

POs:

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, 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 modeling 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.

Course Code	Course Name	Course Outcomes
207002	Engineering Mathematics – III	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems. 2. Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. 3. Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control. 4. Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To discuss higher order linear differential equations, modeling and analyzing mass spring systems. 2. To give knowledge about Laplace transform and Fourier transform techniques to solve differential equations. 3. To explain statistical methods like correlation, regression analysis in analyzing. 4. To give solution of various Partial differential equations and to interpret experimental data applicable to Reliability engineering
202041	Manufacturing Process-I	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To identify appropriate casting method for given application, analyze defect in casting and understand pattern, getting system design. 2. To select metal forming operation based on application and its design criteria. 3. To select maximum material utilization in sheet metal operation and drawing operation. 4. To differentiate thermoset and thermoplastic along with various manufacturing processes. 5. To select operation sequence for component on lathe, tool and time require for metal turning operation. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To introduce students casting process, types of casting and application in industry. 2. To illustrate metal forming and sheet metal operation process such as rolling, forging, wire drawing and extrusion. 3. To understand manufacturing process of plastic. 4. To discuss various joining process such as welding, brazing and soldering. 5. To demonstrate working principle of lathe machine and various operation perform.

202042	Computer Aided Machine Drawing	<p>Course Outcomes:</p> <ol style="list-style-type: none"> 1. Understand the importance of CAD in the light of allied technologies such as CAM, CAE, FEA, CFD, PLM. 2. Understand the significance of parametric technology and its application in 2D sketching. 3. Understand the significance of parametric feature-based modeling and its application in 3D machine components modeling. 4. Ability to create 3D assemblies that represent static or dynamic Mechanical Systems. 5. Ability to ensure manufacturability and proper assembly of components and assemblies. 6. Ability to communicate between Design and Manufacturing using 2D drawings.
202043	Thermodynamics	<p>Course Outcomes:</p> <ol style="list-style-type: none"> 1. Explain the basic concepts of thermodynamics and Distinguish between Open, Closed and Isolated systems, thermodynamics approaches, and Intensive and Extensive properties. 2. Apply the above concepts to solve steam table problem. 3. Define first law of thermodynamics and explain the concept of properties of system. 4. Explain the concept of Entropy and Explain thermodynamics cycle using the second law of thermodynamics for typical engineering problems 5. Measure Stoichiometric air required for burning, execution of steam generators what are more, regular draft prerequisites in plants. 6. Use Psychrometric tables and measurement different basic properties identified with Psychrometry Charts and procedures. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To identify the unique vocabulary associated with thermodynamics and explain the basic concepts of thermodynamics. Zeroth law of thermodynamics for temperature measurement. 2. To distinguish between ideal gas and pure substance. Calculate thermodynamic properties using tables of thermodynamic properties and analyze the processes on T-v diagrams. 3. To State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants. 4. To State and prove the equivalence of two statements of second law of thermodynamics. Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics. 5. To get acquainted with properties of steam, dryness part estimation, vapor forms and Thermodynamic vapor cycles, execution estimation. 6. To get familiar with Psychrometric Charts, Psychrometric forms, human solace conditions
202044	Material Science	<p>Course Outcomes:</p> <ol style="list-style-type: none"> 1. Understands basic concepts , properties and structures of materials. 2. Evaluate testing on materials. 3. Detect defects in materials and eliminate these defects by surface

