Course Outcomes (COs)

On completion of these courses, the students will be able to:

Course Code-Name	Course Outcomes
110002-Communication Skills	CO1: aware of the elements of functional English in order to make them authentic users of language in any given academic and/or professional situation CO2: proficient in making academic presentations CO3: exposed to the real-time career oriented environment CO4: Develop felicity of expression and familiarity with technology enabled communication CO5: exposed to the corporate etiquette and rhetoric
110003-Computer Programming And Utilization	CO1: Recognize the changes in hardware and software technologies with respect to the evolution of computers and describe the function of system softwares (operating Systems) and application softwares CO2: Illustrate the flowchart and inscribe an algorithm for a given problem Inscribe C programs using operators CO3: Develop conditional and iterative statements to write C programs CO4: Exercise user defined functions to solve real time problems CO5: Inscribe C programs that use Pointers to access arrays, strings and functions. CO6: Exercise user defined data types including structures and unions to solve problems
110004-Element Of Electrical Engineering	CO1: Identify the basic elements of the electrical engineering CO2: To write the programs for controlling electrical elements CO3: The significance of electrical engineering for software fields
110006-Elements Of Mechanical Engineering	CO1: Identify the basic elements of the mechanicalengineering CO2: To write the programs for controlling mechanical elements CO3: The significance of mechanical engineering for software fields

110007-Environmental Studies	CO1: Understand the importance of environment
	CO2: Identify the environmental problems and issues on local, regional and global scale
	CO3: Identify problems due to human interactions with the environment
	CO4: Get encouragement to contribute solutions for the existing environmental issues
	CO5: Understand the enforcement of environmental acts in our constitution
110014-Calculus	CO1: Determine the convergence of infinite series
	CO2 Calculate the derivatives of functions of several variables
	CO3 Graphing and optimization of the functions
	CO4 Compute the basic multiple integrals
110015-VCLA	CO1: Calculate the limits and derivatives
	CO2:Determine convergence of sequence and series
110010-Mechanics Of Solids	CO1: Construct free body diagrams and calculate the reactions necessary to ensure static equilibrium.
	CO2:Understand internal forces in members.
	CO3:Locate centroids and determine moment of inertia for composite areas.
	CO4:Analyze the systems with frictional forces.
	CO5:Determine the mass moment of inertia of rigid bodies
	CO6:Calculate stress, strain, and deformation for basic geometries subjected to axial loading and thermal effects.
	CO7: Calculate bending and shear stresses from shear force and bending moment diagram for cantilever, simply supported and over hanging beams of transverse loading.
110011-Physics	CO1: Analyse and understand the basics of electricity and how these basic ideas are used to enhance our current prosperity.
	CO2: Understand the differences between classical and quantum mechanics and

	learn about semiconductor technology. CO3: Analyse and learn about how materials behave at low temperature, causes for their behaviour and applications. CO4: Analyse and understand various types of lasers and optical fibers and their applications. CO5: Understand the fabrication of nanomaterials, carbon nanotubes and their applications in various fields.
110012- *Workshop	CO1: Model and design various basic prototypes in the carpentry trade such as Lap joint, Lap Tee joint, Dove tail joint, Mortise & Tenon joint, Cross-Lap joint CO2: Design and model various basic prototypes in the trade of Welding such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint. CO3: Make various basic prototypes in the trade of Tin smithy such as plain Cylindrical pipe, Cylindrical pipe one end inclined, Cylindrical pipe both ends inclined, Hexagonal pipe one end inclined, and funnel preparations.
110013- Engineering Graphics	CO1: Representing various conics and curves. CO2: Perform dimensioning to a given drawing. CO3: Construction of Plain and Diagonal scales. CO4: Orthographic projections of Lines, Planes, and Solids. CO5: Construction of Isometric Scale, Isometric Projections and Views. CO6: Sectioning of various Solids and their representation. CO7: Understand Development of surfaces and their representation. CO8: Conversion of Pictorial views to Orthographic Projections
130001- Mathematics-III	CO1: Provide the Knowledge of solving linear differential equations with constant coefficients. CO2: Analyze general periodic functions in the form of an infinite convergent series of sine and cosines . CO4: Apply the numerical methods for transitioning a mathematical model of a problem to an programmable algorithm obtaining solution numerically or graphically CO5: Afford Mathematical devices through which solutions of numerous boundary value problems of engineering can be obtained

