Branch	Year	Subject And COs	
Mechanical Engineering	SE Sem I	**Course : Engg. Mathematics-III**	**Course Code: 207002**
		Co. No.	**Course Outcomes**
		CO1	Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems.
		CO2	Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications.
		CO3	Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control.
		CO4	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
		CO5	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.
		Course : Manufacturing Process-I	**Course Code: 202041**
		Co. No.	**Course Outcomes**
		CO1	Understand and analyze foundry practices like pattern making, mold making, Core making and Inspection of defects.
		CO2	Understand and analyze Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes.
		CO3	Understand different plastic molding processes, Extrusion of Plastic and Thermoforming
		CO4	Understand different Welding and joining processes and its defects.
		CO5	Understand, Design and Analyze different sheet metal working processes.
		CO6	Understand the constructional details and Working of Centre Lathe.
		Course : Computer Aided Machine Drawing	**Course Code: 202042**
		Co. No.	**Course Outcomes**
		CO1	Understand the importance of CAD in the light of allied technologies such as CAM, CAE, FEA, CFD, PLM.
		CO2	Understand the significance of parametric technology and its application in 2D sketching.
		CO3	Understand the significance of parametric feature-based modeling and its application in 3D machine components modeling.
		CO4	Ability to create 3D assemblies that represent static or dynamic Mechanical Systems.
		CO5	Ability to ensure manufacturability and proper assembly of components and assemblies.
		CO6	Ability to communicate between Design and Manufacturing using 2D drawings.
		Course : Thermodynamics	**Course Code: 202043**
		Co. No.	**Course Outcomes**
		CO1	Apply various laws of thermodynamics to various processes and real systems.
		CO2	Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes.
		CO3	Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.
		CO4	Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
		CO5	Estimate Stoichiometric air required for combustion, performance of steam generators and natural draught requirements in boiler plants.
		CO6	Use Psychromertic charts and estimate various essential properties related to Psychrometry and processes
		Course : Material Science	**Course Code: 202044**
		Co. No.	**Course Outcomes**
		CO1	Understand the basic concepts and properties of Material.
		CO2	Understand about material fundamental and processing.
		CO3	Select proper metal, alloys, nonmetal and powder metallurgical component for specific requirement
		CO4	Detect the defects in crystal and its effect on crystal properties.
		CO5	Evaluate the different properties of material by studying different test
		CO6	Recognize how metals can be strengthened by cold-working and hot working
		Course : Electronic Measuring Instruments & Tools	**Course Code: 204186**
		Co. No.	**Course Outcomes**
		CO1	Apply knowledge of mathematics, science for engineering applications
		CO2	Design and conduct experiments, as well as to analyze and interpret data
		CO3	Design a component to meet desired needs within realistic constraints of health and safety

	CO4	Identify, formulate, and solve engineering problems
	CO5	Practice professional and ethical responsibility
	CO6	Use the techniques, skills, and modern engineering tools necessary for engineering practice
SE Sem II	**Course : Fluid Mechanics**	**Course Code:202045**
	Co. No.	**Course Outcomes**
	CO1	Use of various properties in solving the problems in fluids
	CO2	Use of Bernoulli's equation for solutions in fluids
	CO3	Determination of forces drag and lift on immersed bodies
	Course : Softs Skills	**Course Code: 202047**
	Co. No.	**Course Outcomes**
	CO1	Improved communication, interaction and presentation of ideas.
	CO2	Right attitudinal and behaviouralchange
	CO3	Developed right-attitudinal and behavioral change
	Course : Engineering Metallurgy	**Course Code: 202048**
	Co. No.	**Course Outcomes**
	CO1	Describe how metals and alloys formed and how the properties change due tomicrostructure
	CO2	Apply core concepts in Engineering Metallurgy to solve engineering problems.
	CO3	Conduct experiments, as well as to analyze and interpret data.
	CO4	Select materials for design and construction.
	CO5	Possess the skills and techniques necessary for modern materials engineering practice
	CO6	Recognize how metals can be strengthened by alloying, cold-working, and heat treatment
	Course : Electrical and Electronics Engineering	**Course Code: 203152**
	Co. No.	**Course Outcomes**
	CO1	Develop the capability to identify and select suitable DC motor / induction motor / special purpose motor and its speed control method for given industrial application.
	CO2	Program Arduino IDE using conditional statements.
	CO3	Interfacing sensors with Arduino IDE.
	Course : Machine Shop - I	**Course Code: 203153**
	Co. No.	**Course Outcomes**
	CO1	NIL
	CO2	
	CO3	
	CO4	
	CO5	
	CO6	
	Course : Theory of Machines-I	**Course Code: 202048**
	Co. No.	**Course Outcomes**
	CO1	Identify mechanisms in real life applications.
	CO2	Perform kinematic analysis of simple mechanisms.
	CO3	Perform static and dynamic force analysis of slider crank mechanism.
