MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

S.No.	Course Code	Course Name	CO No.	Course Outcomes (After completing the course students will be able to…...)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1FY2-01	Engineering Mathematics-I	CO1	Define and explain basic concepts definite integrals, sequence and series, periodic functions and multivariable functions.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Understand properties of beta and gamma function, convergence of sequence and series.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply properties of beta and gamma functions and definite integrals to find surface area and volumes of revolution. They will be able to apply partial derivatives and multiple integrals to solve many problems in science and engineering.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyse Fourier series to make many useful deductions which lay down foundation of signal processing and image processing.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1FY2-02	Engineering Physics	CO1	Describe the concepts of Wave and Quantum mechanics, Laser and Fiber optics, material science and electromagnetic theory. (Recall/Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain the different applications of Laser and optical fibers in communication, engineering, medicine and Science. Application of Hall effect (Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Evaluate energy states in 1-D and 3-D box with the application of quantum mechanics.(Apply)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Analyze the crystal structure through X-ray Diffraction & wavelength of light through Newton's ring experiment and Michelson- interferometer ,types of materials through Hall effect . (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1FY1-05	Human Values	CO1	Relate sustained happiness through identifying the essentials of human values and skills	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO2	Find the happiness and human values in terms of personal and social life to create harmony in them	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
			CO3	Use and understand practically the importance of trust, mutually satisfaction and human relationship	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Identify the orders of nature for the holistic perception of harmony for human existence	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO5	Implement professional ethics and natural acceptance of human values in his/her life	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
4	1FY3-06	Programming for Problem Solving	CO1	Understand the basic concepts of fundamental of computer system, number system and programming. (Remembering)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain various memory units, representation of number system and Conditional, Iterative statements using arrays, string, pointers, file structure. (Understanding)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Examine the concept of algorithms, flowchart, Operators, Pointer, Array, String, structure, union using modularization to solve complex problems using C Programming (Applying)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Illustrate the User Defined functions, Memory management and File concepts to solve real time problems using C Programming (Analyzing)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	1FY3-09	Basic Civil Engineering	CO1	Describe Scope, role and Specialization of Civil Engineering, basics of surveying, types of building, Plinth area, carpet area, floor space index, R.C.C., mode of transportation and different causes of pollution. (Remember)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain solid waste management, building by-laws, concept of sun light and ventilation, chemical and hydrological cycle, biodiversity, causes of road accident, sanitary landfill and on-site sanitation, food chain and food web, contour maps, Global warming, Climate Change, Ozone depletion, and Green House effect. (Understand)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate method of ranging and levelling, road safety measures, building component, environmental acts, different types of foundation, treatment and disposal of waste water, traffic sign and symbol and rain water harvesting. (Apply)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Compute errors in linear measurement, bearings and elevations of respective points on the ground. (Analyze)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1FY2-20	Engineering Physics Lab	CO1	Operate the various devices for the multifarious use in the relative fields.	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO2	Apply knowledge of Newton's Ring,grating, spectrometer,Optical fiber ,Sextant, Hall effect , a n d L a s e r to determine wavelength of light, dispersive power,Numerical aperature Height of Object, Hall coefficient, coherence length and coherence time	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-
			CO3	Conduct the experiments with interest and an attitude of learning.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
			CO4	Evaluate the Band Gap and time constants (t=RC) using basic principles of semiconductors and Capacitors by graphs.	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-
7	1FY1-23	Human Values Activities and Sports	CO1	Recall the natural and social issues and their remedies.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
			CO2	Describe the nature of human values and the impact of external factors over it.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO3	Validate through actions the significance of trust, respect and harmony with self and surroundings.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
			CO4	Outline the relation of human with nature and other factors in terms of human existence	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO5	Associate the knowledge of self and society with clear understanding of social issues and the human beings.	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
8	1FY3-27	Basic Civil Engineering Lab	CO1	Describe various sanitary fittings and water supply fittings	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Examine pH, Turbidity, Hardness and Total solids of given water sample	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Use of EDM and Total Station in the field	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Investigate the linear and angular measurements of the points on the ground and levelling	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
9	1FY3-24	Computer Programming Lab	CO1	Relate the fundamental of C Programming as variable, operators and taxonomy to write a basic C Program	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Write programs that perform operations using condition control statements and loop control statements, single and multi-dimensional arrays along with specific program of matrix multiplication.(Examine)	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Use C programs to implement operations related to Array, Macros and inline functions, Dynamic memory allocations, concept of Structure, Unions and Pointers	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Communicate effectively and work ethically	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-
