

	<b>MECHANICAL ENGINEERING</b>
<b>Course Code</b>	<b>17CED14/17CED24 - COMPUTER AIDED ENGINEERING DRAWING</b>
CO1	Students will be able to demonstrate the usage of CAD software.
CO2	Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.
CO3	Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.
<b>Course Code</b>	<b>17EME14/17EME24- ELEMENTS OF MECHANICAL ENGINEERING</b>
CO1	Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems
CO2	Metal removal process using Lathe, drilling, Milling Robotics and Automation.
CO3	Fair understanding of application and usage of various engineering
<b>Course Code</b>	<b>17WSL16/17WSL26 - WORKSHOP PRACTICE</b>
CO1	Demonstrate and produce different types of fitting models.
CO2	Gain knowledge of development of sheet metal models with an understanding of their applications.
CO3	Perform soldering and welding of different sheet metal & welded joints.
CO4	Understand the Basics of Workshop practices
<b>Course Code</b>	<b>17ME32 - Material Science</b>
CO1	The foundation for understanding the structure and various modes of failure in materials common in mechanical engineering.
CO2	Topics are designed to explore the mechanical properties of metals and their alloys, polymers, ceramics ,smart materials and composites.
CO3	The means of modifying such properties, as well as the processing and failure of materials.
CO4	Concepts of use of materials for various applications are highlighted.
<b>Course Code</b>	<b>17ME33- Basic Thermodynamics</b>
CO1	Learn about thermodynamic systems and boundaries
CO2	Study the basic laws of thermodynamics including, conservation of mass, conservation of energy or first law , second law and Zeroth law.
CO3	Understand various forms of energy including heat transfer and work
CO4	Identify various types of properties (e.g., extensive and intensive properties)
CO5	Use tables, equations, and charts, in evaluation of thermodynamic properties
CO6	Apply conservation of mass, first law, and second law in thermodynamic analysis of systems (e.g., turbines, pumps, compressors, heat exchangers,etc.)
CO7	Enhance their problem solving skills in thermal engineering
<b>Course Code</b>	<b>17ME34 - Mechanics of Materials</b>
CO1	Classify the stresses into various categories and define elastic properties of materials and compute stress and strain intensities caused by applied loads in simple and compound sections and temperature changes.
CO2	Derive the equations for principal stress and maximum in-plane shear stress and calculate their magnitude and direction. Draw Mohr circle for plane stress system and interpret this circle.
CO3	Determine the shear force, bending moment and draw shear force and bending moment diagrams, describe behavior of beams under lateral loads.

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CO4	Explain the structural behavior of members subjected to torque, Calculate twist and stress induced in shafts subjected to bending and torsion.
CO5	Understand the concept of stability and derive crippling loads for columns.
CO6	Understand the concept of strain energy and compute strain energy for applied loads.
<b>Course Code</b>	<b>17ME35B - Machine tools &amp; operations</b>
CO1	To introduce students to different machine tools in order to produce components having different shapes and sizes.
CO2	To enrich the knowledge pertaining to relative motion and mechanics required for various machine tools.
CO3	To develop the knowledge on mechanics of machining process and effect of various parameters on economics of machining.
<b>Course Code</b>	<b>17ME36B-MECHANICAL MEASUREMENTS AND METROLOGY</b>
CO1	Understand metrology, its advancements & measuring instruments,
CO2	Acquire knowledge on different standards of length, calibration of End Bars, linear and angular measurements, Screw thread and gear measurement & comparators.
CO3	Equip with knowledge of limits, fits, tolerances and gauging.
CO4	Acquire knowledge of measurement systems and methods with emphasis on different transducers, intermediate modifying and terminating devices.
CO5	Understand the measurement of Force, Torque, Pressure, Temperature and Strain.
<b>Course Code</b>	<b>17MEL37B - MECHANICAL MEASUREMENTS AND METROLOGY LAB</b>
CO1	To illustrate the theoretical concepts taught in Mechanical Measurements & Metrology through experiments.
CO2	To illustrate the use of various measuring tools measuring techniques.
CO3	To understand calibration techniques of various measuring devices.
<b>Course Code</b>	<b>17MEL38B - MACHINE SHOP</b>
CO1	To provide an insight to different machine tools, accessories and attachments
CO2	To train students into machining operations to enrich their practical skills
CO3	To inculcate team qualities and expose students to shop floor activities
CO4	To educate students about ethical , environmental and safety standards
<b>Course Code</b>	<b>17ME42 - KINEMATICS OF MACHINES</b>
CO1	Identify mechanisms with basic understanding of motion.
CO2	Comprehend motion analysis of planar mechanisms, gears, gear trains and cams.
CO3	Carry out motion analysis of planar mechanisms, gears, gear trains and cams.
<b>Course Code</b>	<b>17ME43 - APPLIED THERMODYNAMICS</b>
CO1	Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.
CO2	Evaluate the performance of steam turbine components.
CO3	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.
CO4	Apply thermodynamic concepts to analyze turbo machines.
CO5	Determine performance parameters of refrigeration and air-conditioning systems.
CO6	Understand the principles and applications of refrigeration systems.

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CO7	Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an airconditioning system.
CO8	Understand the working, applications, relevance of air and identify methods for performance improvement.
<b>Course Code</b>	<b>17ME44 - FLUID MECHANICS</b>
CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
CO2	Understand and apply the principles of pressure, buoyancy and floatation
CO3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
CO4	Understand and apply the principles of fluid kinematics and dynamics.
CO5	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
CO6	Understand the basic concept of compressible flow and CFD
<b>Course Code</b>	<b>17ME45A - METAL CASTING AND WELDING</b>
CO1	Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds.
CO2	Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines.
CO3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.
CO4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
CO5	Explain the Solidification process and Casting of Non-Ferrous Metals.
CO6	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing.
CO7	Explain the Resistance spot, Seam, Butt, Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing.
CO8	Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.
<b>Course Code</b>	<b>17ME46A - COMPUTER AIDED MACHINE DRAWING</b>
CO1	Sections of pyramids, prisms, cubes, cones and cylinders resting on their bases in 2D
CO2	Orthographic views of machine parts with and without sectioning in 2D.
CO3	Sectional views for threads with terminologies of ISO Metric, BSW, square and acme, sellers and American standard threads in 2D.
CO4	Hexagonal and square headed bolt and nut with washer, stud bolts with nut and lock nut, flanged nut, slotted nut, taper and split pin for locking counter sunk head screw, grub screw, Allen screw assemblies in 2D
CO5	Parallel key, Taper key, and Woodruff Key as per the ISO standards in 2D
CO6	Single and double riveted lap joints, butt joints with single/double cover straps, cotter and knuckle joint for two rods in 2D
CO7	Sketch split muff, protected type flanged, pin type flexible, Oldham's and universal couplings in 2D
CO8	assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D
<b>Course Code</b>	<b>17MEL47A - MATERIALS TESTING LAB</b>

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CO1	Acquire experimentation skills in the field of material testing.
CO2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.
CO3	Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
CO4	Apply the knowledge of testing methods in related areas.
CO5	Know how to improve structure/behavior of materials for various industrial applications.
<b>Course Code</b>	<b>17MEL48A- FOUNDRY AND FORGING LAB</b>
CO1	Demonstrate various skills of sand preparation, molding.
CO2	Demonstrate various skills of forging operations.
CO3	Work as a team keeping up ethical principles.