Vision

To impart quality education to the students in the area of Mechanical Engineering and expose to them to the world of work

Mission

- To impart analytical skills through adequate exposure to theory
- To provide exposure to engineering practices
- To inculcate professional ethics and provide necessary inputs for the development of overall personality

Program Educational Objectives (PEOs)

PEO1: To impart knowledge in the area of Mechanical design, Thermal systems and Manufacturing Processes

PEO2: To inculcate leadership qualities, soft skills and spirit of teamwork

PEO3: Capacity building of students for pursuing higher studies, entrepreneurship and successful careers in industry

Program Outcome (POs)

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcome (PSOs)

Students will be able to

PSO1: Analyse the real life problems in the field of Mechanical engineering including Design, Thermal and Manufacturing and develop appropriate solutions using modern tools

PSO2: Apply acquired professional skills, project management abilities and hands on experience in mechanical engineering and allied areas

Course Outcomes (COs)

Second Year

Semester I

Sr. No.	Course code	Course Name	Course outcome
1.	207002	Engineering Mathematics – III	• Solve higher order linear differential equations and apply to modelling and analyzing mass spring systems • Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications • Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control • Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems • Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations
2.	202041	Manufacturing Process-I	• Identify appropriate manufacturing process for product under consideration and source of defect in manufacturing process • Explain components and demonstrate working of various manufacturing processes • Solve numerical related to different manufacturing process • Describe the various technical parameters, components of lathe machine and operate on lathe
3.	202042	Computer Aided Machine Drawing	• Recall and Use different commands & toolbars to draw 2D sketches • Use different commands & toolbars to prepare 3D Model of machine components • Prepare assembly of machine components by using appropriate constrains • Prepare production drawings of machine components by selecting & applying appropriate dimensions and tolerances
4.	202043	Thermodynamics	• Apply various laws of thermodynamics to various processes and real systems and Calculate heat and work transfer, entropy

			change for thermodynamic systems
			• Estimate performance of various thermodynamic gas power cycles and gas refrigeration cycle. Availability analysis for thermodynamic systems
			• Analyze the performance of vapour power cycle and vapour compression cycle
			• Evaluate different types of steam generators and their performance estimation along with the draught calculations
			• Use Psychrometric charts and apply pyschrometric concepts for design of air conditioning systems
5.	202044	Material Science	• Understand the basic concepts and properties of Material. • Understand about material fundamental and processing. • Select proper metal, alloys, non-metal and powder metallurgical component for specific • requirement • Detect the defects in crystal and its effect on crystal properties. • Evaluate the different properties of material by studying different test • Recognize how metals can be strengthened by cold-working and hot working
6.	202051	Strength of Materials	• Use the concepts of simple stresses, strains and Strain energy in the analysis of machine members and structures • Analyze the transversely loaded beams with various Load and support conditions • Compare various theories of Failure and analyze the effect of various loading combinations on a mechanical member • Design the rotational member under Torsion and Analyze the columns for Buckling
7.	202054	Value Education	• Understood human values, their significance and role in life • Promote self-reflection and critical inquiry that foster critical thinking of one's value and the values of others • Practice respect for human rights and democratic principles • Familiarize with various living and non-living organisms and their interaction with environment

			• Understood the basics regarding the leadership and to become a conscious professional

Semester II

Sr. No.	Course code	Course Name	Course outcome
1.	202045	Fluid Mechanics	• Illustrate the various properties of Fluid along with their units • Use the physics of fluid flow and their application • Illustrate the basics of fluid statics, fluid kinematics and fluid dynamics • Apply the Bernoulli's Equation for various practical applications • Estimate the Internal flows, External flows, Boundary layers, Drags and Lift
2.	202047	Soft Skills	• Improved communication, interaction and presentation of ideas • Right attitudinal and behavioural change • Developed right-attitudinal and behavioural change
3.	202048	Theory of Machines – I	• Explain various planar mechanisms • Evaluate static and Dynamic forces in slider crank mechanism • Illustrate mechanical components such as brakes, clutches and dynamometer • Analyze velocity and acceleration of simple mechanisms by various methods
4.	202049	Engineering Metallurgy	• Describe how metals and alloys formed and how the properties change due to microstructure • Apply core concepts in Engineering Metallurgy to solve engineering problems • Conduct experiments, as well as to analyze and interpret data • Select materials for design and construction. • Possess the skills and techniques necessary for modern materials engineering practice • Recognize how metals can be strengthened by alloying, cold-working, and heat treatment
5.	202050	Applied Thermodynamics	• Classify internal combustion engines and analyze air standard, fuel Air and actual cycle used in engines • Compare combustion and identify appropriate