10	1FY3-28	Computer Aided Engineering Graphics	CO1	Describe engineering drawing terminology, concept of scales and conic sections.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Draw Projection of Points, lines, planes, solids and section of solids	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Draft 2D engineering problems on CAD software.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
			CO4	Work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
11	2FY2-01	Engineering Mathematics-II	CO1	Define basic rank of matrix to find, eigen values and eigen vectors of the matrix, degree and order of differential equations.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain complementary functions and particular integral of ordinary differential equation and various methods of solution of ODE to solve complex engineering problems.	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Apply an appropriate analytical technique to find solution of first order and higher order differential equations.	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Sr	Code	Course	CO	Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			CO4	Cassify higher order partial differential equations and analyze a wide variety of time dependent phenomena of real world including heat conduction, wave equation particle diffusion.	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
12	2FY2-03	Engineering Chemistry	CO1	Describe characteristics of water, fuel and Engineering materials-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Determine of hardness of water and calorific value of fuels for Industrial as well as domestic purposes	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Compare different techniques of water treatment, fuel analysis, Manufacturing of engineering materials and corrosion protection methods	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Prepare the generic drugs or medicines by identifying the applications of organic reaction mechanism and manufacturing of engineering materials	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
13	2FY1-04	Communication Skills	CO1	Describe the process of communication, basics of Grammar and Writing and Literary Aspects	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
			CO2	Explain the types of communication, barriers and channels of communication and the concept of Literature through Short Stories and poetry	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO3	Write and prepare professional reports, paragraph and business letters with the correct use of grammar	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
			CO4	Discuss and illustrate the impact of social and moral values by implying the basics of English Writing Skills through literary aspects	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO5	Restate and outline the basic areas of English Language Skills with the applications of literature	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
14	2FY3-07	Basic Mechanical Engineering	CO1	Retrieve basic concepts of thermal and manufacturing process.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Compare different types of thermal and manufacturing processes and.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Annotating about the functioning of turbine & pumps, IC engines, refrigeration system, modes of transmission of power, materials and primary manufacturing process.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Appraise the fundamental knowledge of thermal engineering, in addition to understanding of power transmission to solve the industrial and societal issues.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
15	2FY3-08	Basic Electrical Engineering	CO1	Identify basic components of electrical engineering and connect them to form different circuits to verify basic laws.Understanding	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyse the output of rectifier circuit,AC and DC machines to solve problems assosciated with Basic electrical engineering.Analyse	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Contribute efficiently in a team to acieve desired response of AC and DC Machines. Team Work	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO4	Demonstrate the output of rectifier circuits consisting of basic components of electrical engineering. Mechanism	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
16	2FY2-21	Engineering Chemistry Lab	CO1	Determine the strength of unknown solution by volumetric analysis.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Examine the characteristics of lubricating oil in groups	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO3	Analyze different characteristics of water and fuel to solve societal and enviornmental problems	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
			CO4	Ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
17	2FY1-22	Language Lab	CO1	Use and pronounce the words correctly.	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
			CO2	Acquire knowledge of the correct expressions,vocabulary etc. in personal and professional lives.	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
			CO3	Plan successfully for leadership and teamwork,crack GD's, interviews and other professional activities.	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
			CO4	Synthesize the process of communication using LSRW.	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
18	2FY3-25	Manufacturing Practices Workshop	CO1	Describe the working of Lathe machine.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Apply the basic concepts of Foundry Shop	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Develop various carpentry joints, welding joints and sheet metal objects.	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
19	2FY3-26	Basic Electrical Engineering Lab	CO1	Discuss measurement of electrical quantites	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Compare different connections of transformer	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Demonstrate constructional features of electrical machines and converters	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-
20	2FY3-29	Computer Aided Machine Drawing	CO1	Describe orthographic projections and basic Geometrical Concept	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyze Sectional Views of different mechanical Components and assembly drawing	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Draft a engineering product using CAD software	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
			CO4	Ability to work as a team member ethically	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-
21	3ME1-02	Technical Communications	CO1	Describe the process of technical communication in terms of LSRW	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-
			CO2	Comprehend the professional documents like resume, coverletter, reports	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-
			CO3	Write the technical documents like project proposals, articles	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-
			CO4	Prepare report and present individually or in a team	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
22	3ME2-01	Advanced Engineering Mathematics	CO1	Define the concept of numerical Analysis, Laplace transforms, Fourier transforms and Z-transform.	1	-	-	-	-	-	-	-	-	-	-	-	2	-	2
			CO2	Apply Numerical methods, numerical differentiation and integration of interpolation to construct new data points for polynomial and transcendental equations whenever and wherever routine methods are not applicable.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
