of tubes in tube heat exchangers

28	IV/VII	ME3791	MECHATRONICS AND IoT	 CO1: Explain Select suitable sensors and actuators to develop mechatronics systems. CO2: Discuss Devise proper signal conditioning circuit for mechatronics systems, and also able to implement PLC as a controller for an automated system. CO3: Elucidate the fundamentals of Iot and Embedded Systems CO4: Discuss Control I/O devices through Arduino and Raspberry Pi. CO5: Design and develop an apt mechatronics/IoT based system for the given real-time application.
29	IV/VII	ME3792	COMPUTER INTEGRATED MANUFACTURIN G	 CO1: Discuss the basics of computer aided engineering. CO2: Choose appropriate automotive tools and material handling systems. CO3: Discuss the overview of group technology, FMS and automation identification methods. CO4: Design using computer aided process planning for manufacturing of various components CO5: Acquire knowledge in computer process control techniques.
30	IV/VII	GE3792	INDUSTRIAL MANAGEMENT	 CO1: Discuss basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations. CO2: Discuss the planning; organizing and staffing functions of management in professional organization. CO3: Apply the leading; controlling and decision making functions of management in professional organization. CO4: Discuss the organizational theory in professional organization. CO5: Apply principles of productivity and modern concepts in management in professional organization.
31	IV/VII	ME3781	MECHATRONICS AND IoT laboratory	CO1: Demonstrate the functioning of mechatronics systems with various pneumatic, hydraulic and electrical systems. CO2: Demonstrate the microcontroller and PLC as controllers in automation systems by executing proper interfacing of I/O devices and programming CO3: Demonstrate of IoT based Home automation, CNC router, Robotic arm.