			- emission control technologies in SI and CI engines - Evaluate various performance parameters of engines and identify different methods to improve overall efficiency of engine - Analyze and select Positive displacement compressor based on application
6.	203152	Electrical and Electronics Engineering	- Develop the capability to identify and select suitable DC motor / induction motor / special purpose motor and its speed control method for given industrial application - Program Arduino IDE using conditional statements - Interfacing sensors with Arduino IDE
7.	202053	Machine Shop – I	- Manufacture of spur gear on milling machine using indexing head - Surface grinding using table grinder - Manufacturing any one sheet metal component involving minimum three different operation (use dies and press) - Any two plastic component like bottle, bottle caps, machine handles, etc.

Third Year

Semester I

Sr. No.	Course code	Course Name	Course outcome
1.	302041	Design of Machine Elements-I	- Identify and quantify failure modes for mechanical elements - Design Shafts, Keys and Coupling for industrial applications - Design fasteners and welded joints subjected to different loading conditions - Selects optimum design parameter to design power screw for various applications - Apply proficiency of drawing skill to generate production drawing of mechanical system
2.	302042	Heat Transfer	- Apply heat transfer laws and electrical analogy to analyze one dimensional cartesian, cylindrical and spherical coordinate systems - Analyze thermal systems with and without internal heat generation, transient heat conduction and extended surfaces

Sr. No.	Course code	Course Name	Course outcome
			• Evaluate heat transfer rate in convection and radiation heat transfer • Apply heat transfer principles to design and estimate performance of thermal equipment's
3.	302043	Theory of Machines-II	• Describe the fundamentals of Step-less regulation and Gyroscope • Apply the fundamentals of gear theory for Force analysis of Various types of Gears • Construct a four Link mechanism and cam profile • Analyze speed and torque in Gear trains
4.	302044	Turbo Machines	• Apply thermodynamics and kinematics principles to turbo machines • Calculate different parameters for turbo machines • Evaluate the performance of turbo-machines (Centrifugal pumps, rotary compressors and turbines) • Select turbo machine for given application
5.	302045	Metrology and Quality Control	• Explain limits, fits, tolerance, geometric and position tolerances and gauge design • Demonstrate the methods of measurement, standards of measurement and carryout data collection and its analysis • Construct Quality Control charts and use of quality control techniques • Evaluate problem and analyze the cause for variation with suitable corrective actions
6.	302046	Skill Development	• Identify different tools and tackles used in machine assembly shop • Apply proficiency of drawing skill to generate production drawing of machine Elements • Apply practical aspects of machine components used in assembly • Apply skills required in machine shop floor for assembly and disassembly

Semester II

Sr. No.	Course code	Course Name	Course outcome
1.	302047	Numerical Methods and Optimization	• Use appropriate Numerical Methods to solve engineering problems & draw the flowcharts for the same • Compute the Numerical results and write basic MATLAB programs for the engineering problems • Make use of built-in functions in MATLAB to justify numerical results

			• Formulate Mathematical equation for solving real life problems using optimization techniques
2.	302048	Design of Machine Elements-II	• Design of Spur, Helical, Bevel and worm gears • Select the Rolling contact bearing belts rope and belt drives from manufacturer's catalogue • To design the gearbox for various industrial applications • Design sliding contact bearing for industrial applications • Apply proficiency of drawing skill to generate production drawing of mechanical system
3.	302049	Refrigeration and Air Conditioning	• Evaluate the use of various refrigerants for different application • Analyze and evaluate the performance of vapour compression and vapour absorption systems. • Design of air conditioning systems using psychrometric concept and cooling load calculations • Design of duct systems on various parameters
4.	302050	Mechatronics	• Apply the concepts of PLC and PID controller for industrial applications • Analyze the Mechatronic system using the Transfer Function • Integrate an appropriate Sensors, Actuators with Data Acquisition system • Design a simple Mechatronic system for day to day applications
5.	302051	Manufacturing - Process-II	• Apply the knowledge of various manufacturing processes. • Calculate various process parameters and their effect on processes and identify application of modernization in machining • Explain and analyze various advanced manufacturing processes and tooling. • Differentiate Jigs and Fixtures to utilize machine capability for variety of operations
6.	302052	Machine Shop-II	• Apply the knowledge of various manufacturing processes practically • Differentiate Jigs and Fixtures to utilize machine capability for variety of operations • Create the process planning sheet for assembly parts
7.	302053	Seminar	• Establish motivation for any topic of interest and develop a thought process for technical presentation • Organize a detailed literature survey and build a