			CO3	Analyze the Fundamentals of the Fourier, Laplace, and Z-Transforms. These systems can be carried out in terms of either a time domain or a transform domain formulation.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	1
			CO4	Evaluate Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications and Z-transform in the characterization of Linear Time-Invariant system (LTI), in development of scientific simulation algorithms	-	3	-	-	-	-	-	-	-	-	-	-	2	-	2
21	3ME3-04	Engineering Mechanics	CO1	Describe Statics and Dynamic forces acting in Simple mechanisms and motions	1	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Explain the motion characteristics of a body subjected to a given force system	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Illustrate numerous concepts for designing mechanics of various machine/automobile components	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Solve the engineering problems of statics and dynamics for mechanical systems	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
22	3ME4-05	Engineering Thermodynamics	CO1	Describe the basic concept of thermodynamics	1	-	-	-	-	-	-	-	-	-	-	-	2	2	1
			CO2	Explain the heat & work, Pure substance and laws of thermodynamics	2	-	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO3	Illustrate the thermodynamic power cycles like Carnot, Otto, Diesel, Brayton, Ericsson and Rankine	3	-	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO4	Solve the thermodyanamic problems using the concepts of Entropy, Availibility and thermodynamics relationship	-	2	-	-	-	-	-	-	-	-	-	-	3	2	3
23	3ME4-06	Material Science And Engineering	CO1	Describe the various mechanical properties and the testing methods for engineering materials.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO2	Classify general crystal structures and engineering materials on the basis of their properties and applications	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyze the iron carbon equilibrium diagram and the phase transformation which take place during solidification of metals and alloys.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	2

S.No	Code	Subject	CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
			CO4	Justify the isothermal transformation diagrams and heat treatment processes for metallic material to obtain the desired properties in it.	-	-	2	-	-	-	-	-	-	-	-	-	2	2	-
24	3ME4-07	Mechanics of Solids	CO1	Explain basic concepts of stress, strain, torsion deflection,bending and strain Energy.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO2	Apply the concept of stresses and strain, theories of failure, bending & torsion on different types of loading conditions and sections.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyze the stresses in shafts, cylindrical and sperical thin wall pressure vessels, long and short columns for different end conditions.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Evaluate the deflection of beams and stresses in principal plane by analytical & graphical method.	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
28	3ME4-21	Machine Drawing Practice	CO1	Draw simple mechanical parts using concept of Engineering Graphics	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Analyse dimensioning, sectioning and development of views of complex feature components	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Compare 2D and 3D drafting of component using CAD software	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Construct assemblies from the concepts learnt using drafting softwares	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
26	3ME4-22	Material Testing Lab-I	CO1	Identify the engineering material on the basic of its physical appearence and mechanical testings	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Compare and contrast the micro-structures of metallic materials and predict the the heat treatment operation done on it.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Prepare the metallic sample and select the suitable heat treatment process to obtain the desired properties in it.	-	3	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO4	Make use of different mechanical testing machines to identify and compare various mechanical properties like hardness, toughness, tensile, compression, bending, torsional strength of engineering materials.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO5	Communicate effectively and work as a team member ethically	-	-	-	-	-	-	2	2	2	-	-	-	-	-	-
27	3ME4-23	Basic Mechanical Engineering Lab	CO1	Apply the knowledge of assemble and disassemble of the machines like Bicycle, Pump, sewing Machine, etc and submit the written report indicating the learning achieved .	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Analyze observational study of complex systems via cut sections of AC, refrigerator and I.C engine models for understanding basic Mechanical Engineering concepts	-	2	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO3	Conclude the knowledge of basic mechanical engineering	-	-	-	-	-	-	-	2	2	-	2	3	2	2	-
			CO4	Present the report on study of mechanical systems in individually or in team	-	-	-	-	-	-	-	2	2	2	-	2	3	2	2
25	3ME4-24	Programming Using MATLAB	CO1	Apply Basic commands, built-ins, applications of MATLAB to solve Array, Graphic functions, Matrix , Loops and numerical problems.	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Develop code for problems involving different types of mathematical models, plot functions and equations (ODE, PDE, Linear and nonlinear equations).	-	-	3	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Illustrate the graphic features of MATLAB effectively in the various applications	-	-	-	3	-	-	-	-	-	-	-	-	3	2	-
			CO4	Solve mathematical problems encountered in Mechanical Engineering using SimScape and Simulink tool	-	-	-	2	-	-	-	-	-	-	-	-	3	2	-
			CO5	Execute the coding for evaluation and simulation of problems in teamwork ethically	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-
29	3ME7-30	Industrial Training	CO1	Relating the real time applications to the mechanical engineering concepts.	-	3	-	-	-	-	-	-	-	-	-	2	2	-	1
			CO2	Develop the problem solving approach by developing projects in industry	-	-	3	-	2	-	-	-	2	-	2	2	-	2	-
			CO3	Build skills to be working as a team member and become employable.	-	-	-	-	-	-	-	-	3	-	-	-	-	3	2
			CO4	Create a well organized report employing elements of technical writing and critical thinking.	-	-	-	-	-	-	-	2	-	3	-	3	-	2	1
31	4ME1-03	Managerial Economics and Financial Accounting	CO1	Discuss the concepts of economics like demand, supply, market structure and financial management like balance sheet.	-	-	-	-	-	1	-	-	-	3	3	2	-	-	-
			CO2	Apply the economic functions and theories like: demand & supply functions, production & cost functions & pricing theories.	-	-	-	2	-	1	-	-	2	-	3	2	-	-	-
			CO3	Analyze the relationship between economic variables using the concept of elasticity, cash flow analysis, fund flow analysis and ratio analysis	-	3	2	3	-	-	-	-	-	-	3	2	-	3	2
			CO4	Evaluate the real-life problems of business organizations using capital budgeting techniques.	-	3	-	3	-	3	2	-	2	-	3	2	-	3	-
