	Course Outcome (COs) of ME Department	
Department of Mechanical Engineering		
3ME-201	Advanced Engineering mathematiME Year of study: 2021-22	
CO1	Apply a range of mathematical theorems and methods to solve routine and complex analytic and applied problems	
CO2	Analyze data necessary for the solution of engineering problems	
CO3 CO4	Examine the effectiveness of proposed solutions to identified engineering problems. Examine the Fourier Series Analysis.	
C04 C05	Examine Z transform and Understand Basic Mathematical Calculation.	
3ME-102	Technical Communication Year of study: 2021-22	
CO1	Demonstrate critical and innovative thinking.	
CO2	Display competence in oral, written, and visual communication.	
CO3	Show an understanding of opportunities in the field of communication.	
CO4	Respond effectively to cultural communication differences.	
CO5	Demonstrate positive group communication exchanges.	
3ME3-04	Engineering Mechanics Year of study: 2021-22	
CO1	Determine the resultant force and moment for a given force system.	
CO2	Determine the centroid and moment of area.	
<u>CO3</u>	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.	
CO4 CO5	Apply basic knowledge of mathematics and physics to solve real-world problems Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.	
3ME4-05	Engineering Thermodynamics Year of study: 2021-22	
CO1	Explain the basic principles and applications of the thermodynamics to the various real life systems.	
CO2	Describe fundamental laws of thermodynamics.	
CO3	Apply the concepts such as Entropy, Energy Balance also the calculations of heat, work and other important thermodynamic properties for various ideal gas processes.	
CO4	Estimate performance of various thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.	
CO5	Estimate Pure Substance problem and Analysis of Substance.	
3ME4-06	Material Science Engineering Year of study: 2021-22	
CO1 CO2	Apply core concepts in Materials Science to solve engineering problems. Interpret about material fundamental and material processing.	
CO2	Distinguish the defects in crystal and its effect on crystal properties	
CO4	Figure out the different mechanical properties of material by studying different destructive and non- destructive testing.	
CO5	Articulate and utilize corrosion prevention strategies and estimate corrosion behavior of materials and components	
3ME4-07	Mechanics of Solids Year of study: 2021-22	
CO1	Understand statically determinate and indeterminate problems.	
<u>CO2</u>	Determine the resistance and deformation in member subjected to axial, flexural and torsional loads. Evaluate principal stresses, strains and apply the concept of failure theories for design.	
CO3 CO4	Analyze and design thin, thick cylinders and springs.	
C05	To Design Pressure Vessels and Find Stress Concentration Factor.	
3ME4-21	Mechine Drawing Practice Year of study: 2021-22	
CO1	Learn the basic concepts and to draw the views of section of solids, orthographic projections and threaded fasteners.	
CO2	Create assembly and get the detailed drawing of machine components.	
CO3	Represent tolerances and the levels of surface finish of machine elements.	
CO4	Develop the ability to apply Limits, Fits, and Dimensional Tolerances, as well as Geometric Tolerances to components and assemblies on Engineering Drawings.	
CO5	Develop an ability to create 2D drawings from 3D models.	
3ME4-22	Material Testing Lab Year of study: 2021-22	
CO1	Learn the principles of materials science and engineering through lab investigation.	
CO2	Learn the basic skills required to properly use materials science Instrument.	
CO3	Analyze mechanical properties of materials.	
CO4	Perform Rockwell hardness tester for measurement of hardness.	
CO5	Analyze impact test, fatigue test and bending test.	
3ME4-23	Basic Mechanical Engineering Lab Year of study: 2021-22	
C01	Do hands on assembling and disassembling of SI & CI Engine.	
CO2	Do hands on assembling and disassembling of bicycle & sewing machine.	
CO3	Understand working principles & classification of boilers and their accessories.	
CO4	Understand working principles & classification of pumps.	
3ME4-24	MATLAB Year of study: 2021-22	
C01	Use MATLAB effectively to analyze and visualize data.	
CO2	Apply numeric techniques and computer simulations to solve engineering-related problems.	
CO3	Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.	
CO4	Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation.	
CO5	Create and control simple plot and user-interface graphics objects in MATLAB.	