			document with respect to technical publications • Summarize proof-of-concept and related data • Prepare Effective presentation and improve soft skills

Final Year

Semester I

Sr. No.	Course code	Course Name	Course outcome
1.	402041	Hydraulics and Pneumatics	• Demonstrate principles & applications of various components used for hydraulic & pneumatic systems • Analyze industrial hydraulic & Pneumatic circuits • Evaluate the performance of fluid power components • Justify system requirements & Design hydraulic and pneumatic system for industrial applications
2.	402042	CAD CAM Automation	• Apply the concepts of Robotics, Automation and Rapid Prototyping • Apply the analytical concepts of Geometric modelling and Transformations • Analyze and Evaluate the solution of structural problems using FEA • Generate CNC program for Turning, Milling and generate tool path
3.	402043	Dynamics of Machinery	• Formulate mathematical model for any mechanical system • Estimate natural frequency and mode shape for vibratory system • Apply balancing techniques for dynamic balancing of mechanical components and engines • Measure vibration and noise using vibration analyzer to predict faults in mechanical system
4.	402044	Finite Element Analysis	• Apply fundamentals of FEA for finite element formulation • Interpret results of FEA and make an assessment in terms of discretization and numerical error • Analyze the structural member to obtain results for displacement, stress, temperature and modal analysis • Evaluate and compare results of finite element analysis by application of FEA software
5.	402045	Energy Audit	• Identify and Evaluate the energy conservation

Sr. No.	Course code	Course Name	Course outcome
		and Management	• opportunities in thermal utilities • Identify and Evaluate the energy conservation opportunities in electrical utilities • Evaluate the projects of energy conservations with financial evaluation tools namely Simple payback, Internal rate of return and Net present value • Evaluate the energy policies for energy conservation and environmental sustainability
6.	402045A	Automobile Engineering	• Compare and Select the Proper Automotive System for the Vehicle • Apply the knowledge of EVs, HEV's and solar vehicles • Analyze the performance of the vehicle • Diagnose the faults of the automobile vehicle
7.	402046	Project-I	• Compare various studies available in the literature • Identify the gap between existing mechanical systems and propose new mechanical system • Define problem statement and possible solutions and their evaluation • Work as a team and communicate effectively

Semester II

Sr. No.	Course code	Course Name	Course outcome
1.	402047	Energy Engineering	• Analyze different types of power plants and estimate its performance parameters • Illustrate environmental and safety aspects of power plants • Evaluate non-conventional power technologies as against conventional power plants • Evaluate economic feasibility of power plants
2.	402048	Mechanical System Design	• Design mechanical system such as gear box, Material handling system, Pressure Vessel and I.C. engine • Design Mechanical systems by using manufacturing assembly and safety considerations • Apply proficiency of design and drawing skill using different tools and techniques • Apply statistical and optimum design principles for mechanical components
3.	402049	Industrial Engineering	• Summarize the concepts of Productivity, Safety, HRD, Facility design • Apply the techniques of Work study for industrial situations • Solve the Numerical on inventory control and

			Costing • Develop and simulate various models of Production & Operations management
4.	402050	Product Design and Development	• Understand essential factors for product design • Design product as per customer needs and satisfaction • Understand Processes and concepts during product development • Understand methods and processes of Forward and Reverse engineering • Carry out various design processes as DFA, DFMEA, design for safety • Understand the product life cycle and product data management
5.	402051	Project-II	• Use the technique, skills and modern engineering tools necessary for engineering practice • Design and conduct experiments, analyse and interpret data • Execute and monitor the plan • Understand the professional ethics and responsibilities and norms of engineering practice and economic analysis • Find research scope for further improvement • Prepare the report and present the same