32	4ME2-01	Data Analytics	CO1	Apply statistical tools for different types of problems in Data Analytics.	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Analyze sample data and interpret the same for given problem.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Formulate data analysis problems by selecting appropriate analysis model.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Evaluate complex engineering problems Using PCA, Logistic regression and multiple regression	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
33	4ME3-04	Digital Electronics	CO1	Discuss the concepts of electronics componant like Diode,BJT, Op-Amp and Digital Electronics componants.	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO2	Apply the basic concept of elctonics companants in Robotics,IoT etc.	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Classify between different Amplifiers and evaluate their efficiency.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO4	Design bias circuitry of BJT and flip-flop etc.	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
34	4ME4-05	Fluid Mechanics and Fluid Machines	CO1	Explain the basic principles of fluid mechanics and its application	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Apply the concept of pressure, Flow characteristics and theory of rota-dynamic machine	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Analyse basic equation of fluid statics and fluid dynamics	3	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Calculate the work done and efficiencies of pump and turbines	3	3	-	-	-	-	-	-	-	-	-	-	3	2	-
35	4ME4-06	Manufacturing Processes	CO1	Describe the principle and applications of forging, casting, forming,welding and powder metallurgy processes.	1	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Explain the terminologies and concepts associated with manufacturing processes.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Identify the possible defects in manufacturing processes and their remedies.	-	1	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Justify the appropriate manufacturing process to manufacture any component.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
36	4ME4-07	Theory of Machines	CO1	Explain the basic principles of machines, mechanisms & its inversions and working of various mechanical elements.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO2	Solve the basic problems on various fundamental machine mechanisms by graphical and analytical method.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	1
			CO3	Evaluate the various mechanisms and motion of various mechanical components like Power screw, Clutches, Gears, Gear Trains, Cam & Follower, Gyroscope etc.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO4	Analyse the terms, laws and concepts related with machines, machine parts and mechanisms to solve the problems related with practical applications.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	3
36	4ME3-21	Digital Electronics Lab	CO1	Apply logic formulation and optimization of combinational and Sequential ckts using digital Ics	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Design Arithmatic and Decisions making circuits using digital Ics	-	2	-	-	-	-	-	-	-	-	-	-	2	-	2
			CO3	Analysis of combinational and sequential circuits using digital Ics	-	-	2	-	-	-	-	-	-	-	-	-	2	-	2
			CO4	Ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
37	4ME4-22	Fluid Mechanics Lab	CO1	Determine the meta centric height of object, flow rate and flow coefficients for venturimeter, orificemeter and notches	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Verify the Bernoullis theorem and calculate the losses in pipes	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Conducting experiments and drawing the characteristic curves of Pelton wheel, Francis and Kaplan turbine	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
			CO1	Explain the working principle of general machine tools such as Lathe, Milling, Shaper, Grinder machines.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-

S.No	Code	Course	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
38	4ME4-23	Production Practise Lab	CO2	Apply the knowledge of the machining to perform operations like turning, knurling, chamfering and boring on lathe machine.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Analyse the moulding sand properties like moisture content, permeability and strenght.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Appraise the learning and skills of production engineering to make industry need project in a team.	-	-	-	-	-	-	2	2	2	-	-	-	2	2	3
39	4ME4-24	Theory of Machines Lab	CO1	Understand the fundamentals of theory of machines	3	-	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO2	Study inversion of various types of mechanism	-	3	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO3	Evaluate the various mechanisms and motion of various mechanical components	-	-	2	-	-	-	-	-	-	-	-	-	2	2	3
			CO4	Apply the knowledge and skills to develop working models in team and Examine the real time applications of theory of machines	-	-	-	-	-	-	2	2	2	-	-	-	3	2	2
42	5ME3-01	Mechatronic Systems	CO1	Explain the basic fundamentals and applications of Mechatronic systems with various electrical parameters.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Apply the concept of sensors, actuators, pneumatic systems and microcontrollers in Automobile Engg.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Analyze the role of controls and modeling in mechatronics.	-	1	-	-	-	-	-	-	-	-	-	-	2	1	-
			CO4	Design Instrumentation and Data Acquisition system for robotics.	-	2	-	-	-	-	-	-	-	-	-	-	2	1	-
43	5ME4-02	Heat Transfer	CO1	Describe the process of heat transfer and relevant applications	1	-	-	-	-	-	-	-	-	-	-	-	2	2	1
			CO2	Explain the concept of heat transfer and its different modes conduction, convection and radiation	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Solve the problems of conduction, convection and radiation	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Design the Heat exchangers and calculate the heat transfer coefficient and effectiveness.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	2
44	5ME4-03	Manufacturing Technology	CO1	List out the different types of machining and finishing processes for manufacturing of desired mechanical component.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Outline the understanding of different types of machining process in assessing the machining time required for a particular machining process.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Apply the learning of various machining process in calculation of the forces acting during metal removal processes	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Examine the theoretical knowledge of machining processes in respect to the industry in accordance to innovation of mechanical component through conventional machining processes.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
45	5ME4-04	Design of Machine Elements I	CO1	Explain fundamentals of mechanical components design subjected to static loading based on material & manufacturing consideration	2	-	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Apply the basic design concept to design various Mechanical components, such as joints, beam, lever, spring, Keys, shaft, couplings & threaded fasteners.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyse and solve the problems of various machine members which are subjected to different loading conditions.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Evaluate the design stresses & parameters of mechanical components like beam, shaft, joints, Keys, couplings, & threaded fasteners.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	2
