

SEMESTER	SUBJECT CODE	SUBJECT NAME	CO No.	COURSE OUTCOMES
S1	MAT 101	LINEAR ALGEBRA AND CALCULUS	CO1	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms.
			CO2	compute the partial and total derivatives and maxima and minima of multivariable functions
			CO3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
			CO4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
			CO5	determine the Taylor and Fourier series expansion of functions and learn their applications.
	CYT 100	ENGINEERING CHEMISTRY	CO1	Compute the quantitative aspects of waves and oscillations in engineering systems.
			CO2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
			CO3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
			CO4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
			CO5	Study various types of water treatment methods to develop skills for treating wastewater
	EST 100	ENGINEERING GRAPHICS	CO1	Draw the projection of points and lines located in different quadrants
			CO2	Prepare multiview orthographic projections of objects by visualizing them in different positions
			CO3	Draw sectional views and develop surfaces of a given object
			CO4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
			CO5	Convert 3D views to orthographic views and vice versa
			CO6	Obtain multiview projections and solid models of objects using CAD tools
	EST 120	BASICS OF ELECTRONICS	CO1	Apply fundamental concepts and circuit laws to solve simple electric and magnetic circuits

		AND ELECTRICAL ENGINEERING	CO2	Develop and solve models of magnetic circuits
			CO3	Apply the fundamental laws of Electrical Engg to solve simple ac circuits in steady state
			CO4	Describe working of a voltage amplifier
			CO5	Outline the principle of an electronic instrumentation system
			CO6	Explain the principles of radio and cellular communication
	HUT 101	LIFE SKILLS	CO1	Define and Identify different life skills required in personal and professional life
			CO2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
			CO3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
			CO4	Take part in group discussions.
			CO5	Use appropriate thinking and problem solving techniques to solve new problems
			CO6	Understand the basics of teamwork and leadership
	CYL 120	ENGINEERING Chemistry lab	CO1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
			CO2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
			CO3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
			CO4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
			CO5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
			CO6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum
	ESL 120	ELECTRONICS AND	CO1	Demonstrate safety measures against electric shocks
			CO2	Identify the tools used for wiring, electrical accessories, wires, cables, batteries and standard symbols

		ELECTRICAL WORKSHOP	CO3	Develop the connection diagram, identify the suitable accessories and materials necessary
				for wiring simple lighting circuits for domestic buildings
S2	MAT 101	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS, AND TRANSFORMS	CO1	Apply the concept of vector functions and learn to work with conservative vector field
			CO2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space.
			CO3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
			CO4	Apply Laplace transforms to solve physical problems arising in engineering
			CO5	Apply Fourier transforms to solve physical problems arising in engineering
	PHT 110	ENGINEERING PHYSICS B	CO1	Compute the quantitative aspects of waves and oscillations in engineering systems.
			CO2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
			CO3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
			CO4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
			CO5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system
	EST 100	ENGINEERING MECHANICS	CO1	Recall principles and theorems related to rigid body mechanics.
			CO2	Identify and describe the components of system of forces acting on the rigid body.
			CO3	Apply conditions of equilibrium to various practical problems involving different force system.
			CO4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
			CO5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses.
	EST 120		CO1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.

		BASICS OF CIVIL & MECHANICAL ENGINEERING	CO2	Explain different types of buildings, building components, building materials and building construction
			CO3	Describe the importance, objectives and principles of surveying.
			CO4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
			CO5	Discuss the Materials, energy systems, water management and environment for green buildings.
			CO6	Analyse thermodynamic cycles and calculate its efficiency
			CO7	Illustrate the working and features of IC Engines
			CO8	Explain the basic principles of Refrigeration and Air Conditioning
			CO9	Describe the working of hydraulic machines
			CO10	Explain the working of power transmission elements
			CO11	Describe the basic manufacturing, metal joining and machining processes
	HUT 102		PROFESSIONAL COMMUNICATION	CO1
		CO2		Analyze, interpret and effectively summarize a variety of textual content
		CO3		Create effective technical presentations
		CO4		Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
		CO5		Identify drawbacks in listening patterns and apply listening techniques for specific needs
		CO6		Create professional and technical documents that are clear and adhering to all the necessary conventions
	EST 102	PROGRAMING IN C	CO1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
			CO 2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
			CO 3	Write readable C programs with arrays, structure or union for storing the data to be processed
			CO 4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem

			CO 5	Write readable C programs which use pointers for array processing and parameter passing
			CO 6	Develop readable C programs with files for reading input and storing output
	PHL 120	ENGINEERING PHYSICS LAB	CO1	Develop analytical/experimental skills and impart prerequisite hands on experience forengineering laboratories
			CO2	Understand the need for precise measurement practices for data recording
			CO3	Understand the principle, concept, working and applications of relevant technologies andcomparison of results with theoretical calculations
			CO4	Analyze the techniques and skills associated with modern scientific tools such as lasers andfiber optics
			CO5	Develop basic communication skills through working in groups in performing the laboratoryexperiments and by interpreting the results
	ESL 120	CIVIL & MECHANICAL WORKSHOP	CO1	Name different devices and tools used for civil engineering measurements
			CO2	Explain the use of various tools and devices for various field measurements
			CO3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
			CO4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
			CO5	Compare different techniques and devices used in civil engineering measurements
			CO6	Identify Basic Mechanical workshop operations in accordance with the material and objects
			CO7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
			CO8	Apply appropriate safety measures with respect to the mechanical workshop trades
S3	MA201	LINEAR ALGEBRA AND COMPLEX ANALYSIS	CO1	Students will understand about complex numbers and functions
			CO2	Students will get an idea of Conformal mapping
			CO3	Students will understand the integration of complex functions
			CO4	Students will gain knowledge of various singularities and series expansions
			CO5	Students will be able to find the rank of a matrix and solution of equations using matrix theory

			CO6	Students will understand the matrix Eigen value problems
			CO1	Students will be able to understand basic concepts of stress and strain in solids and apply this knowledge during the analysis of thermal stresses and statically indeterminate structures
			CO2	Students will be able to demonstrate the ability to select appropriate shaft size by applying the principles of torsion
			CO3	Students will be able to depict and analyse the shear force and bending moment develops in a beam while solving complex problems.
			CO4	Student will be able to determine the bending stress and shear stress in beams and can select the appropriate geometry for the requirement.
			CO5	Student will be able to develop the governing differential equation for the elastic curve, and apply different techniques for finding out the deflection at required points.
			CO6	Student will be able to calculate the buckling load for columns with different end conditions.
	ME201	MECHANICS OF SOLIDS		
			CO1	Ability to calculate pressure variations in accelerating fluids using Euler's and Bernoulli's equations.
			CO2	Become conversant with the concepts of flow measurements and flow through pipes and be able to describe them. Knowledge
			CO3	Apply the momentum and energy equations to fluid flow problems based on an analysis of the various system specifications
			CO4	Evaluate head loss in pipes and conduits and recommend suitable engineering criteria for fluid flow, power transmission, etc
			CO5	Use dimensional analysis to design physical or numerical experiments applying dynamic similarity
	ME203	MECHANICS OF FLUIDS		
			CO1	To understand the basic concepts of thermodynamic such as temperature, pressure, system. define energy transfer through mass, heat and work for closed and control volume systems.
			CO2	To understand and apply the first Law of Thermodynamics on closed and control volume systems and to analyse preliminary problems.
	ME205	THERMODYNAMICS		

			CO3	To understand and apply Second Law of Thermodynamics and entropy concepts in analysing the thermal efficiency of a system and to analyse preliminary problems of change in entropy in various thermodynamic processes
			CO4	To identify the properties of substances on property diagrams and obtain the data from property tables.
			CO5	To apply concept of chemical thermodynamics, with emphasis on the first and second laws, to predict physical changes and reaction outcomes based on Gibbs energies
			CO6	To apply concept of chemical thermodynamics, with emphasis on the first and second laws, to predict physical changes and reaction outcomes based on Gibbs energies
ME210	Metallurgy & Materials Engineering		CO1	Understand the basic chemical bonds, crystal structures (BCC, FCC, and HCP), and their relationship with the properties.
			CO2	Analyze the microstructure of metallic materials using phase diagrams and modify the microstructure and properties using different heat treatments.
			CO3	How to quantify mechanical integrity and failure in materials.
			CO4	Apply the basic principles of ferrous and non-ferrous metallurgy for selecting materials for specific applications.
			CO5	Define and differentiate engineering materials on the basis of structure and properties for engineering applications.
HS210	Life Skills		CO1	Communicate Effectively
			CO2	Make Effective Presentations
			CO3	Write different types of reports
			CO4	Face Interview and Group Discussion
			CO5	Critically think on a particular problem
			CO6	Solve Problems
ME231	Computer Aided Machine Drawing Lab		CO1	To introduce students to the basics and standards of engineering drawing related to machines and components.
			CO2	To teach students technical skills regarding assembly, production and part drawings.
			CO3	To familiarize students with various limits, fits and tolerances.
			CO4	To help students gain knowledge about standard CAD packages on modeling and drafting

