SEMESTER: IV **REGULATION: R20**

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20CS4T04	PYTHON PROGRAMMING	**1**	Recognize core programming basics and program design with functions using Python programming language.	K2
		2	Interpret the high-performance programs designed to strengthen the practical expertise.	K3
		3	Develop applications for real time problems by applying python data structure concepts.	K2
		4	Analyze the importance of object-oriented programming over structured programming.	K2
		5	Apply the concepts of exception handling and system libraries.	K3
20MA4T07	PROBABILITY AND STATISTICS	**1**	Make use of the concepts of probability and their applications	K3
		2	Apply discrete and continuous probability distributions	K3
		3	Use the components of a classical hypotheses test	K3
		4	Examine significance tests based on small and large sampling tests	K3
		5	Use correlation methods and principle of least squares, regression lines	K3
20ME4T01	THEORY OF MACHINES	**1**	Examine the plane motion mechanism with single degree of freedom	K2
		2	Analyze the velocity of various links in mechanisms using velocity diagrams or instantaneous center method as well as determine the acceleration of links using acceleration diagrams.	K3
		3	Design and analyze Cams for specified motion and follower and and analyze motion of higher pairs like toothed gears, gear trains	K3
		4	Analyze the effect of gyroscopic couple on planes and ships as well as Construction of turning moment diagrams and apply them in designing flywheels.	K4
		5	Estimate unbalances force in rotating members and reciprocating mechanisms and Solve problems of Governors.	K3

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME4T02	METALLURGY AND MATERIAL SCIENCE	**1**	Describe the properties of metals with respect to crystal structure and grain size.	K2
		2	Illustrate various types of steels and cast iron, their properties and applications	K3
		3	Summarize the properties and applications of nonferrous metals	K2
		4	Infer the concepts of ceramics, composite materials and nano materials.	K2
		5	Demonstrate the metal powders producing Methods, Manufacturing and Applications.	K2
20BM4T01	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	**1**	Describe the importance of managerial economics and its utility in decision making	K2.
		2	Generalize the meaning and usefulness of the production function and cost function in analyzing the firm's production activity	K2&K3.
		3	Comprehend the concept of Market structure, different types of Markets and pricing policies	K4& K1.
		4	Identify different forms of business organization and analyze their merits and demerits	K1.
		5	Evaluate the investment proposals through techniques of capital budgeting and financial performance of the company through Financial Statements	K5.
20CS4L04	PYTHON PROGRAMMING LAB	**1**	Apply core programming basics and program design with functions using Python programming language.	K3
		2	Interpret the high-performance programs designed to strengthen the practical expertise.	K3
		3	Develop applications for real time problems by applying python data structure concepts.	K3
		4	Test and apply the concepts of packages, handling, multithreading and socket programming.	K3
		5	Divide the importance of object-oriented programming over structured programming.	K4
20ME4L01	THEORY OF MACHINES LAB	**1**	Demonstrate and Analyze single and double slider crank chain mechanisms	K3
		2	Analyse the performance characteristic, and stability & sensitivity on various Governors	K4
		3	Determine the performance characteristics of different types of governors	K4
		4	Perform the experiment for static balancing and dynamic balancing	K4
		5	Analyse whirling of a shaft	K4

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME4L02	MECHANICS OF SOLIDS AND METALLURGY LAB	**1**	Analyze the relationship between load and deformation of different materials under the influence of axial (tensile), shear and bending loads.	K4
		2	Analyze the torsional stresses produced in different machine members, (shafts and springs), and to compute the rigidity modulus of their materials.	K3
		3	Examine the strength of different materials under impact loads, and determine the indentation hardness of different materials on different hardness Scales.	K3
		4	Prepare the microstructure as per standards and observe the microstructure of various materials	K3
		5	Perform hardness test and heat treatment of steels.	K2
20ME4S01	3D EXPERIENCE	**1**	Draw simple machine components by using sketch and part module.	K4
		2	Perform assemblies using the part drawings	K4
		3	Perform simple analysis on the modeled components using Simulia and delmia	K4