	CO4	Determine moment of inertia of rigid bodies experimentally.
	CO5	Analyze velocity and acceleration of mechanisms by vector and graphical methods.
	Course : Applied Thermodynamics	**Course Code: 202050**
	Co. No.	**Course Outcomes**
	CO1	Classify various types of Engines, Compare Air standard, Fuel Air and Actual cycles and make out various losses in real cycles.
	CO2	Understand Theory of Carburetion, Modern Carburetor, Stages of Combustion in S. I. Engines and Theory of Detonation, Pre-ignition and factors affecting detonation.
	CO3	Understand Fuel Supply system, Types of Injectors and Injection Pumps, Stages of Combustion in CI Engines, Theory of Detonation in CI Engines and Comparison of SI and CI Combustion and Knocking and Factors affecting, Criteria for good combustion chamber and types.
	CO4	Carry out Testing of I. C. Engines and analyze its performance.
	CO5	Describe construction and working of various I. C. Engine systems (Cooling, Lubrication, Ignition, Governing, and Starting) also various harmful gases emitted from exhaust and different devices to control pollution and emission norms for pollution control.
	CO6	Describe construction, working of various types of reciprocating and rotary compressors with performance calculations of positive displacement compressors.
	Course : Design of Machine Elements – I	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	Ability to identify and understand failure modes for mechanical elements and design of machine elements based on strength
	CO2	Ability to design Shafts, Keys and Coupling for industrial applications.
	CO3	Ability to design machine elements subjected to fluctuating loads.
	CO4	Ability to design Power Screws for various applications.

TE Sem I	CO5	Aability to design fasteners and welded joints subjected to different loading conditions.
	CO6	Ability to design various Springs for strength and stiffness.
	Course : HEAT TRANSFER	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	1. Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
	CO2	2. Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
	CO3	3. Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
	CO4	4. Interpret heat transfer by radiation between objects with simple geometries.
	CO5	5. Analyze the heat transfer equipment and investigate the performance.
	Course : Theory of Machine – II	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	Student will be able to understand fundamentals of gear theory which will be the prerequisite for gear design.
	CO2	Student will be able to perform force analysis of Spur, Helical, Bevel, Worm and Worm gear.
	CO3	The student to analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.
	CO4	Student will be able to design cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.
	CO5	The student will synthesize a four bar mechanism with analytical and graphical methods.
	CO6	a. The student will analyze the gyroscopic couple or effect for stabilization of Ship Aeroplane and Four wheeler vehicle. b. Student will choose appropriate drive for given application (stepped / step-less).
	Course : Turbo Machines	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	Apply thermodynamics and kinematics principles to turbo machines.
	CO2	Analyze the performance of turbo machines.
	CO3	Ability to select turbo machine for given application.
	CO4	Predict performance of turbo machine using model analysis.
	Course : Metrology And Quality Control	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	1. Understand the methods of measurement, selection of measuring instruments / standards of measurement, carryout data collection and its analysis.
	CO2	. Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design
	CO3	Understand and use/apply Quality Control Techniques/ Statistical Tools appropriately.
	CO4	Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.
	Course : Skill Development	**Course Code:**
	Co. No.	**Course Outcomes**
	CO1	NIL
	CO2	
	CO3	
	CO4	
	CO5	
	Course : Numerical Methods and Optimization	**Course Code: 302047**
	Co. No.	**Course Outcomes**
	CO1	Use appropriate Numerical Methods to solve complex mechanical engineering problems.
	CO2	Formulate algorithms and programming.
	CO3	Use Mathematical Solver.
	CO4	Generate Solutions for real life problem using optimization techniques.
	CO5	Analyze the research problem.
	Course : Design of Machine Elements – II	**Code: 302048**
	Co. No.	**Course Outcomes**
	CO1	To understand and apply principles of gear design to spurgears and industrial spur gear boxes.
	CO2	To become proficient in Design of Helical and Bevel Gear.
	CO3	To develop capability to analyse Rolling contact bearing and its selection from manufacturer’s Catalogue
	CO4	To learn a skill to design worm gear box for various industrial applications.
	CO5	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.
	CO6	To achieve an expertise in design of Sliding contact bearing in industrial applications
	Course : Refrigeration and Air Conditioning	**Course Code: 302049**
	Co. No.	**Course Outcomes**

	CO1	Illustrate the fundamental principles and applications of refrigeration and air conditioning system
	CO2	Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems
	CO3	Present the properties, applications and environmental issues of different refrigerants
	CO4	Calculate cooling load for air conditioning systems used for various
	CO5	Operate and analyze the refrigeration and air conditioning systems.
TE Sem II	**Course : Mechatronics**	**Course Code: 302050**
	Co. No.	**Course Outcomes**
	CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram
	CO2	Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
	CO3	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
	CO4	Time and Frequency domain analysis of system model (for control application)
	CO5	PID control implementation on real time systems
	CO6	Development of PLC ladder programming and implementation of real life system.