	CE230	Material Testing Lab	CO1	To determine the Modulus of Elasticity of steel and wood using UTM
			CO2	To verify Clerk- Maxwell's Reciprocal Theorem and hence determine the Modulus of elasticity of steel.
			CO3	To determine the Modulus of rigidity of steel using torsion test, spring test and torsion pendulum
			CO4	To analyse the toughness of a specimen using Impact testing machine
			CO5	To test the hardness of a material by Rockwell, Brinell and Vicker Hardness test.
			CO6	To determine the ultimate shear stress of steel using UTM E
S4	MA202	Probability Distributions, Transforms and Numerical Methods	CO1	To introduce the concept of random variables, probability distributions, specific discrete and continuous distributions with practical application in various Engineering and social life situations.
			CO2	To know Laplace and Fourier transforms which has wide application in all Engineering courses.
			CO3	To enable the students to solve various engineering problems using numerical methods
	ME202	Advanced Mechanics of Solids	CO1	Students will able to compute: the strain in a body from the given displacement field, stress tensor at a point from strain tensor and vice-versa. Students will be able to identify/analyze whether a given stress field is possible for the given boundary conditions.
			CO2	Students will be able to compute the principal stress and principal strain for a given state of stress or strain. Students will be able to Identify the principal planes corresponding to each principal stress/strain
			CO3	Students will be able to demonstrate the procedure for solving 2-D problems in elasticity using polynomial method.
			CO4	Students will be able to compute hoop stress, radial stress and radial displacement for thick cylinders subjected to internal and external pressure and rotating discs. In addition students will be able to evaluate the thickness of pressure vessels required to withstand a given internal or external pressure based on theories of failure
			CO5	Students will be able to compute the stresses in curved beams subjected to bending and beams subjected to unsymmetrical bending. The nature of stress developed in straight beams, curved beams and unsymmetrical bending are compared

			CO6	Students will be able to comprehend the usage of energy methods for solving structural problems. Energy principles like Castigliano's theorem, principle of virtual work etc. for solving simple problems are demonstrated.
ME204	Thermal Engineering		CO1	To acquire knowledge on the working of steam turbines, IC engines and gas turbines
			CO2	To introduce the combustion process in IC engines
			CO3	To understand air pollution from IC engines and its remedies.
			CO4	Integrate the concepts, laws and methodologies from the course in thermodynamics into analysis of cyclic processes
			CO5	To apply the thermodynamic concepts into various thermal application like IC engines, steam turbines, compressors.
ME206	Fluid Machinery		CO1	Students will be able to define the principles and working of Hydraulic Machines. Knowledge
			CO2	Students will be able to estimate the hydrodynamic forces on various types of vanes and to calculate the performance of various hydraulic machines
			CO3	Students will be able to design an appropriate pump/turbine with reference to given application/situation. Carry out calculations involved in design of pump/turbine.
			CO4	Students will be able to understand the relation between various performance parameters and to interpret characteristic curves of a given pump/turbine/compressor.
			CO5	Describe the operating characteristics of Fluid machinery (pumps, turbines and compressors), and the factors affecting their operation and specifications, as well as their operation in a system.
ME220	Manufacturing Technology		CO1	To give an exposure to different techniques of casting and moulds required.
			CO2	To provide an exposure to different rolling processes and different rolled products
			CO3	To familiarize with different forging methods, cautions to be adopted in die design.
			CO4	To give an introduction to various work and tool holding devices used in manufacturing.
			CO5	To introduce to the bending, shearing and drawing processes of sheet metal working and allied machines
		CO6	To give an understanding of welding metallurgy and weldability and to introduce various metal joining techniques	
HS200	Business Economics		CO1	To familiarize the prospective engineers with elementary Principles of Economics and Business Economics.