		<p>modification.</p> <p>4. Select proper metals, non-metals and powder metallurgical component.</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain basic concepts, properties and structures of materials. 2. To discuss various testing on materials. 3. To explain metal corrosion and prevention methods. 4. To explain surface modification methods of materials. 5. 5. To explain powder metallurgical process.
202051	Strength of Materials	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To apply knowledge of mathematics, science for engineering applications. 2. To Design and conduct experiments, as well as to analyze and interpret data. 3. To Identify, formulate, and solve engineering problems. 4. Use the techniques, skills, and modern engineering tools necessary for engineering practice. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To Understand the Mechanical behavior of the body by determining the stresses, strains and deflections produced by the loads up to the elastic limit. 2. To Introduce the Fundamental concepts related to deformation, strain energy, moment of inertia, load carrying capacity, shear forces, bending moments, torsional moments, column and struts. 3. To explain the relation between bending moment and slope. 4. To introduce the principal stresses and strains and theories of failure. 5. To explain the relation between the stress strain diagram. 6. To introduce the slope and deflection of beams.
202055	Audit course	--
202045	Fluid Mechanics	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To identify fluid and its properties. 2. To identify rotational and irrotational flow. 3. To identify modes of failure in any design application and practice of optimum design to avoid failure. 4. To design pressure vessel and IC engine design for given problem. 5. Design any given mini-project with a problem statement and CAD model. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain and demonstrate various properties of fluid. 2. To describe concept of stream line, streak line, path line and its function. 3. To explain static and dynamic forces exerted by the fluid. 4. To describe the concept of boundary condition and its importance. 5. To demonstrate and explain various minor and major losses through pipe and over the plate. 6. To state the concept of lift and drag.
202047	Soft Skills	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Improved communication, interaction and presentation 2. Right attitudinal and behavioural change 3. Developed right-attitudinal and behavioral change

202048	Theory of Machines – I	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Identify mechanisms in real life applications. 2. Perform kinematic analysis of simple mechanisms. 3. Perform static and dynamic force analysis of slider crank mechanism. 4. Determine moment of inertia of rigid bodies experimentally. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To make the student conversant with commonly used mechanism for industrial application. 2. To discuss the drawing of velocity and acceleration diagram for simple and complex mechanisms. 3. To explain graphical and analytical methods for solving problems in static and dynamic force analysis 4. To conduct laboratory experiments for finding moment of inertia of rigid bodies.
202049	Engineering Metallurgy	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To familiarize understudies with the essential ideas of Metal Structure. 2. To Recognize Fundamentals of Metallography. 3. To give an essential learning of Ferrous and Non Ferrous Metal Processing. 4. To identify in what way metals can be strengthened by alloying, cold-working, and heat treatment. 5. Selection and use of various Metals and Alloys for typical engineering application. 6. To procedure develop advanced Materials. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Designate how change properties of microstructure and metals and alloys forms. 2. Distinguish different metals and non-metals material properties 3. Identify different Ferrous and Non Ferrous Metal. 4. Explain different metallurgical processes to material for increase material properties distinctive manufacturing application. 5. Relate core concepts in metals to solve engineering problems. 6. Select materials for design and construction.
202050	Applied Thermodynamics	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Identify various components and working cycles of IC engine. 2. Identify stages on combustion, detonation, knocking and pre-ignition in IC engine. 3. Identify various emissions and controlling methods to reduce these emissions. 4. Prepared heat balance sheet. 5. Identify various types of compressor and investigate performance. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain constructional components and their working of IC engine. 2. To explain combustion of CI and SI engine. 3. To explains various pollutants and norms of CI and SI engine 4. To discuss methods of IC engine testing for determination of frictional, brake and indicated power.

		<p>5. To explain method of preparation of heat balance sheet.</p> <p>6. To explain performance and working of positive displacement compressor.</p>
203152	Electrical and Electronics Engineering	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Student will be able to identify and select suitable DC motor ,induction motor, special purpose motor and its speed control method for given industrial application. 2. Students will be able to write program of Arduino IDE using conditional statements. 3. Students will be able to interface sensors with Arduino IDE. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain operation of DC machine and discuss how to control speed of DC machine. 2. To give knowledge of induction motor and its application. 3. To explain working of special purpose motor. 4. To introduce basic concepts of Microcontroller and Arduino IDE 5. To explain interfacing of peripheral devices with Arduino IDE.