46	5ME4-05	Principles of Management	CO1	Describe the different concepts of management.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Recognise the functions of management and the nature of organising	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
			CO3	Relate theory of leadership to prepare profiles of business leaders and controlling the system.	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
			CO4	Plan the course of action using case studies to solve behavioural problems in organisation.	-	-	-	-	-	-	-	-	-	-	3	-	2	-	-
47	5ME5-12	Automobile Engineering	CO1	List out the different parts of the automobile.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	3
			CO2	Discuss the working of various parts like engine, transmission, clutch, brakes.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	3
			CO3	Categorize how the steering and the suspension systems operate.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	3
			CO4	Design a strong base of automobile vehicle for understanding the future developments in automobile industry.	-	-	2	-	-	-	-	-	-	-	-	-	2	2	3
48	5ME5-11	NDET	CO1	Describe NDT methods used for evaluation of materials	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Explain various inspection in accordance with the established procedure for in service damage in the components	2	-	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO3	Analyze various defect occurs in materials and select the appropriate NDT method for evaluation	-	2	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO4	Evaluate effect of Regenerative Feed Heating and Reheating cycle on efficiency of Steam power plant	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
49	5ME3-21	Mechatroncs Lab	CO1	Explain the fundamental knowledge of Transducers, mobile robot, PLC and MATLAB programming	2	-	-	-	-	-	-	-	-	-	-	-	-	2	2
			CO2	Apply the knowledge of programming for mobile robots as an industrial solution.	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Execution of PLC programming.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO4	Application of the fundamental knowledge of MATLAB simulink.	-	3	-	-	-	-	-	-	-	-	-	-	-	2	2
			CO5	Communicate effectively and work as a team member professionally in a ethical manner.	-	-	-	-	-	-	2	2	2	-	-	-	-	-	-
50	5ME4-22	Heat Transfer Lab	CO1	Apply the concepts of conduction, convection and radiation heat transfer.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO2	Compare the Effectiveness in Parallel and Counter Flow Heat Exchangers	-	2	-	-	-	-	-	-	-	-	-	-	3	2	3
			CO3	Evaluate the importance and validity of engineering assumptions through the lumped heat capacity method	-	3	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Investigate the rates of heat transfer for different materials and geometries	-	-	3	-	-	-	-	-	-	-	-	-	3	2	2
			CO5	Ability to communicate effectively and work as a team member ethically	-	-	-	-	-	-	2	2	2	-	-	-	-	-	-
51	5ME4-23	Production Engineering Lab	CO1	Apply the principle of metrology for measuring various parameters like length, height, threads, angle, displacement, flatness, roughness, etc., by using different measuring instruments.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Investigate the force generated on the workpiece during various machining operaations.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Appraise the learning and skills of measurement and metrology to make project in a team.	-	-	-	-	-	-	2	2	2	-	2	-	2	2	2
			CO4	Create mini project using various machine tools and prepare report of the lab	-	-	3	-	3	-	-	2	2	2	2	2	2	-	-
52	5ME4-24	Machine Design Practice - I	CO1	Explain the material properties, manufacturing considerations. ISO standards for selection of materials, selection of fits for various applications.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Apply the design procedure and acquire skill of finding resisting areas against failure of designing under static load to various machine elements like shaft, coupling, joints, levers, beams, brackets etc.	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Evaluate the efficient design criteria related with manufacturing, production, strength and stiffness, limits, fits and assigning tolerances for a member as per standard.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Synthesize of simple mechanical elements using modern tools and compile the results with help of mini project in team.	-	-	-	2	2	-	-	2	-	2	-	-	3	2	-
53	5ME7-30	Industrial Training	CO1	Relating the real time applications to the mechanical engineering concepts.	-	3	-	-	-	-	-	-	-	-	-	-	2	2	1
			CO2	Develop the problem solving approach by developing projects in industry	-	-	3	-	2	-	-	2	-	2	2	2	-	-	2
			CO3	Build skills to be working as a team member and become employable.	-	-	-	-	-	-	-	-	-	3	-	-	-	3	2
			CO4	Create a well organized report employing elements of technical writing and critical thinking.	-	-	-	-	-	-	-	2	-	3	-	3	-	2	-
55	6ME3-01	Measurement and Metrology	CO1	Describe the measuring concept and working principle of metrological instruments used in them.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Identify the appropriate measuring device and method as per their application.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-

No.	Course Code	Course Name	CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
			CO3	Determine the appropriate parameters associated in the selection of metrological concepts and instruments.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Evaluate eorros, surface finish of the compoents	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
56	6ME4-02	CIMS	CO1	Describe the importance and scope CIM in fabrication/ manufacturing industry.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Explain and compare the different components of CIM.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Applying modern technics use in industry i.e. Computer Aided Process Planning, Group Technology, Computer Aided Production Management Systems, manufacturing resource planning (MRPII), ERP, Computer Aided Quality Control, Computer Aided Material Handling, flexible manufacturing systems (FMS).	-	-	-	-	3	-	-	-	-	-	-	-	3	3	-
			CO4	Create program for varies parts made by CNC machine.	-	-	3	-	-	-	-	-	-	-	-	-	3	2	-
57	6ME4-03	Mechanical Vibrations	CO1	Understand the fundamentals of mechanical vibrations, sound and noise	2	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO2	Apply different methods to formulate the equation of motion for free undamped, damped and force vibation of single degree of freedom system and their solution cases.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyse and compute the natural frequencies and mode shapes of 2 degree and multiple degree of freedom system and calculate the critical speed of shaft	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Evaluate the natural frequency of vibrations of continous system.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
58	6ME4-04	Design of Machine Elements II	CO1	Explain the fundamentals on designing of machine elements subjected to variable load.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO2	Apply the basic design concept to design Shaft, IC Engine components, bolts, springs, rope and belt drives and other components based on their applications in industries or on field.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyse and solve the problems of components when designed for variable stresses, considering stress concentration, fatigue and combined loading.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Evaluate the design, stresses & parameters of mechanical components like beam, shaft, bolts, bearings, IC Engine Components, Belt, Rope & Pulley Drive. Etc.	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