4ME2-01	Data Analytics Year of study: 2021-22 Apply Universite & Multiversite statistics for data applysis	
CO1 CO2	Apply Univariate & Multivariate statistics for data analysis Perform Linear, Multiple & Logistic Regression	
CO2 CO3	Demonstrate an understanding of dimensionality reduction techniques & Time Series analysis as well as its applications for data analytics	
CO4	Identify common approaches and algorithms for basic features selection, decision trees and factor analysis.	
C05	Apply common approaches and algorithms used for Cluster analysis and Time series model.	
4ME1-03	Managerial Economics and Financial Accounting Year of study: 2021-22	
C01	Understand the roles of managers in firms	
CO2	Understand the internal and external decisions to be made by managers	
CO3	Analyze the demand and supply conditions and assess the position of a company	

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CO2 Define management, its four basic functions and skills.		
	CO2	Define management, its four basic functions and skills.

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CO3	Know critical management theories and philosophies and how to apply them.
CO4	Recognize the concept of social responsiveness and its benefits.
CO5	Recognize the part communication plays in the management function.
5ME3-21	Mechatronics Lab Year of study: 2021-22
CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CO2	Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
CO2	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
CO3	Time and Frequency domain analysis of system model (for control application)
C04	PID control implementation on real time systems
5ME4-22	Heat Transfer Lab Year of study: 2021-22
C01	Determine Thermal Conductivity.
CO1	Determine Stefan Boltzmann Constant.
CO2	Estimate heat transfer coefficient.
C03	Measure heat transfer coefficient in free convection
C04	To Study and Compare LMTD and Effectiveness
5ME4-23	Production Engineering Lab Year of study: 2021-22
C01	Perform Linear and Angular measurements.
CO1	Understand the concept of Slip gauges.
CO2	Perform tests to measures gear tooth profiles and screw threads.
CO4	To measure flatness and surface defects in the given test specimen
C04	Force measurements during turning, drilling and milling operations.
5ME4-24	Machine Design Practice-I Year of study: 2021-22
CO1	Understand the problem and draw the design specifications.
C01	Solve problems related to fits and tolerances.
CO2	Understand component behavior subjected to loads and identify the failure criteria.
CO4	Design beams, conters and knuckle etc.
6ME3-01	Measurement & Metrology Year of study: 2021-22
CO1	Explain the basics of standards of measurement, limits, fits
CO1	Identify the uses of gauges and comparators.
CO3	Understand the significance of measurement system, errors.
CO4	Interpret measurement of field variables like force, torque
CO5	Comprehend the fundamentals of thermocouple and strain.
6ME4-02	Computer Integrated Manufacturing System Year of study: 2021-22
	Gain advanced knowledge in manufacturing tools, solutions to industrial applications; Identify, formulate and solve mechanical engineering problems related to Computer
CO1	integrated manufacturing environment.
	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased
CO2	
	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life.
CO3	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased
	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge.
CO3 CO4	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life.
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CO3 CO4 CO5 6ME4-03 CO1	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Vibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems.
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CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO4 CO5 6ME4-04 CO1 CO2 CO3 CO3 CO4	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Vibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems Analyze rotating and reciprocating systems and compute critical speeds. Analyze rotating and reciprocating systems and compute critical speeds. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, fleorings of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, fleorings. Design shafts, couplings a
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CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO2 CO3 CO4 CO2	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Wire CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Vibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems Analyze rotating and reciprocating systems and compute critical speeds. Analyze and design machine supporting structures, vibration isolators and absorbers. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design shafts, couplings and gears. Analyze the pressure distribution and design journal bearings. Design shafts, couplings and gears. Making actual models of machine elements like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 <
CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO3 CO4 CO5 6ME4-05 CO4	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Vibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the coules and effects of vibration in mechanical systems. Analyze and design machine supporting structures, vibration isolators and absorbers. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design shafts, couplings and gears. Analyze the pressure distribution and design journal bearings. Design balts, springs, brakes, clutches and engine parts. Making actual models of machine elements like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 Understand the of of statistical tools in quality improvement.