Course Code	Course Name	Course Outcomes
302041	Design of Machine Elements – I	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Choose proper materials for different machine elements according to their physical and mechanical properties. 2. Design the Shafts, Keys and Coupling for industrial applications. 3. Design the machine elements subjected to fluctuating loads. 4. Identify and understand failure modes for mechanical elements and design of machine elements based on strength. 5. Design various springs for strength and stiffness. 6. Design fasteners and welded joints subjected to different loading conditions. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To give brief idea about material selection for different machine elements depending on their physical and mechanical properties. 2. To illustrate design procedure of shafts, keys and coupling. 3. To introduce students with design of machine elements which are subjected to fluctuating loads. 4. To discuss different types of theories of failure of mechanical elements. 5. To discuss the types of springs and design procedure for springs. 6. To illustrate the design of various types of elements such as fasteners, shafts, couplings
302042	Heat Transfer	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Analyze various modes of heat transfer. 2. Implement all equations of heat transfer to practically. 3. Analyze heat transfer equipment and investigate their performance. 4. To investigate heat exchanger effectiveness. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain modes of heat transfer and their mechanism 2. To discuss techniques of applying equations of heat transfer in different problems. 3. To discuss techniques of applying boundary conditions to various equations of heat transfer. 4. To explain simultaneous modes of heat transfer. 5. To explain and demonstrate heat exchanger. 6. To explain procedure of preparation of heat balance sheet on any heat transfer equipment's.
302043	Theory of Machines-II	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Perform force analysis of Spur, Helical, Bevel, Worm and Worm gear. 2. Calculate virtual number of teeth on helical gear. 3. Analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design. 4. Design cam profile for different follower motions.

		<p>5. Synthesize a four bar mechanism with analytical and graphical methods.</p> <p>6. Analyze the gyroscopic couple or effect for stabilization of Ship, airplane and four wheeler vehicles.</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To introduce the students to theory of all types of gears and force analysis of gears. 2. To introduce terminology of gears, geometrical relationship, torque transmitted and virtual number of teeth helical gears. 3. To give knowledge about analysis of each type of gear train. 4. To illustrate types of cam and cam profile drawings for all follower motions. 5. To familiarize students with synthesis of different type of the mechanisms. 6. To give brief information of mechanism for system controls – Gyroscope
302045	Metrology and Quality Control	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To apply knowledge of various tools and techniques used to determine geometry and dimensions of components in engineering applications. 2. To demonstrate experiments, as well as to analyze and interpret data. 3. To design gauges to meet desired needs within realistic constraints. 4. To use Quality Control Techniques and its applications in engineering industries. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To introduce Selection of tool and techniques for determining geometry and dimensions. 2. To initiate students with design and calibration of measuring tools and equipment's. 3. Students should able to understand application of Quality Control Techniques and application of Quality Management Concept.
302051	Manufacturing Processes-II	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Apply the knowledge of various manufacturing processes. 2. Identify various process parameters and their effect on processes. 3. Figure out application of modern machining. 4. Able to identify and draw Jigs and Fixtures for variety of operations. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain and discuss the metal cutting phenomena. 2. To illustrate the selection procedure of process parameter and tools for obtaining desired machining characteristic. 3. To explain various principles of manufacturing processes. 4. To give knowledge of Jigs and Fixtures for variety of operations.
302047	Numerical Methods and Optimization	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Apply appropriate Numerical Methods to solve complex mechanical engineering problems. 2. Formulate algorithms and programming. 3. Use Mathematical Solver.