59	6ME4-05	Quality Management	CO1	Describe the basic concept of Quality Management.	1	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Explain a system, component, and process to meet desired needs within limits using modeling process quality and learn the concept of control charts.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Illustrate the concept of Quality Assurance, Acceptance sampling and study quality systems like ISO9000, ISO 14000 and Six Sigma.	3	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Identify engineering problems, concept of reliability and Taguchi Method of Design of experiments.	-	2	-	-	-	-	-	-	-	-	-	-	2	3	-
60	6ME4-21	CIMS Lab	CO1	Apply the techniques of CNC programming and cutting tool path generation by using G-Codes and M-codes.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Examine Tool Path for different Machining operations of small components using CNC simulator software for CNC Lathe & CNC Milling Machine.	-	2	-	-	3	-	-	-	-	-	-	-	3	3	-
			CO3	Appraise the CNC codes and simulation software to prepare the part of model in the form of project in the team.	-	-	-	-	-	-	-	2	2	-	-	2	2	3	-
			CO4	Create program for varies parts made by CNC machine.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
61	6ME4-22	Vibration Lab	CO1	Understanding various aspects of mechanical vibrations and their control	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Investigate oscillations of different systems like simple and compound pendulum, damped and un-damped system frequencies of experimental data by computing derived quantities from the measured values	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Construct mathematical models of different vibrating systems	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Measure different mechanical properties like moment of inertia, radius of gyration, natural frequencies of different systems etc.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO5	Examine the real time applications of mechanical vibration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	6ME4-23	Machine Design Practice - II	CO1	Apply the knowledge of machine design principles to solve various problems related to fatigue Loading.	-	2	-	-	-	-	-	-	-	-	-	-	3	-	-
			CO2	Evaluate & Compare mechanical components (Bolts, Shaft, Bearings, IC Engine Components, Gears etc.) under variable stresses.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyze Fatigue life cycle & failure criteria of IC engine and other mechanical components	-	3	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO4	Synthesize mechanical components (Shaft, IC Engine components, springs, rope and belt drives, Gear etc.) using data book and document the results by team	-	-	2	-	-	-	-	2	2	2	-	2	3	2	2
63	6ME4-24	Thermal Engineering Lab I	CO1	Describe the working of Petrol and Diesel Engine, Boilers and automobile operations	2	-	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO2	Categorize all types of accessories of IC Engines, Boiler and Transmission system as per their importance	-	-	3	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Communicate effectively and work as a team member ethically	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
			CO4	Review literature survey, write the term paper independently and present the PPT in a group	-	-	-	-	-	-	-	2	2	2	-	3	-	-	-
64	6ME5-11	Refrigeration and Air Conditioning (Elective-1)	CO1	Explain the fundamentals of refrigeration and air-conditioning systems	2	-	-	-	-	-	-	-	-	-	-	-	-	2	3
			CO2	Determine the performance parameters of refrigeration and air-conditioning system	-	2	-	-	-	-	-	-	-	-	-	-	-	2	3
			CO3	Identify the suitable refrigeration and air conditioning systems as per the applications	-	3	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO4	Evaluate parameters to design the refrigeration and air-conditioning system for various applications	-	-	3	-	-	-	-	-	-	-	-	-	3	2	3
65	6ME5-12	Non Conventional Machining Methods (Elective-2)	CO1	Categorize various non conventional machining methods.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Illustrate the principle and mechanics of metal removal for non conventional machining methods.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Describe the process parameters of non conventional machining methods.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Examine the real time applications of non conventional machining methods.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	1
68	7ME5-11	I. C. Engines	CO1	Explain the fundamental concepts and working of I C engine systems and its Components	3	-	-	-	-	-	-	-	-	-	-	-	-	2	1
			CO2	Identify fuel metering, fuel supply, lubricating and Ignition systems for I C engines.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	2
			CO3	Analyze the performance, emission and combustion characteristics of I C engines	-	3	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO4	Evaluate the fuel mixture ratio for different operating conditions	-	2	-	-	-	-	-	-	-	-	-	-	2	2	2
69	7ME5-13	Turbo Machine	CO1	Describe the fundamentals of turbomachines	1	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Analyze the basic principles of axial and radial turbomachines, and ways to analyze and understand the flow within them.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Compare and contrast various turbomachines and their analysis on the basis of given specification/requirements through their velocity triangles..	3	-	-	-	-	-	-	-	-	-	-	-	2	3	-
			CO4	Comparison and analysis of gas turbine cycles through velocity triangles.	2	2	-	-	-	-	-	-	-	-	-	-	2	1	-
70	7EE6-60.1	Electrical Machines and Drives	CO1	Understand the constructional details and principle of operation of rotating electrical machines	3	-	-	3	3	-	-	-	-	3	-	-	-	-	-
			CO2	Acquire knowledge about the working principle and various aspects of electric drives.	3	-	-	2	3	-	-	-	-	2	-	-	-	-	-
			CO3	Study and analyze the various control techniques for speed control on various electric drives .	2	-	-	3	3	-	-	-	-	3	-	-	-	-	-
			CO4	Develop design knowledge on how to design the speed control and current control loops of an electric drive	3	-	-	3	2	-	-	-	-	3	-	-	-	-	-
71	7EE6-60.2	Power Generation Sources	CO1	Classify and describe various renewable energy sources.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Predict possible renewable energy sources.	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Illustrate the renewable energy sources.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Re-organize energy sources	3	3	2	1	-	-	-	-	-	-	-	-	-	-	-
			CO5	Prioritize all other renewable energy sources as needed by societal application.	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-
		Environmental	CO1	Define terms used in Environmental impact assessment, quality standards for environmental Components	2	1	-	-	-	-	-	1	-	-	-	-	1	-	-

#	Code	Course	CO	Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
72	7CE6-60.1	Environmental Impact Analysis (EIA)	CO2	Understand the concepts about EIA i.e; ecological imbalance, effects of pollution, importance of stakeholders in the EIA process	2	1	-	-	-	-	1	-	-	-	1	-	1	-	-