S5			CO2	To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability
			CO3	To apply business analysis to the “firm” under different market conditions.
			CO4	To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues.
			CO5	To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate.
			CO6	To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level.
			ME232	Thermal Engineering Lab
	ME230	Fluid Mechanics & Machines Lab	CO2	To provide experience on testing of fuels and lubricants
			CO1	To provide experience on various Hydraulic machines.
			CO2	To acquaint the students with the measurement of various parameters
			CO3	To familiarize the theory and their applications in the field of fluid mechanics.
			CO4	To gain practical experience in handling various hydraulic machines.
			CO5	Calibration of discharge measuring equipments and nature of calibration curves in both closed & open channel flow.
	ME301	MECHANICS OF MACHINERY	CO6	Stability of floating bodies and the significance of metacentric height & radius of gyration
			CO1	To understand the kinematics of different mechanism
CO2			To understand the motion resulting from a specified set of linkages and to synthesise the mechanism.	
CO3			To understand and to design of cam mechanisms for specified output motions.	
CO4			To understand the basic concepts of toothed gearing and kinematics of gear trains.	
ME303	MACHINE TOOLS & DIGITAL MANUFACTURING	CO5	Knowledge in gear terminologies and to calculate velocity of gears in a gear train.	
		CO1	Evaluate the mechanism of orthogonal and oblique cutting and the cutting forces developed	
		CO2	Select appropriate process in a machine tool while machining a job	
		CO3	Understand and apply operational principles of machine tools	
			CO4	To develop know ledge on the principles of operations of milling machine

		CO5	Select different super finishing processes
		CO6	understand and apply the principles of digital manufacturing
ME305	COMPUTER PROGRAMMING & NUMERICAL METHODS	CO1	To equip students with fundamentals of computer programming .
		CO2	To provide fundamental idea about the use of computer programming.
		CO3	To provide basic idea object oriented programming
		CO4	To provide fundamental idea about numerical methods for analyzing the basic engineering problems.
		CO5	Write C++ programs to solve simple engineering programs using Class, Object and concepts like member functions, friend decleration and inheritance.
		CO6	Acquire basic knowledge about sources of errors in numerical methods.
		EE311	ELECTRICAL DRIVES & CONTROL FOR AUTOMATION
CO2	to study the different methods of starting D.C motors and induction motors.		
CO3	To study the controllers for automation		
CO4	Students will be able to identify solid state drive for speed control of various special electrical machines.		
CO5	Students will be able to design speed control of induction motor drives in an energy efficient manner using power electronics & be able to learn the control system for synchronous motor drives using		
HS300	PRINCIPLES OF MANAGEMENT	CO1	To recall and identify the relevance of management concept
		CO2	To describe, discuss and relate management techniques adopted within an organisation
		CO3	To apply management techniques for meeting current and future management challenges faced by the organisation
		CO4	To compare the management theories and models critically and to inspect and question it's validity in the real world
		CO5	To assess and modify different theories of management so as to relate it to current management challenges
		CO6	To apply principles of management in order to execute the role as a manager
ME367	NON-DESTRUCTIVE TESTING (ELECTIVE 1)	CO1	Students will be able to understand the basic concepts of different types of Non – Destructive Testing methods.

		CO2	Students will be able to demonstrate Liquid Penetrant Inspection on various samples.
		CO3	Students will be able to demonstrate Magnetic Particle Inspection on various samples.
		CO4	Students will be able to explain the working principle of Ultrasonic Testing and use it for industrial needs
		CO5	Students will be able to analyze the results obtained from industrial radiographic test.
		CO6	Students will be able to explain the working of Eddy Current Testing.
ME341	DESIGN PROJECT	CO1	To understand the engineering aspects of design with reference to simple products
		CO2	To foster innovation in design of products, processes or systems
		CO3	To develop design that add value to products and solve technical problems
		CO4	The students will be able to analyse the problem requirements and arrive workable design solutions
		CO5	The students will be able to understand the engineering aspects of design with reference to simple products to assess its impact on the society, health, environment and safety
		CO6	The students will be able to develop design that add value to products and solve technical problems
EE335	ELECTRICAL AND ELECTRONICS LAB	CO1	Students will be able to Perform load test on DC shunt, series motors, single phase transformers, 3/1 phase induction motors and analyse its performance characteristics.
		CO2	Students will be able to perform the load test on shunt generator and predetermine the performance of DC machine when working as motor/generator
		CO3	Students can determine the efficiency and voltage regulation of a single phase transformer performing oc/sc test
		CO4	Students can determine the open circuit characteristics of self excited generators
		CO5	Students will get awareness in applying rectifier circuits and CE configuration of BJT
ME331	MANUFACTURING TECHNOLOGY LAB I	CO1	Students will understand the importance of safety in machine tool technology.
		CO2	Hands on experience on lathe machine to perform turning, facing, threading operations and will create models as per product drawings.
		CO3	Students select the proper tools to work on a machine for the type of part required.
		CO4	Students will prepare parts by milling, drilling, grinding, welding operations as per the part drawing.

			CO5	Students will be able to select process parameters for operations determine basic feeds and speeds on their machine.
			CO6	Students can recognise appropriate heat treatment process.
S6	ME302	HEAT AND MASS TRANSFER	CO1	Solve problems involving steady state heat conduction with and without heat generation in simple geometries.
			CO2	Evaluate heat transfer coefficients for Natural convection and Forced convection situations using empirical relations.
			CO3	Design Heat Exchangers and Fins and evaluate its performance.
			CO4	Solve problems involving transient heat conduction and Understand the basics of Heat pipe, Boiling and Condensation
			CO5	Estimate radiation heat transfer between black body and gray body surfaces.
			CO6	Solve problems involving mass transfer due to diffusion, chemical reaction and convection.
	ME304	DYNAMICS OF MACHINERY	CO1	Solving problems related to static and dynamic force analysis of planar mechanism graphically
			CO2	Students can explain turning moment diagrams of IC engines and can conduct flywheel analysis. Students are also capable of explaining how balancing of rotating and reciprocating masses are done and can calculate the unbalanced forces and couples in a system.
			CO3	Students can explain the theory behind gyroscopic couple and to predict the effect of gyroscopic couple in aircraft, ships and automobiles
			CO4	Knowledge in the vibration model of a system, concept of free damped and un damped, forced vibration systems and can solve problem related to different damping conditions.
			CO5	Students are capable of writing equation of motion of two degree, multi degree of freedom systems and choosing methods to solve frequency of such systems at different modes of vibration
			CO6	Students have knowledge in the critical speed of shafts and are capable of solving problems related to free torsional vibrations in shafts. They also have knowledge in vibration absorbers, dampers and vibration measuring instruments.
	ME306		CO1	To introduce machining principles and processes in the manufacturing of precision components and products that use conventional and nonconventional technologies

		ADVANCED MANUFACTURING TECHNOLOGY	CO2	To give basic understanding of the machining capabilities, limitations, and productivity of advanced manufacturing processes.
			CO3	To describe how PLC's operate and how they control automated equipment and systems
			CO4	To demonstrate tool path simulations with CNC powered equipment
			CO5	To introduce CNC programming
			CO6	Students will be able to gain fundamental knowledge in micromachining and material addition process.
	ME308	COMPUTER AIDED DESIGN AND ANALYSIS	CO1	Students able to express the concept of CAD/CAM/CIM and Other terminologies used in the development and manufacturing of a product.
			CO2	Students able to demonstrate different methods for geometric modelling in CAD
			CO3	Students able to evaluate the types of curves used in creating a geometry.
			CO4	Students able to formulate stiffness matrix to analyse structural and thermal problems
			CO5	Students analyse structural finite element problems by getting knowledge about various finite element methods.
			CO6	Students analyse structural finite element problems by getting knowledge about isoparametric elements, shape functions
	ME312	METROLOGY AND INSTRUMENTATION	CO1	Understand the working of linear and angular measuring instruments.
			CO2	To familiarize with the working of optical measuring instruments and fundamentals of limits and limit gauges.
			CO3	To give basic idea about various methods for measurement of screw thread and surface finish parameters.
			CO4	To give an exposure to advanced measuring devices and machine tool metrology
			CO5	To provide students an overview of mechanical measurement systems and principle of instruments for motion and dimension measurement.
			CO6	To provide basic idea about working principle and applications of devices for measurement of force and torque; strain and stress and temperature.
	ME372	Operations Research	CO1	To understand the role of operation research in decision making
			CO2	To impart the various operation research techniques for effective problem solving
			CO3	To impart the various techniques in Linear programming problem

S7	ME332	Computer Aided Design & Analysis Lab	CO4	Students will be able to evaluate and solve different O.R methods
			CO1	Students are capable of developing 3D models of machine components, complex geometries etc. using CATIA V6
			CO2	Students are capable to assembly the parts created to develop the whole mechanism.
			CO3	Students are capable to generate 2D sketches of the assembled parts and provide dimensions and symbols to generate 2D drawing.
			CO4	Students can apply their knowledge in importing CAD geometries and to modify and mesh using different meshing methods and local meshing controls as a part of preprocessing of the FE problem in ANSYS workbench
			CO5	Students have knowledge to conduct simple structural, fluid flow and thermal analysis problems in ANSYS.
	ME334	Manufacturing Technology Lab II	CO1	Students will be able to select and use different linear and angle measuring devices like vernier calipers, micrometers, bevel protractors, slip gauges etc
			CO2	Students will be able to use equipments like Surface Roughness tester, Profile projector, and Tool makers Microscope to find out parameters of gear, thread, tool and surface roughness
			CO3	Students will be able to do the process of calibration by carrying out experiments on devices like strain gauge, LVDT, and Roughness tester
			CO4	Students will be able to understand about CNC machine tool and also to write NC part programming statements to carry out the machining processes using CNC machine tool.
			CO5	Students will be able to make inferences during different measurement processes.
			CO6	Students will be able to perform, analyse and infer the experiments as a team.
	ME401	DESIGN OF MACHINE ELEMENTS I	CO1	To review the concept of statics and strength of materials
			CO2	To introduce the fundamental approaches to failure prevention of components
CO3			To provide knowledge in the design of common machine elements such as fasteners, shafts, spring cotter joints and coupling	
ME403	ADVANCED ENERGY ENGINEERING	CO1	To give an idea about global energy scenario and conventional energy sources	
		CO2	To understand solar, wind and Biomass energy	
		CO3	To know concepts of other renewable energy sources	

			CO4	To create awareness on the impacts of energy conversion and importance of sustainable energy
ME405	REFRIGERATION AND AIR CONDITIONING		CO1	To introduce various Refrigeration and Air Conditioning systems.
			CO2	To impart knowledge on refrigeration cycles and methods to improve performance.
			CO3	To familiarize the components of refrigeration systems.
			CO4	To know the applications of refrigeration
			CO5	To impart knowledge on air conditioning systems.
			CO6	Using the principles of air conditioning, they will be able to design different type of air conditioning systems and duct systems for industrial applications.
ME 407	MECHATRONICS		CO1	Students will understand the basic structure of Mechatronics system, sensors and encoders.
			CO2	students will gain knowledge on the various types of hydraulic and pneumatic actuators used. They will synergize this with their knowledge in developing simple hydraulic and pneumatic circuit's using standard symbols.
			CO3	Students will develop and idea about Micro Electro Mechanical System, Deep Reactive Ion Etching (DRIE) and LIGA Process.
			CO4	Students will be able to select various mechatronics elements in the Design of modern CNC machines
			CO5	Students will gain fundamental knowledge in system modelling and Mechatronics in Robotics.
			CO6	Students will be able to assess case studies of mechatronic systems.
ME 409	COMPRESSIBLE FLUID FLOW		CO1	To analyze and solve compressible flow related engineering problems
			CO2	To evaluate the sonic speed for ideal gases and obtain the Mach numbers. Also, to classify subsonic, transonic, supersonic and hypersonic flow regimes.
			CO3	To apply the knowledge gained in performing preliminary design of supersonic inlets, diffusers, wind tunnels and other compressible flow devices by using one- dimensional compressible flow theory.
			CO4	To combine conservation of mass, momentum and energy principles with gas equations of state and second law of thermodynamics to analyze normal shock.
			CO5	To combine conservation of mass, momentum and energy principles with gas equations of state and second law of thermodynamics to analyze Fanno flow & Rayleigh flow.

			CO6	To describe various compressible flow field visualization and measurement methods
ME 463	AUTOMOBILE ENGINEERING		CO1	Students will be able to practically identify and explain different automotive systems and subsystems.
			CO2	Students will be able to understand the principles of transmission, suspension, steering and braking systems of an automobile
			CO3	Students will be able to investigate the future developments in the automobile industry
			CO4	Students will be able to interpret the various terminologies used in the automotive industry
			CO5	Students will be able to analyse the effectiveness of energy storing and dissipating systems in a vehicle.
			CO6	Students will be able to evaluate the aerodynamic design parameters of the vehicle and can validate the same.
		ME 467	CRYOGENIC ENGINEERING	
	CO2			To apply the knowledge of ideal refrigeration techniques and to analyse common cryogenic refrigeration systems.
	CO3			To apply the knowledge of ideal refrigeration techniques, to understand and analyse common cryogenic refrigeration systems.
	CO4			To understand some of the novel cryogenic refrigeration methods
	CO5			To gain knowledge and to understand various cryogenic fluid storage and transport systems and to evaluate their performance applying fundamental concepts.
	CO6			To gain knowledge about different cryogenic instrumentation and to understand cryo pumping.
ME 431	MECHANICAL ENGINEERING LAB		CO1	Ability to apply the principle of heat transfer for quantitative measurement and to compare the results with theoretical values
			CO2	Ability to compute natural frequency of simple vibrating systems
			CO3	Understand the working of different governors, and can predict the stability of mechanical governors.
			CO4	Understand the theory behind gyroscopic effect and to predict the effect of gyroscopic couple in different mechanisms.

S8	ME 451	SEMINAR & PROJECT PRELIMINARY	CO5	Understand the theory and principle of free and forced Vibration
			CO6	To practice calibration of thermometer and pressure gauges
			CO1	To identify the current topics in the specific stream
			CO2	Collect recent publications related to identified topics
			CO3	Do a detailed study of a selected topic based on current journals, published papers and books
			CO4	Present a seminar on the selected topic on which a detailed study has been done
	ME402	DESIGN OF MACHINE ELEMENTS II	CO1	To acquire knowledge and design of different types of clutches and brakes
			CO2	To understand the basics of bearings, types of bearing, lubrication system and design of bearings.
			CO3	To understand the concept of gears and the basic procedure in design of spur gear helical, bevel, worm gear.
			CO4	To acquire knowledge and design of flat belt, v belt and chains.
			CO5	To acquire basic knowledge in Connecting rod and Pressure vessels.
	ME404	Industrial Engineering	CO1	To understand the fundamental tools and techniques in Industrial Engineering, application of Industrial Engineering, Production Methods, Product Development process and design process.
			CO2	To understand the Facility Planning, Material Handling methods, maintenance planning.
CO3			Impart knowledge of the principles of Methods engineering, Job Evaluation and Merit Rating .	
CO4			To have knowledge on Industrial relations, communication and management.	
CO5			To understand the principles of Production planning and control, Inventory Control.	
ME476	Material Handling & Facilities Planning	CO6	Impart knowledge on Quality Control, Statistical quality control, Total quality management.	
		CO1	Identify the value of facility planning on the strategy of a firm	
		CO2	Develop a systematic plant layout	
			CO3	Analyse the safety and environmental aspects in facilities planning

			CO4	Understand various material handling systems and classification of material handling equipment
			CO5	Selection and Maintenance of material handling equipment with safety and ergonomics aspects
			CO1	Describe the basic concepts of disaster and hazards if India
			CO2	List various types of natural disaster and various manmade disaster
			CO3	Elaborate on the Principles of disasters management(
	CE488	Disaster Management	CO4	Explain the application of modern techniques used in disaster mitigation and managemen
			CO1	To apply engineering knowledge in practical problem solving.
			CO2	To foster innovation in design of products, processes or systems.
	ME492	Project	CO3	To develop creative thinking in finding viable solutions to engineering problrms.