		<p>4. Generate Solutions for real life problem using optimization techniques.</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To discuss difference between analytical and Numerical Methods with students. 2. To introduce Numerical Techniques for solving complex Mechanical engineering Problems. 3. To set up platform in students for understanding engineering analysis software. 4. To introduce logical sequencing for solution procedure and skills in soft computing. 5. To discuss the solution for different real life problems with available constraints and introduce the scope for engineering research
302048	Design of Machine Elements -II	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Identify theories of failure for design the different mechanical component 2. Select and use the appropriate method for designing the motion transmission elements 3. Ability to analyze mechanical motion transmission elements <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To explain design consideration for mechanical elements such as gears, bearings. 2. To discuss failure modes of various mechanical component 3. Enable students to apply engineering tools for designing the motion transmission elements 4. To state design procedure for the belt rope and chain drive.
302044	Turbo Machines	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To analyze basic concept of turbo-machinery 2. To identify the impulse turbine and evaluate the performance characteristic. 3. To identify the reaction turbine and evaluate the performance characteristic. 4. To identify the type of steam turbine and able to plot the various characteristic. 5. To ability to design the pump and compressor for given requirement. <p>Course Objectives:</p> <ol style="list-style-type: none"> 5. To introduce basic concept of turbo-machinery. 6. To explain and demonstrate the working principle of impulse turbine. 7. To explain and demonstrate the working principle of reaction turbine 8. To describe the steam turbine working principle with application. 9. To explain construction, working principle design of pump and compressor.
302050	Mechatronics	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Use transfer function, reduction and analysis to solve given problems. 2. Perform interfacing of various sensors with DAQ microcontroller. 3. Develop PLC programs using ladder programming.

		<ol style="list-style-type: none"> 4. To perform of system modeling and analysis in time domain and frequency domain for given examples. 5. Use Proportional, derivative and integral controllers for given problem. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To discuss concept of transfer function, reduction and analysis . 2. To make students Understand principles of sensors, its characteristics, interfacing with DAQ microcontroller. 3. To discuss the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application. 4. To illustrate concept of system modeling and analysis in time domain and frequency domain to the students. 5. To discuss Understand control actions such as Proportional, derivative and integral and study its significance in industrial applications
302049	Refrigeration And Air Conditioning	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 6. To identify the application of refrigeration and air conditioning. 7. To select refrigerant for particular application and able to take trial on VCC system. 8. To find COP of VAC system. 9. To identify the type of psychometric process. 10. To apply the AC system for particular application. 11. To design the air distribution system. <p>Course Objectives:</p> <ol style="list-style-type: none"> 6. To explain the fundamental of refrigeration and air conditioning and its application. 7. To illustrate refrigerant and VCC system with demonstration. 8. To describe working principle VAC system with application. 9. To explain the basic psychometric properties and its processes. 10. To explain different AC system. 11. To explain air distribution system.

Course Code	Course Name	Course Outcomes
402041	Refrigeration and Air Conditioning	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To identify the application of refrigeration and air conditioning. 2. To select refrigerant for particular application and able to take trial on VCC system. 3. To find COP of VAC system. 4. To identify the type of psychometric process. 5. To apply the AC system for particular application. 6. To design the air distribution system. <p>Course Objectives:</p> <ol style="list-style-type: none"> 12. Introduce and discuss various types of geometries. 13. Introduce various types of geometry. 14. Apply boundary condition to 1 D and 2 D problem. 15. To introduce and create the NC and CNC program for real world manufacturing. 16. Discuss and introduce the latest manufacturing methods. 17. Introduce the real automation and robotic system in industry.
402042	CAD/ CAM Automation	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Knowledge about the geometry. 2. Develop the solid modeling, surface modeling and wire frame modeling. 3. Analyze the complex FEA problem. 4. Develop the NC and CNC program for real world problem. 5. Select suitable manufacturing method for complex components. 6. produce the automation for production. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Introduce and discuss various types of geometries. 2. Introduce various types of geometry. 3. Apply boundary condition to 1 D and 2 D problem. 4. To introduce and create the NC and CNC program for real world manufacturing. 5. Discuss and introduce the latest manufacturing methods. 6. Introduce the real automation and robotic system in industry.
402043	Dynamics of Machinery	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To create ability to understand how to categories he balancing problems 2. Ability to develop analytical competency in solving vibration problem 3. To generate ability to understand measurement and control of vibration and noise <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To Introduce Various Balancing Techniques. 2. To explain the different vibratory systems