SEMESTER: VI **REGULATION: R20**

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME6T01	INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	**1**	Gain a solid understanding of the fundamentals, principles related to Artificial Intelligence and machine learning	K2
		2	Apply feature extraction and selection techniques.	K3
		3	Analyze and solve complex problems by applying probabilistic reasoning.	K3
		4	Devise and develop a machine learning model using various steps	K2
		5	Apply machine learning algorithms for classification and regression problems	K3
20ME6T02	HEAT TRANSFER	**1**	Describe modes of heat transfer and solve one-dimensional heat conduction problems without and with heat generation.	K3
		2	Develop heat transfer relations for different fin configurations and solve one dimensional transient heat conduction problems.	K3
		3	Apply different correlations developed for estimation of forced and natural convection heat transfer.	K3
		4	Describe various regimes of boiling and types of condensation heat transfer and also analyze different types of heat exchangers.[	K4
		5	State and apply laws of radiation and estimate radiation heat transfer between bodies.	K3
20ME6T03	CAD/CAM	**1**	Classify the hardware and software of CAD systems.	K2
		2	Illustrate the curve representation and surface representation.	K3
		3	Infer NC, CNC systems and basic programs using G-Codes, M-Codes, APT.	K2
		4	Summarize the principles of Group Technology and apply them in grouping parts, CAPP and CIM importance.	K2
		5	Discuss about Computer Aided Quality Control and FMS	K2

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME6E02	AUTOMOBILE ENGINEERING	**1**	Classify and describe the different parts of an automobile engine.	K2
		2	Describe the working principle of various elements of transmission system.	K2
		3	Describe the steering geometry, steering mechanisms and steering gears of an automobile.	K2
		4	Describe the working principle of various parts of suspension and braking systems.	K2
		5	Describe the various components of electrical systems, lubrication systems and safety systems used in automobiles.	K2
20ME6E03	UNCONVENTIONAL MACHINING PROCESSES	**1**	Classify the Unconventional machining process and describe he need for it.	K2
		2	Compare various mechanical energy based unconventional maching processes	K2
		3	Illustrate the chemical and electro-chemical energy based unconventional machining processes.	K3
		4	Describe about various parameters and applications of Electric Discharge Machining	K2
		5	Describe about various parameters of high Energy beam and advanced nano-finishing process.	K2
20ME6L01	HEAT TRANSFER LAB	**1**	Determine the thermal conductivity of metal rod, lagged pipe and composite wall.	K3
		2	Determine the temperature distribution, efficiency and effectiveness of a fin.	K3
		3	Determine the convective heat transfer co- efficient and the rate of heat transfer by natural and forced convection.	K3
		4	Calculate LMTD, Effectiveness and overall heat transfer coefficient for the parallel flow and counter flow heat exchangers	K3
		5	Determine Emissivity of the given gray body	K3
20ME6L02	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB	**1**	Develop intelligent algorithms like BFS, DFS and heuristic to solve AI problems	K4
		2	Implement hill climbing algorithm to solve Simulated Annealing and 8 puzzle problems	K4
		3	Solve problems implementing Towers of Hanoi and A* Algorithm algorithm	K4
		4	Implement and demonstrate ML algorithms finding the most specific hypothesis using training data samples	K4
		5	Apply the knowledge of Machine learning, to Implement and demonstrate regressions. .	K4

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME6L03	CAD/CAM LAB	**1**	Model a simple machine parts and assemblies from the part drawings using standard CAD packages.	K3
		2	Analyze various machine parts by using analysis software	K4
		3	Develop and execute CNC Turning and Milling codes for different operations using standard CAM Packages.	K3
20HS6S01	Advance Communication Skills Lab	**1**	Gather ideas and organize information relevantly and coherently	K2
		2	Participate in group discussions and face interviews with confidence	K3
		3	Write Resume with covering letter	K2
		4	Make oral presentations and public speaking	K3
		5	Take part in social and professional communication	K3

SEMESTER: VIII **REGULATION: R20**

Course Code	Course Name	CO. No	CO Statement	Knowledge Level
20ME8P01	PROJECT WORK, SEMINAR AND INTERNSHIP IN INDUSTRY	**1**	Review literature to identify the gaps, objectives & scope of the working advanced areas of mechanical engineering and define a problem.	K1
		2	Analyze the problems of mechanical engineering to formulate objectives of project.	K4
		3	Design a system, component, or process to meet the desired needs within certain realistic constraints such as economic, environmental, social, safety, manufacturability, and sustainability.	K6
		4	Demonstrate the techniques, skills, and modern engineering tools necessary for engineering practice.	K5
		5	Apply knowledge to solve engineering problem in multidisciplinary functional teams to communicate effectively and ethically, prepare a professional report as per recommended format, and defend the work.	K6