131901- Electrical Machines And Electronics	Understand principles of DC Machines and Single Phase transformer Understand principles of electrical power, Induction Motors and Generators. Understand applications and utilization of various electrical equipments and working of Electrical measuring devices. Understand applications of various Electrical Machines in day to day life and industrial applications. Explain all the Semi conductor devices(PN diode, Zener diode, Transistor. Describe construction and operation of different FET configurations, oscillator circuits and operational amplifiers.
131902-Machine Design And Industrial Drafting	CO1.Understand the concepts to determine stresses in curved beams having different cross-sections. CO2.Calculate safe load for columns with different boundary conditions. CO3.Analyze and Design shaft and couplings with different geometrical features under loading
131903- Manufacturing Process-I	Understand the basic principles, constructional features and classification of machine tools. Differentiate the various machining processes with applicability. Understand the various machine tool mechanisms. Get acquainted with the numerical calculations in metal cutting.
131904-Material Science And Metallurgy	Acquire an understanding of the main concepts related to the structure and properties of materials. Understand about phase rules and Iron-Iron Carbon equilibrium diagram, TTT diagrams. Understand the basic concepts of Heat treatment processes. Understand the various strengthening mechanisms. Understand the basic steps involved in the Powder Metallurgy process. Understand the basic methods of manufacturing various types of composite materials.
130101-Fluid	Understand the concepts of mass, momentum, and energy in engineering applications.

Mechanics	Develop basic understanding of the fundamental equations of fluid mechanics.
	Analyze hydrostatic forces in submerged bodies.
	Apply the Bernoulli equation to solve problems in fluid flows.
	Understand about laminar and turbulent boundary layer concepts.
140001-Mathematics-IV	CO1: Calculate complex numbers and functions
	CO2:Calculate numerical analysis
140002-Management-I	CO1:Understand organization structure
	CO2:Undersatnd social responsibility and managerial ethics
	CO3:Understand organizational culture and environment
141901-Mechanical Measurement And Metrology	Get familiarity with terminology and errors in measurement.
	Get acquainted with limits, tolerances and gauge design.
	Understand the principles of linear and angular measuring instruments.
	Understand the surface roughness terminology and types of various surface roughness measuring instruments.
	Understand the strain measurement.
	Familiarize with temperature measuring instruments.
141902-Kinematics Of Machines	Analyze different mechanisms and machines.
	Calculate position, velocity, and acceleration of linkages.
	Apply the concept of friction in development of machines
	Develop the cam profiles. Calculate velocity, and acceleration of follower.
	Develop the cam profiles.
141903-Engineering Thermodynamics	Apply mass and energy balances (First Law) to a variety of simple processes.
	Apply Steady flow energy equation to of thermodynamic systems.
	Understand the limitations of First law of thermodynamics and need of Second law of thermodynamics.

	Understand the concept of energy and irreversibility.
	Determine the properties of a pure substance using thermodynamic tables.
	Analyze various gas and vapour power cycle.
141904-Institute Elective-I	CO1: Familiarise with unconventional sources
	CO2: Understand need of these sources due to crisis of conventional sources
	CO3: Understand the use of the solar energy
150001-Management-II	Understand how to maximize profit under competition.
	Familiarize with various functions of marketing and market research.
	Choose the best alternative from various options and calculate depreciation using different methods.
151901-Manufacturing Process-II	Describe the technology of the casting processes.
	Explain various casting methods.
	Differentiate various joining processes with application.
	Understand the various bulk forming processes.
	Describe different types of plastics and its shaping process.
151902-Theory Of Machines	Analyze different types of governors which controls speed of the machine or engine.
	Attain a deeper understanding on the gyroscopic effects of rotating bodies for aero-planes, naval ships, automobiles, and two wheelers.
	Calculate the length of path of contact, length of arc of contact, contact ratio, no of teeth's required to avoid interference and speed.
	Synthesize kinematic linkages.
151903-Fluid Power Engineering	Apply the momentum principles for impact of jets.
	Analyze hydraulic pumps, hydraulic turbines.
	Study the performance characteristics of the hydraulic machines.
	Understand the various factors influencing the performance of hydraulic machines.
	Understand the controlling methods of hydraulic turbines.