		<ol style="list-style-type: none"> 3. To develop analytical competency in solving vibratory problem 4. To understand the various techniques of measurement and control of vibration
402044	Elective – I: Energy Audit Management	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To generate ability to carry out energy audit 2. To select appropriate method of energy audit 3. To suggest the various methods to reduce energy consumption of the equipment <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To discuss importance of energy management 2. To explain how to carry out energy audit 3. To introduce method to reduce consumption of energy and save cost 4. To explain significance of waste heat recovery and cogeneration
402045	Elective –II: Advanced Manufacturing Processes	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Describe the principles and operations of advanced manufacturing processes. 2. Select the most appropriate process for a given product design, application requirements and cost constraint. 3. Identify the principles of non-traditional manufacturing system. 4. Work cooperatively in groups to complete the assigned project. 5. To improve a manufacturing process either working in a team or individually. 6. To explain manufacturing processes via experimental and theoretical analyses <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To define and describe the fundamentals and principals of advanced manufacturing processes. 2. To apply relevant theories to solve manufacturing problems 3. To explain manufacturing processes via experimental and theoretical analyses 4. To relate manufacturing theory to practice through laboratory experiments 5. To improve a manufacturing process either working in a team or individually. 6. To explain manufacturing processes via experimental and theoretical analyses
402047	Power Plant Engineering	<p>Course Outcomes: On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To apply the knowledge of electrical power generation and its distribution. 2. To identify the component of steam power plant with application. 3. To take trial on hydro-electrical power plant and find out the performance characteristic. 4. To take trial on diesel power plant and plot the various graphs. 5. To find efficiency of non-conventional power plant. 6. To analyze effect of conventional power plant on environment and

		<p>prepare its report..</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To introduce the electric power generation & its distribution. 2. To explain the working principle & component of steam power plant. 3. To describe the hydroelectric and nuclear power-plant & demonstrate the hydroelectric power plant. 4. To explain the diesel & gas turbine power plant & demonstrate the diesel power plant. 5. To illustrate the non-conventional power plant. 6. To introduce the instrumentation and environmental impact.
402048	Mechanical System Design	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. To design Gear box based on application. 2. To select appropriate material handling system based on industrial application and designs the material handling system. 3. To identify modes of failure in any design application and practice of optimum design to avoid failure. 4. To design pressure vessel and IC engine design for given problem. 5. To design any given mini-project with a problem statement and CAD model. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To introduce the fundamentals of mechanical engineering design theory to design, create and select components for design of gear box and speed ratio selection. 2. To illustrate pressure vessel design criteria and knowledge and rules of IBR for pressure vessel design. 3. To introduce optimization methods and selection of optimum design based on criteria for mechanical components. 4. To discuss design of IC engine and illustrate various parameter, while selection of component for IC engine. 5. To explain various material handling system with detailed industrial application
402049C	Elective-III: Industrial Engineering	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. An ability to apply knowledge of mathematics, science, and engineering 2. Skill to design and conduct experiments, as well as to analyze and interpret data. 3. Simplify to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. 4. Capacity to function on multidisciplinary teams and ability and solve engineering problems. 5. An ability to understand professional and ethical responsibility and ability to communicate effectively. 6. Ability to design, develop, implement and improve integrated systems that include people, materials, information, equipment, and people.

		<p>Course Objectives:</p> <ol style="list-style-type: none"> 1. To Program graduates use the fundamental principles and major areas of Industrial Engineering in their professional practice. 2. To Suite graduates are life-long learners, pursuing graduate education and professional growth in Industrial Engineering and related fields. 3. To Platform graduates pursue diverse career paths in a variety of industries. 4. To capacity to multidisciplinary teams and ability to identify, formulates, and solve engineering problems. 5. To understand professional and ethical responsibility and ability to communicate effectively. 6. Created value to organizations through the analysis, evaluation, and improvement of engineered systems and processes using appropriate industrial engineering methods and tools.
402050B	Elective- IV: Finite Element Analysis	<p>Course Outcomes:</p> <p>On successful completion of course student will be able to</p> <ol style="list-style-type: none"> 1. Derive the 1D and 2D FEA problem. 2. Apply the knowledge to solve the 1D FEA problems in real world. 3. Apply the knowledge to solve the 2D FEA problems in real world. 4. Solve the steady state heat transfer problem. 5. Solve the dynamics problems. <p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Introduce the 1D and 2D finite element problem to student by using displacement based finite element problem. 2. To familiarize the various methods of finite element analysis. 3. To identify and define the isoperimetric FEA problem. 4. Introduce the 1D steady state heat transfer problem. 5. To familiarize with dynamic analysis.