			CO3	Organize an environmental impact assessment for a proposed project/activity	1	2	1	-	1	1	2	-	-	-	2	-	1	-	-
			CO4	Analyze different methodologies and impacts related to EIA	1	3	1	-	1	1	2	-	-	-	2	-	1	-	-
73	7CE6-60.2	Disaster Management (DM)	CO1	Understand concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Explain concept of disasters, risks, hazards, capacity building, coping with disaster and disaster management act and policy in India	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Classify disasters, risks, hazards, management techniques	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Apply the concept of capacity building, coping with disaster and disaster management act and policy in India	1	2	1	-	1	1	-	-	-	-	-	-	1	-	-
			CO5	Investigate natural and manmade disasters	-	2	2	1	2	1	-	-	-	-	-	-	1	-	-
74	7CS6-60.1	Quality Management / ISO 9000 (Open Elective-1)	CO1	Understand the importance of quality management and the ways individuals can affect quality.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO2	Analyse the components of a quality management system and the role of the quality management system.	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO3	Apply quality management to improve computer based systems.	-	-	-	3	-	-	-	-	-	-	-	-	-	1	-
			CO4	Design Various components of quality system to avoid failures and rectification.	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
75	7CS6-60.2	Cyber Security (Open Elective-1)	CO1	Develop The Understanding Of Cybercrime and legal Perspectives of Security Implications for Organizations in respect to the Mobile and Wireless Devices.	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-
			CO2	Analyze different cyber offences & attacks and Determine How a Criminals plan the cyber Attacks.	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-
			CO3	Understanding the cyber security solutions and use of cyber security Tools in Cybercrime.	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
			CO4	Evaluate and communicate the Management Perspective human role in security systems with an Organizational, emphasis on ethics, social engineering vulnerabilities and training.	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-
76	7EC6-60.1	Principle of Electronic communication	CO1	Describe the principles of various digital modulation systems and their properties,including bandwidth, channel capacity, transmission over bandlimited channels, inter-symbol interference (ISI), demodulation methods, and error performance in the presence of noise.	3	2	-	2	-	-	-	-	-	-	3	-	-	-	1
			CO2	Apply the concepts to practical applications in telecommunication	2	3	-	2	-	-	-	-	2	-	3	-	-	-	1
			CO3	Analyse communication systems in both the time and frequency domains.	2	3	2	-	2	-	2	-	-	-	3	-	1	-	-
			CO4	Design a communication system comprised of both analog and digital modulation techniques.	-	3	2	-	-	-	-	-	-	2	-	3	-	1	-
77	7EC6.60.2	Micro System Smart Technology	CO1	Explain the smart grids components and architecture	3	-	-	-	-	-	-	-	-	-	-	-	2	2	2
			CO2	Apply different measuring methods and sensors used in smart grid	3	3	2	-	-	-	-	-	-	-	-	-	2	2	2
			CO3	Analyze various renewable energy technologies	3	3	-	2	-	-	-	-	-	-	-	-	2	2	2
			CO4	Designing of various smart grid technology based devices.	-	-	3	3	3	-	-	-	-	-	-	-	2	2	2
78	7ME4-21	FEA Lab	CO1	Understanding the basic features of an analysis softwares	3	-	-	-	-	-	-	-	-	-	-	-	2	3	2
			CO2	Demonstrate the structural analysis of beams subjected to point, uniformly distributed and varying loads	-	3	-	-	-	-	-	-	-	-	-	-	2	3	2
			CO3	Apply modern tools to formulate and solve problems of bars, truss, beams, and plate to find stress with different loading conditions.	-	-	-	3	-	-	-	-	-	-	-	-	2	3	2
			CO4	Examine the real time applications of Finite element method for developing a mini project	-	-	-	3	-	-	-	-	-	-	-	-	2	3	2
79	7ME4-22	Thermal Engineering Lab-II	CO1	Explain the various control of refrigeration and air-conditioning and working of simple steam turbine	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Perform constant speed load test on a single cylinder diesel engine and exhaust gas analysis, with safty precautions	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Determine the COP of refrigeration system and Mechanical heat pump, and discuss in a group those factors which effect the COP.	-	2	-	-	-	-	-	2	-	2	-	-	3	2	-
			CO4	Plot Performance characteristics of Pelton wheel, Francis Turbine, Kaplan Turbine and Centrifugal pump	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
80	7ME4-23	Quality Control Lab	CO1	Prepare X, and R control charts for variable from standards.	-	-	3	-	-	-	-	-	2	-	-	-	2	2	-
			CO2	Prepare p, c, and u control charts for attributes from raw data.	-	-	3	-	-	-	-	-	2	-	-	-	2	2	-
			CO3	Demonstrate how to use the corresponding OC curves.	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO4	Understand the generation of random numbers for system simulation	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	7ME7-30	Industrial Training	CO1	Understand, learn and practise new technology/tools in mechanical engineering	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Understand industry and society specific applications	-	-	-	-	-	2	-	-	-	-	-	-	3	2	-
			CO3	Understand professional ethics	-	-	-	-	-	-	3	-	-	-	-	-	3	2	-
			CO4	Understand how to work in team, coordinate and lead	-	-	-	-	-	-	-	3	-	-	-	-	-	2	-
			CO5	Understand how to communicate with colleagues & professionals & Understand Technical Report writing, presentation and delivery	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-
			CO6	Understand and learn how to study, utilize and keep updated in the field of mechanical engineering and allied areas.	-	-	-	-	-	-	-	-	-	-	3	-	-	2	-
82	7ME7-40	Seminar	CO1	Gather, study and understand advancements in Mechanical Engineering	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO2	Analyse literature & Understand Challenges and opportunities and identify problems in certain area of Mechanical Engineering	-	3	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO3	Understand use of modern tools and techniques	-	-	-	-	2	-	-	-	-	-	-	-	-	3	-
			CO4	Understand Technical Report writing, presentation and delivery	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-
83	8ME5-11	Hybrid and Electric Vehicles	CO1	Understand the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO2	Analyze the design, component sizing and the power electronics devices used in hybrid electric vehicles.	2	-	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Construct the hybrid vehicle configuration and performance analysis.	-	2	-	-	-	-	-	-	-	-	-	-	3	3	-
			CO4	Discuss different energy storage technologies used for hybrid electric vehicles and their control.	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
84	8ME5-12	Supply and Operations Management	CO1	Describe the concept of operations management and productivity along with the use of MRP, JIT & its objectives and SCM.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Evaluate and rank the capacity locations, plant location and schedule of production.	-	-	2	-	-	-	-	-	-	-	-	-	2	2	-
			CO4	Construct the various facility alternatives and their capacity decisions; develop a balanced line of production & sequencing techniques in operation environments	-	-	2	-	-	-	-	-	-	-	-	-	2	2	-