	Familiarize with different hydraulic devices/systems needed for various applications.
151904-Power Plant Engineering	Identify various conventional energy resources.
	Understand the working principle of various energy conversion systems.
	Familiarize power plant economics and power tariffs.
	Understand impact of power plant effluents on environment.
151905-Machine Design-I	CO1. Design and develop different kinds of suspension systems such as coil and leaf springs under different loading conditions.
	CO2. Analyze and design the clutches and brakes according to the requirement.
	CO3. Design the I.C engine components like piston, connecting rod, crankshaft and flywheel for a greater range of conditions.
	CO4. Determine the probability of failure and life of a machine element using the concepts of reliability.
	CO5. Analyze and calculate stresses and strains for thick pressure vessels.
151906-Institute Elective-II	CO1: Understand different types of power plants
	CO2: Understand different types of turbines
	CO3: Understand the economics of power generation
161901- Dynamics Of Machines	Understand how to balance several masses in different planes along with rotating and reciprocating masses.
	Calculate natural frequencies for undamped and damped vibrating systems.
	Analyze the response of the vibrating mass at different operating conditions.
	Calculate natural frequencies for different modes of vibrations for transverse and torsional loading conditions.
161902-Internal Combustion Engines	Analyze air standard cycles used in I.C. Engines and Gas turbines.
	Familiarize with the types of engines and their working 2-stroke and 4-stroke, petrol and diesel engines.
	Understand different fuel supply systems like carburetor, MPFI, fuel injectors, direct injection and their limitations. Also understand principles and operation of various jet and rocket propulsion devices.

	Analyze the performance of I.C.engines, gas turbines and their operating curves etc.
	Understand the combustion phenomena in I.C. Engines.
	Indentify various alternative fuels and their applicability.
161903-Computer Aided Design	Describe the Importance of design work station, its utility advantages of computer aided design over traditional design.
	Generate Algorithms for different graphic primitives like Line, circle, ellipse etc.
	Generate different curves like B-spline, Cubic spline, Bezier curve etc.
	Solve different problems using Graphic transformations like Translation, scaling, Rotation, mirror & shearing.
	Explain various graphics standards like IGES, PHIGS, GKS etc.
	Apply concept of FEM in solving complex mechanical engineering problems.
161904-Alternate Energy Resources	CO1: Familiarise with unconventional sources
	CO2: Understand need of these sources due to crisis of conventional sources
	CO3: Understand the use of the solar energy
161905-Control Engineering	Understand open loop/closed loop systems with design control systems.
	Develop of transfer function with block diagrams.
	Represent dynamic systems like Mechanical, Electrical, thermal & fluid systems.
	Develop linear varying time response and also to analyze first & second order systems.
	Develop of Root Contour Plots.
	Develop Body diagrams & polar plots and also to analyze PID controllers.
	Develop fluid power logic system.
161906-Heat And Mass Transfer	Formulate heat conduction problems in rectangular, cylindrical and spherical coordinate system, by transforming the physical system into a mathematical model.
	Familiarize with time dependent heat transfer.
	Compute convective heat transfer coefficients in forced convection, natural convection for internal flows & external flows.
	Describe fundamental mechanism involved in boiling and condensation.

	Know the design fundamentals for heat exchangers, which include the LMTD and NTU approaches.
	Elucidate radiation heat transfer and compute radiation heat transfer between black and non-black bodies.
161907- Industrial Engineering	Familiarize with different types production systems and functions of Production Planning and control.
	Apply to predict the demand accurately.
	Plan the required Capacity using different strategies and develop a Master production schedule.
	Ensure proper and better inventory control.
	Develop a MRP schedule.
	Diagnose quality problems and ensure better quality control.
171901- Operation Research	Use Linear programming for the optimum allocation of limited resources such as men, machines, materials and capital.
	Solve transportation problems to minimize cost and understand the principles of assignment of jobs and recruitment policies.
	Solve game theory problems.
	Apply Queuing theory to solve problems of traffic congestion, counters in banks, railway bookings etc.
	Solve problems of Scheduling and sequencing of production runs and develop proper inventory policies.
	Apply PERT/CPM: [Project scheduling and allocation of resources] to schedule and control construction of dams, bridges, roads etc in a optimal way.
171902- Automobile Engineering	Analyze complete functionality of petrol and diesel engines.
	Analyze complete details & working of fuel supply systems in automobile vehicle and modern trends in fuel supply systems.
	Describe necessity and working of cooling system, lubrication, electrical and starting systems.
	Explain systems that are transmitting power from prime mover of automobile to the road wheels.
	Familiarize with the systems for stability of an automobile.
	Elucidate the control systems of an automobile.