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(402041)	HYDRAULICS AND PNEUMATICS	<p>Course Objective:</p> <ol style="list-style-type: none"> 1. To introduce the electric power generation & its distribution. 2. Explain that hydraulic fluid is incompressible in the scope of pascal law. 3. Draw a hydraulic circuit diagram; understand the basic elements. Know the properties of the basic elements used in the hydraulic system. 4. Define the elements used in the production of circular motion as hydraulic motors. Associating with the types of hydraulic pumps, hydraulic motors, and explains the forms of work. 5. describes the working principle of pneumatic cylinders and motors on a simple circuit <p>Course Outcomes:</p> <ol style="list-style-type: none"> 1. Understand fluid power, Application and Advantages of fluid power. 2. Analyze the properties of fluids and perceive the usage of oil instead of water in hydraulic systems 3. To understand the production of compressed air and its distribution. 4. To understand about hydraulics filters and sealers, types of filter elements,- construction and working of filter in hydraulic unit. 5. To understand components of hydraulic systems and its advantages 6. To know about pneumatic system and its advantages in industrial applications.
		<p>Course Objective:</p> <ol style="list-style-type: none"> 1. Introduce and discuss various types of geometries. 2. Introduce various types of geometry. 3. Apply boundary condition to 1 D and 2 D problem. 4. To introduce and create the NC and CNC program for real world manufacturing. 5. Discuss and introduce the latest manufacturing methods. 6. Introduce the real automation and

(402042)	CAD/CAM AND AUTOMATION	<p>7. robotic system in industry.</p> <p>Course Outcomes:</p> <ol style="list-style-type: none"> 1) Knowledge about the geometry. 2) Develop the solid modeling, surface modeling and wire frame modeling. 3) Analyze the complex FEA problem. 4) Develop the NC and CNC program for real world problem. 5) Select suitable manufacturing method for complex components.
(402043)	DYNAMICS OF MACHINERY	<p>Course Objectives:-</p> <ol style="list-style-type: none"> 1. To Introduce Various Balancing Techniques. 2. To explain the different vibratory systems 3. To develop analytical competency in solving vibratory problem 4. To understand the various techniques of measurement and control of vibration <p>Course Outcomes:-</p> <ol style="list-style-type: none"> 1. To create ability to understand how to categories he balancing problems 2. Ability to develop analytical competency in solving vibration problem 3. To generate ability to understand measurement and control of vibration and noise
		<p>Course Objective:</p> <ol style="list-style-type: none"> 1. Introduce the 1D and 2D finite element problem to student by using displacement based finite element problem. 2. To familiarize the various methods of finite element analysis. 3. To identify and define the isoperimetric FEA problem. 4. Introduce the 1D steady state heat transfer problem. 5. To familiarize with dynamic analysis. <p>Course Outcomes:-</p>

(402050B)	FINITE ELEMENT ANALYSIS (ELE-I)	<ol style="list-style-type: none"> 1. Derive the 1D and 2D FEA problem. 2. Apply the knowledge to solve the 1D FEA problems in real world. 3. Apply the knowledge to solve the 2D FEA problems in real world. 4. Solve the steady state heat transfer problem. 5. Solve the dynamics problems.
(402044C)	ENERGY AUDIT AND MANAGEMENT (ELE-II)	<p>Course Objectives:-</p> <ol style="list-style-type: none"> 1. To discuss importance of energy management 2. To explain how to carry out energy audit 3. To introduce method to reduce consumption of energy and save cost 4. To explain significance of waste heat recovery and cogeneration <p>Course Outcomes:-</p> <ol style="list-style-type: none"> 1. To generate ability to carry out energy audit 2. To select appropriate method of energy audit 3. To suggest the various methods to reduce energy consumption of the equipment
(402047)	ENERGY ENGINEERING	<p>Course Objective:</p> <ol style="list-style-type: none"> 1. To introduce the electric power generation & its distribution. 2. To describe the hydroelectric and nuclear power-plant & demonstrate the hydroelectric power plant. 3. To explain the working principle & component of steam power plant. 4. To illustrate the non-conventional power plant. 5. To introduce the instrumentation and environmental impact. 6. To explain the diesel & gas turbine power plant & demonstrate the diesel power plant. <p>Course Outcomes:-</p> <ol style="list-style-type: none"> 1. To apply the knowledge of electrical power generation and its distribution. 2. To take trial on hydro-electrical power plant and find out the performance characteristic.