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CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO5 6ME4-04 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME5-11 CO1 CO2	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Vibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems Analyze rotating and reciprocating systems and compute critical speeds. Analyze and design machine supporting structures, vibration isolators and absorbers. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design shafts, couplings and gears. Analyze the pressure distribution and design journal bearings. Design belts, springs, brakes, clutches and engine parts. Making actual models of machine elements like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 Understand the role of statistical tools in quality improvement. Understand the elifferent types of variability, rational subgroups, and how a control chart is used to detect assignable causes. Construct the sampling plan and OC curve etc. Refrigeration & Air Conditioning Year of study: 2021-22 Understand the plan and DC curve etc. Refrigeration & Air Conditioning Year of study: 2021-22 Understand the principal sand applications of refrigeration systems. Understand wapour compression refrigeration systems.
CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO5 6ME4-04 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME5-11 CO1 CO2 CO3 CO3	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CAC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Write CAC part programs using CADEM simulation package for simulation of machining operations such as Turning. Drilling & Milling. Withration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems. Analyze rotating and reciprocating systems and compute critical speeds. Analyze and design machine supporting structures, vibration isolators and absorbers. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design bafts, couplings and gears. Analyze the pressure distribution and design journal bearings. Design bafts, cluchbea and engine parts. Making actual models of machine elements. Iliderstand the olf of study: 2021-22 Understand the olferent types of variability, rational subgroups, and how a control chart is used to detect assignable causes. Construct and interpret control charts for variables such as x-bar, r, s, and individuals charts. Construct the sampling plan and OC curve etc. Refrigeration & Air Conditioning Year of study: 2021-22 Understand the plan and OC curve etc. Students will be able to Construct the sampling plan and OC curve etc. Refrigeration & Air Conditioning Year of study: 2021-22 Understand the pi
CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO5 6ME4-04 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME4-11 CO2 CO3 CO4 CO5 CO3 CO4 CO5	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Write CNC part programs using CADEM simulation package for simulation of machining operations such as Turning. Drilling & Milling. Write CNC part programs using CADEM simulation package for simulate governing equations of motion. Understand the causes and effects of vibration in mechanical systems Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems Analyze rotating and reciprocating systems and compute critical speeds. Analyze rotating and reciprocating systems and compute critical speeds. Analyze and design machine supports structures, vibration isolators and absorbers. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design shafts, couplings and gears. Analyze the pressure distribution and design journal bearings. Design belts, springs, brakes, clutches and engine parts. Making actual models of machine elemnts like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 Understand the role of statistical tools in quality improvement. Understand the different types of variability, rational subgroups, and how a control chart is used to detect assi
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CO3 CO4 CO5 6ME4-03 CO1 CO2 CO3 CO4 CO5 6ME4-04 CO5 6ME4-04 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME4-05 CO1 CO2 CO3 CO4 CO5 6ME5-11 CO1 CO2 CO3 CO4 CO5 6ME5-12	Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design bets, coupling and be bearings, gears connecting rod with all calculations. Making and the role of stratistical to construct the sampling bearing. Design bets, coupling and the sampling bearings. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design of Machine Element-II Year of study: 2021-22 Understand the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design bets, springs, brakes, cluctes and engine parts. Making actual models of machine elements like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 Understand the role of study: 2021-22 Understand the role of study: 2021-22 Understand the role of study: 2021-22 Understand the different types of variability, rational subgroups, and how a control chart is used to detect assignable causes. Construct and interpret control charts for variable such as x-bar, r, s, and individuals charts. Construct the sampling plan and OC curve etc. Students will be able to Construct the sampling plan and OC curve etc. Refrigeration & AF Conditioning Year of study: 2021-22 Understand the principles and applications of refrigeration systems. Understand vapur compression refrigeration systems. Understand vapure compression refrigerati
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CO3 CO4 CO5 GME4-03 CO1 CO2 CO3 CO4 CO5 GME4-04 CO5 GME4-04 CO5 GME4-05 CO1 CO2 CO3 CO4 CO5 GME5-11 CO2 CO3 CO4 CO5 GME5-11 CO2 CO3 CO4 CO5 GME5-12 CO1 CO2 CO3 CO3 CO4	Design a system, components, or process and meet specific objectives keeping in view the economical approaches, availability of materials and manufacturability with increased life. Acquire knowledge of CAD-CAM engineering and be able to discriminate, evaluate, analyze and integrate existing and new knowledge. Develop habit of individual critical thinking in analyzing a complex problem in the computer aided designing, manufacturing and optimization. Write CMC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. Wibration Engineering Year of study: 2021-22 Understand the causes and effects of vibration in mechanical systems. Develop schematic models for physical systems and formulate governing equations of motion. Understand the role of damping, stiffness and inertia in mechanical systems Analyzer otsting and reciprocating systems and compute critical speeds. Analyzer and design machine supporting structures, vibration isolators and absorbers. Develop schematic models for physical systems and compute critical speeds. Analyzer and the concepts of principal stresses, theories of failure, stress concentration and fatigue loading. Design belts, springs, brakes, clutches and engine parts. Making actual models of machine element. Making actual models of machine lements like bearings, gears connecting rod with all calculations. Quality Management Year of study: 2021-22 Understand the role of statistical tools in quality improvement. Understand the role of statistical tools in quality improvement. Students will be able to Construct the sampling plan and OC curve etc. Refigeration & Air Conditioning Year of study: 2021-22 Understand vapour compression refigeration systems. Analyze air conditioning processes using the principles of psychrometry.