85	8ME5-13	Additive Manufacturing	CO1	Define the various process used in Additive Manufacturing	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-
			CO2	Analyze and select suitable process and materials used in Additive Manufacturing	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO3	Design, analyze and solve problems related to Additive Manufacturing	-	-	2	-	-	-	-	-	-	-	-	-	3	2	-
			CO4	Apply knowledge of additive manufacturing for various real-life applications	-	3	-	-	-	-	-	-	-	-	-	-	3	2	-
			CO5	Apply technique of CAD and reverse engineering for geometry transformation in Additive Manufacturing.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
86	8EE6-60.1	Energy Audit and Demand side Management	CO 1	Understand the current Energy Scenarios in India.	3	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			CO 2	Understand the energy auditing of motors, lighting system and building, by appropriate analysis methods through survey instrumentations.	3	3	-	-	-	1	-	-	-	-	-	-	2	3	3
			CO 3	Understand the Electrical-Load Management and Demand side Management.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-

#	Code	Course	CO	Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
			CO 4	Apply the Energy Conservation in transport, agriculture, household and commercial sectors.	3	2	2	1	-	-	-	-	-	-	-	-	1	1	1
87	8EE6-60.2		CO1	Learn about soft computing techniques and their applications.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Analyze various neural network architectures.	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Define the fuzzy systems	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Understand the genetic algorithm concepts and their applications	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO5	Identify and select a suitable Soft Computing technology to solve the problem.	3	3	3	-	-	-	-	-	-	-	-	-	-	1	-
88	8CE6-60.1	Composite Materials (CM)	CO1	Explain the basics of composites, its structure and its properties	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Compute the physio-mechanical properties of composites from tests	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO3	Assessment of engineering properties of composite materials	1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
			CO4	Analyze the failure and maintenance of composite materials	1	-	1	1	1	-	-	-	-	-	-	-	1	1	-
90	8CE6-60.2	Fire and Safety Engineering (F&SE)	CO1	Explain the fundamentals of Fire Engineering	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-
			CO2	Apply the learned principles in planning, designing and management of fire safe buildings	2	1	1	-	1	1	-	-	-	1	-	1	1	1	-
			CO3	Assess fire fighting installations, control technologies and hazardous materials	1	2	1	-	1	1	-	-	-	1	-	1	1	1	-
			CO4	Design of fire safety building for fire resistant construction by following safety legislation	1	-	1	1	1	1	-	1	-	-	-	-	-	1	-
91	8CS6-60.1	Big Data Analytics (Open Elective-II)	CO1	Understanding of Big Data and their needs in Industry	3	-	-	-	-	-	-	-	-	-	-	-	-	1	-
			CO2	Designing of Hadoop and Google File System	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO3	Analysis of Map Reduce and their basic programs map reduce.	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
			CO4	Design an Hive Data system.	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
92	8CS6-60.2	IPR, Copyright and Cyber Law of India (Open Elective-II)	CO1	Determine and analyse the domain name system (DNS) in internet and various cybercrime offence in cyber space.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			CO2	Understand the concept of Intellectual Property and Intellectual Property Rights with special reference to India and abroad	-	-	-	-	-	-	-	3	-	-	-	-	-	1	-
			CO3	Apply intellectual property law principles including the copyright law, patents law, designs and trademarks, to real problems and analyse the social impact of intellectual property law and policy.	-	-	-	-	-	3	-	-	-	-	-	-	-	1	-
			CO4	Study the Jurisdiction Issues in Cyber Space and Competition Law in India	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
93	8EC6.60.1	Industrial and Medical applications of RF Energy	CO1	Understanding of basic concepts and Principles of EM wave, propagation reflection and transmission. [Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	-	-	-
			CO2	Apply the knowledge for interest in complex dielectric constant, dipolar loss mechanism and design mechanism to understand the effect of rate rise of temperature.. [Applying & Understanding]	3	2	-	-	-	-	-	-	3	-	-	-	2	2	2
			CO3	Analyze the structure of RF heating in industrial application. [Analyzing]	3	2	3	-	-	-	-	-	3	-	-	-	-	2	-
			CO4	Design of Hazards and safety standards in various engineering problem. [Create & Design].	3	3	3	3	-	-	-	-	3	-	-	-	2	2	2
94	8EC6-60.2	Robotics and Control	CO1	Understand the fundamentals of robotics and its components, methods of linear motion into rotary motion and vice-verse. [Understanding]	3	3	2	2	2	3	3	3	2	-	3	3	2	2	-
			CO2	Apply the appropriate techniques for movement of robotic joints with computers/microcontrollers. [Applying & Understanding]	3	2	2	2	-	3	2	-	3	2	3	3	-	2	2
			CO3	Analyze parameters required to be controlled in a Robot for specific application. [Analyzing]	3	2	3	3	3	3	-	-	2	2	2	3	2	2	2
			CO4	Design and Develop small automatic / autotronics applications with the help of Robotics for solving the real life problems [Create & Design].	2	2	3	2	2	2	2	3	3	2	2	3	2	2	2
95	8ME4-21	Industrial Engineering Lab	CO1	Demonstrate Commitment to quality, timeliness, and continuous improvement in production rate in manufacturing sector	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Show the ability to formulate, conduct, analyze and interpret experiments and apply experimental results to improve processes in industry	-	3	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Implement the concepts they learned, during Industrial In-Plant Training	-	-	-	-	-	-	-	2	2	2	-	-	2	3	-
			CO4	Determine the appropriate parameters associated in the selection of metrological concepts and instruments.	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
96	8ME4-22	Metrology Lab	CO1	Apply the principle of metrology for measuring various parameters like length, height, threads, angle, displacement, flatness, roughness, etc., by using different measuring instruments.	2	-	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO2	Investigate the surface generated on the work piece during various machining operations.	-	2	-	-	-	-	-	-	-	-	-	-	2	2	-
			CO3	Demonstrate the necessary skills to collect data, perform analysis and interpret results to draw valid conclusions through standard test procedures using various metrology instruments.	-	-	-	-	-	-	-	2	2	2	-	2	2	2	-
			CO4	Determine the appropriate parameters associated in the selection of metrological concepts and instruments.	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-
97	8ME7-50	Final Project	CO1	Apply the knowledge of engineering and sciences to finalize the project topic	3	-	-	-	-	2	2	-	-	-	-	-	2	2	2
			CO2	Analyse the existing research in the field of selected projected	-	3	-	-	-	-	-	-	-	-	-	-	3	3	2
			CO3	Formulate and propose a plan for creating a solution for the research plan identified.	-	-	3	3	2	2	-	-	2	-	-	2	3	3	2
			CO4	Demonstrate an ability to work in teams and manage the conduct of the research study	-	-	-	-	-	-	-	-	3	-	2	3	2	3	2
			CO5	Report and present the findings of the study conducted in the preferred focus area.	-	-	-	-	-	-	-	2	3	3	3	3	3	2	2