		<ol style="list-style-type: none"> 3. To identify the component of steam power plant with application. 4. To take trial on diesel power plant and plot the various graphs. 5. .To analyzes effect of conventional power plant on environment and prepares its report.
(402048)	MECHANICAL SYSTEM DESIGN	<p>Course Objective:</p> <ol style="list-style-type: none"> 1. To introduce the fundamentals of mechanical engineering design theory to design, create and select components for design of gear box and speed ratio selection. 2. To illustrate pressure vessel design criteria and knowledge and rules of IBR for pressure vessel design. 3. To introduce optimization methods and selection of optimum design based on criteria for mechanical components. 4. To discuss design of IC engine and illustrate various parameter, while selection of component for IC engine. 5. To explain various material handling system with detailed industrial application. <p>Course Outcomes:-</p> <ol style="list-style-type: none"> 1. To design Gear box based on application. 2. To select appropriate material handling system based on industrial application and designs the material handling system. 3. To identify modes of failure in any design application and practice of optimum design to avoid failure. 4. To design pressure vessel and IC engine design for given problem. 5. To design any given mini-project with a problem statement and CAD model.
		<p>Course Objective:</p> <ol style="list-style-type: none"> 1. To Program graduates use the fundamental principles and major areas of Industrial Engineering in their professional practice. 2. To Suite graduates are life-long learners, pursuing graduate education and professional growth in Industrial Engineering and related fields. 3. To Platform graduates pursue diverse career paths in

<p>(402049B)</p>	<p>INDUSTRIAL ENGINEERING (ELE-III)</p>	<p>a variety of industries.</p> <ol style="list-style-type: none"> 4. To capacity to multidisciplinary teams and ability to identify, formulates, and solve engineering problems. 5. To understand professional and ethical responsibility and ability to communicate effectively. 6. Created value to organizations through the analysis, evaluation, and improvement of engineered systems and processes using appropriate industrial engineering methods and tools. <p>Course Outcomes:-</p> <ol style="list-style-type: none"> 1. An ability to apply knowledge of mathematics, science, and engineering 2. Skill to design and conduct experiments, as well as to analyze and interpret data. 3. Simplify to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. 4. Capacity to function on multidisciplinary teams and ability and solve engineering problems. 5. An ability to understand professional and ethical responsibility and ability to communicate effectively. 6. Ability to design, develop, implement and improve integrated systems that include people, materials, information, equipment, and people.
<p>(402045A)</p>	<p>ADVANCED</p>	<p>Course Objective:</p> <ol style="list-style-type: none"> 1. To define and describe the fundamentals and principals of advanced manufacturing processes. 2. To apply relevant theories to solve manufacturing problems 3. To explain manufacturing processes via experimental and theoretical analyses 4. To relate manufacturing theory to practice through laboratory experiments 5. To improve a manufacturing process either working in a team or individually. 6. To explain manufacturing processes via experimental and theoretical analyses <p>Course Outcomes:-</p>

	MANUFACTURING PROCESS	<ol style="list-style-type: none">1. Describe the principles and operations of advanced manufacturing processes.2. Select the most appropriate process for a given product design, application requirements and cost constraint.3. Identify the principles of non-traditional manufacturing system.4. Work cooperatively in groups to complete the assigned project.5. To improve a manufacturing process either working in a team or individually.6. To explain manufacturing processes via experimental and theoretical analyses
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