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	Computer Integrated Manufacturing Lab Year of study: 2021-22
CO1	
CO2	Create the G-code program (with a standard computer post processor) of a work-piece on a standard numerically controlled machine tool with CNC controls. Create basic and advanced CNC programs from imported CAD data using several CAM systems.
	Use effectively CAD years in order to produce the final NC code for the manufacturing of various mechanical parts and carry out exchange of data between CAD and
CO3	CAM systems.
CO4	Compare the operation and programming of CNC machine tool using manual programming
CO5	Compare the operation and programming of CNC machine tool using CAM systems.
6ME4-22	Vibration Engineering Lab Year of study: 2021-22
CO1	Design on experiment to measure the periodic time of free-vibrations of single degree and multi degree of freedom system
CO2	Analyze the mechanical vibrations to determine the material properties of mechanical elements used
CO3	Understand the fundamental of vibration measurement in the real world.
6ME4-23 CO1	Machine Design Practice – II Year of study: 2021-22 Design mechanical components under fatigue loading.
CO2	Design helical compression, tension and torsional springs.
CO3	Design of bolts subjected to variable stresses.
CO4	Design of spur, bevel and helical gears.
Ch454.24	
6ME4-24 CO1	Thermal Engineering Lab-1 Year of study: 2021-22 Differentiate between SI & CI Engines.
CO2	Differentiate between 2-stroke & 4-stroke Engines
CO3	Understand theoretical and actual working cycles of SI & CI Engines.
CO4	Demonstrate steering system.
CO5	Demonstrate Ignition & Fuel Supply System.
7ME5-11	IC Engine Year of study: 2021-22
CO1	Understand working and performance of IC Engines through thermodynamic cycles.
CO2	Understand combustion phenomena in SI and CI engines and factors influencing combustion chamber design.
CO3	Outline emission formation mechanism of IC engines, its effects and the legislation standards.
CO4 CO5	Understand working principles of instrumentation used for engine performance and emission parameters. Evaluate methods for improving the IC engine performance.
7ME5-12	Operation Research Year of study: 2021-22
CO1	Apply and analyze mathematical optimization functions to various applications
CO2	Decertize the importance and value of Operations Decertify and mathematical modeling in calving practical problems in industry by Linear programming problems
CO3	Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry by Linear programming problems Understand the mathematical tools that are needed to formulate & solve transportation problems for optimization
CO4	Formulate & analyze a managerial decision problem into a mathematical model using game theory & investment analysis.
CO5	Use mathematical models to solve the inventory & replacement problems.
7ME5-13	Turbomachine Year of study: 2021-22
7ME5-13 CO1 CO2	Give examples of the main applications of turbo machines
CO1	Give examples of the main applications of turbo machines Recognize typical designs of turbo machines Explain the working principles of turbo machines and apply it to various types of machines
CO1 CO2 CO3 CO4	Give examples of the main applications of turbo machines Recognize typical designs of turbo machines Explain the working principles of turbo machines and apply it to various types of machines Determine the velocity triangles in turbo machinery stages operating at design and off-design conditions
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CO1 CO2 CO3 CO4 CO5 7AG6-60.1 CO1 CO2	Give examples of the main applications of turbo machines Recognize typical designs of turbo machines Explain the working principles of turbo machiners and apply it to various types of machines Determine the velocity triangles in turbo machinery stages operating at design and off-design conditions Explain the working principles of Reciprocating pumps. Human Engineering & Safety Year of study: 2021-22 Understand the importance of human factors and their application in system development. Know the effect of visual, auditory and factual displays in human performance.
CO1 CO2 CO3 CO4 CO5 7AG6-60.1 CO1 CO2 CO3	Give examples of the main applications of turbo machines Recognize typical designs of turbo machines Explain the working principles of turbo machinery stages operating at design and off-design conditions Explain the working principles of Reciprocating pumps. Human Engineering & Safety Year of study: 2021-22 Understand the importance of human factors and their application in system development. Know the effect of visual, auditory and factual displays in human performance. Understand the importance of optimum work-rest cycles in endurance.
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CO1 CO2 CO3 CO4 CO5 7AG6-60.1 CO1 CO2 CO3 CO4 CO5 7ME4-21 CO1 CO2 CO3 CO4 CO2 CO3 CO4	Give examples of the main applications of turbo machines Recognize typical designs of turbo machines Explain the working principles of turbo machinery stages operating at design and off-design conditions Explain the working principles of Reciprocating pumps. Human Engineering & Safety Year of study: 2021-22 Understand the importance of human factors and their application in system development. Know the effect of visual, auditory and factual displays in human performance. Understand the importance of optimum work-rest cycles in endurance. Ideally design the work space in accordance to anthropometry. Have the general understanding safety features and regulation acts in farm machinery Demonstrate the ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software. Model multi-dimensional heat transfer problems using ANSYS Demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes Develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use. Thermal Engineering Lab-II Year of study: 2021-22
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8ME5-11	Hybrid and Electric Vehicle Year of study: 2021-22
CO1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
CO2	
	Explain plug – in hybrid electric vehicle architecture, design and component sizing and the power electronics devices used in hybrid electric vehicles.
CO3	Analyze various electric drives suitable for hybrid electric vehicles.
CO4	Discuss different energy storage technologies used for hybrid electric vehicles and their control.
CO5	Demonstrate different configurations of electric vehicles and its components, hybrid vehicle configuration by different techniques, sizing of components and design optimization
	and energy management.
8ME5-12	Supply & Operations Management Year of study: 2021-22
CO1	Demonstrate an understanding of fundamental operations concepts, key principles of its management, and relevant analysis approaches.
CO2	Demonstrate the ability to understand a real-world unstructured problem, and gather necessary information and data to formulate into a structured problem
СОЗ	
	Demonstrate ability to develop quantitative and qualitative analysis framework and solution methods, and appropriately implement them to obtain meaningful solutions
CO4	Demonstrate ability to identify strengths and weaknesses of alternative solutions and obtain relevant managerial insights.
CO5	Setup Facilities Layout , Facility Location and Enhance Product Qulaity
8ME5-13	Additive Manufacturing Year of study: 2021-22
CO1	Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping technologies.
CO2	Describe different RP techniques.
CO3	Discuss fundamentals of Reverse Engineering.
8EC6-60.2	Robotics and Control Year of study: 2021-22
CO1	Design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effectors, sensor, machine vision robot kinematics and
	programming.
CO2	Explain the basic concepts of working of robot analyze the function of sensors in the robot
CO3	Write program to use a robot for a typical application
CO4	Use Robots in different applications
8AN6-60.1	Finite Element Methods Year of study: 2021-22
CO1	Recognize the significance and importance of finite element methods to the professional design engineer.
CO2	Provide a theoretical understanding on the fundamentals of finite element methods for small displacement linear elastic analysis
CO3	Provide experience on how to develop good models and how to interpret the numerical results in design.
8MI6-60.2	Maintenance Management Year of study: 2021-22
CO1	Maintenance management skill
CO2	Need of safety devices
CO3	Increase the productivity of the plant at minimal cost
CO4	Failure analysis of plant machineries
CO5	Concept of tribology, conditioning monitoring