171903- Computer Integrated Mfg	Describe the NC applications, Advantages & Disadvantages of NC systems. Classify the NC systems & NC co-ordinate systems, CNC, DNC. Generate NC part programming and also to generate APT language programming. Develop computer aided process plan. Generate code for cellular manufacturing & group technology. Explain allocations & benefits of FMS. Describe different types of robots, its configurations and constructional features.
171904- Product Design And Value Engg.	Describe quality specifications of design for manufacturing and assembly. Apply the concepts of design for casting, welding and forming operations. Identify the design factors and processes along with customer desires for manufacturing. Understand the design for assessably with case studies.
171907- Department Elective-I	CO1: Understand basics of energy, its various forms and conservation CO2: Understand energy management and audit CO3: Determine energy efficiency in thermal utilites and systems
170001-Project-I	Identification of real world problems. Formulation and solution of problems using fundamental engineering knowledge. Awareness of design methodologies & its implementation. Technical report writing.
181901- Refrigeration & Air Conditioning	Describe and analyze air refrigeration, simple and complex vapor compression refrigeration systems and their subsystems. Explain the operation of various devices of vapour compression refrigeration system and their effect on the performance of whole refrigeration system. Analyze the aqua ammonia and LiBr absorption refrigeration and understand their merits as alternatives to VCR systems. Select the most appropriate refrigerant for a given cooling application and understand the impact of refrigerants on the environment.

	Understand thermodynamics of air –vapour mixtures and various air conditioning process and presenting them on psychrometric chat. Understand various A/C systems and heat pump circuits and using them in combination to design real world heating & cooling needs.
181902-Machine Design-II	Determine the key design parameter for geared transmission systems like spur, helical, bevel and worm gears. Identify the principal failure mechanisms affecting bearing systems, materials and lubricants capable of resisting them. Specify the principal requirements of drive systems for given applications. Identify appropriate transmission elements to meet specified objectives. Summarize appropriate mechanical components from manufacturer's catalogues.
181903-Production Technology	Describe and apply the concept of clearance between the tool and work piece in Sheet metal operations. Get clear understanding of the various manufacturing processes, methods of producing gears. Acquire thorough knowledge of un- conventional methods of manufacturing. Understand the principles of location and the use of various jigs & fixtures. Analyze the basic theory of metal cutting.
181904-Thermal Engineering	Identify the different types of steam generators and the function of the components. Analyze and solve problems associated with nozzles by using molier diagram and steam tables. Analyze the different types of steam turbines for their performance. Describe the purpose, construction and operation of different condensers. Elucidate the principles of reciprocating compressors and rotary compressors and their application.
181905-Department Elective-II	CO1: Study the development of industrial safety and management CO2: Familiarise with safety acts CO3: Determine maintenance policies and preventive maintenance

181909-Project-II	Get Exposure to research and development.
	Generate and Implement innovative ideas for social benefit.
	Develop prototype/models.
	Solve the industrial problems at various stages.
	Publish/present research papers in National/International journals & conferences.

Programme Outcomes (POs)

Program Outcomes are narrower statements that describe what the students are expected to know and be able to do upon the graduation. These relate to the knowledge, skills and behavior the students acquire through the program. They are specific to the program and are consistent with the Graduate Attributes and facilitate the attainment of PEOs. The graduate of BE program in **Mechanical Engineering** should be able to

PO1. Analyze, design, optimise and evaluate mechanical components and systems using state-of-the-art IT tools.

PO2. Analyze, design, optimise and evaluate thermal systems including IC engines, refrigerating, air-conditioning, and power generating systems.

PO3. Plan, including methods design, process plan, and process automation, the manufacturing of given mechanical components and systems.

PO4. Analyze and design quality assurance systems.

PO5. Apply modern management methods to manufacture of components and systems.

PO6. Work in a team using common tools and environments to achieve project objectives.

PO7. Recognize their professional and personal responsibility to the community.

PO8. Pursue life-long learning as a means of enhancing the knowledge and skills necessary to contribute to the betterment of their profession and community.