	Course : MANUFATCURING PROCESS – II	**Course Code: 302051**
	Co. No.	**Course Outcomes**
	CO1	Student should be able to apply the knowledge of various manufacturing processes.
	CO2	Student should be able to identify various process parameters and their effect on processes.
	CO3	Student should be able to figure out application of modern machining.
	CO4	Students should get the knowledge of Jigs and Fixtures for variety of operations.
	Course : MACHINE SHOP – II	**Course Code: 302052**
	Co. No.	**Course Outcomes**
	CO1	Ability to develop knowledge about the working and programming techniques for various machines and tool
	Course : SEMINAR	**Course Code: 302053**
	Co. No.	**Course Outcomes**
	CO1	Establish motivation for any topic of interest and develop a thought process for technical presentation.
	CO2	Organize a detailed literature survey and build a document with respect to technical publications.
	CO3	Analysis and comprehension of proof-of-concept and related data.
	CO4	Effective presentation and improve soft skills.
	CO5	Make use of new and recent technology (e.g. Latex) for creating technical reports
BE Sem I	**Course: Refrigeration and Air Conditioning**	**Course Code: 402041**
	Co.No.	**Course Outcomes**
	CO1.	Illustrate the fundamental principles and applications of refrigeration and air conditioning system
	CO2	Obtain cooling capacity and coefficient of performance by conducting test on vapor compression refrigeration systems
	CO3	Present the properties, applications and environmental issues of different refrigerants
	CO4	Calculate cooling load for air conditioning systems used for various applications
	CO5	Operate and analyze the refrigeration and air conditioning systems.
	Course: CAD/CAM and Automation	**Course Code: 402042**
	Co.No.	**Course Outcomes**
	CO1.	Analyze and design real world components
	CO2	Suggest whether the given solid is safe for the load applied.
	CO3	Select suitable manufacturing method for complex components.
	Course: Dynamics of MachineryCAD/CAM and Automation	**Course Code: 402043**
	Co.No.	**Course Outcomes**
	CO1.	Solutions to balancing problems of machines.
	CO2	Ability to understand the fundamentals of vibration and Noise.
	CO3	Ability to develop analytical competency in solving vibration problems.
	CO4	Ability to understand measurement and control of vibration and Noise.
	CO5	Ability to Calculate natural frequencies, Eigen values & Eigen vectors.
	CO6	Ability to measure vibrations, vibration characteristics and understand various methods for vibration control for real life problem.
	Course: Energy Audit and Management (Elective I)	**Course Code: 40204aA**
	Co.No.	**Course Outcomes**
	CO1.	Carry out Energy Audit of the residence / society / college where they are studying.

		CO2	Carry out electrical tariff calculation and accurately predict the electricity bill required for the installation.
		CO3	Suggest various methods to reduce energy consumption of the equipment / office / premises.
	BE Sem II	**Course: Power Plant Engineering**	**Course Code: 402047**
		Co.No.	**Course Outcomes**
		CO1	Ability to have adequacy with Design, erection and development of energy conversion plants.
		CO2	optimization of energy Conversion plant with respect to the available resources.
		CO3	Scope of alternative erection of optimized, suitable plant at the location depending upon geographical conditions
		Course: Mechanical System Design	**Course Code: 402048**
		Co.No.	**Course Outcomes**
		CO1	The student will understand the difference between component level design and system level design.
		CO2	Ability to design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
		CO3	Ability to learn optimum Design principles and Apply it to mechanical components.
		CO4	Ability to to handle system level projects from concept to product.
		Course: Industrial Engineering (Elective III)	**Course Code: 402049C**
		Co.No.	**Course Outcomes**
		CO1	Apply the Industrial Engineering concept in the industrial environment.
		CO2	Manage and implement different concepts involved in methods study and understanding of work content in different situations.
		CO3	Undertake project work based on the course content.
		CO4	Describe different aspects of work system Design and facilities Design pertinent to manufacturing industries.
		CO5	Identify various Cost accounting and financial management practices widely applied in industries.
		CO6	Develop capability in integrating knowledge of Design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
		Course: AUTOMOBILE ENGINEERING (Elective III Open Elective)	**Course Code: 402049D**
		Co.No.	**Course Outcomes**
		CO1	After completion of the course student would be able to handle technical & management problems in automotive industries
		CO2	The student would be able to diagnosis the faults of automobile vehicles.
		CO3	Ability to understand various transmission systems, Suspension, brakes, Vehicle Performance, Vehicle Safety.
		Course: Finite Element Analysis (Elective IV)	**Course Code: 402050B**
		Co.No.	**Course Outcomes**
		CO1	Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
		CO2	Apply mechanics of materials and machine Design topics to provide preliminary results used for testing the reasonableness of finite element results.
		CO3	Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis
		CO4	Interpret the results of finite element Analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors