Department of Mechanical Engineering

COURSE OUTCOMES (COs)

A.Y. 2022-23 **Term - ODD** **Semester – III**

MEC301 – Engineering Mathematics-III

MEC301.1	The students will be able to understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
MEC301.2	The students will be able to understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
MEC301.3	The students will be able to expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
MEC301.4	The students will be able to understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
MEC301.5	The students will be able to apply Matrix algebra to solve the engineering problems.
MEC301.6	The students will be able to solve Partial differential equations by applying numerical methods

MEC302 – Strength of Materials

MEC302.1	The students will be able to discuss and Demonstrate fundamental knowledge about sectional properties, various types of stresses and strains.
MEC302.2	The students will be able to compute shear force and bending moment; draw shear force diagram (SFD), bending moment diagram (BMD), and discuss the relation between them for determinate beams subjected to different types of loads.
MEC302.3	The students will be able to analyse the bending stress and shear stresses induced in beam.
MEC302.4	The students will be able to analyse the deflection in beams and torsional stresses in shaft.
MEC302.5	The students will be able to analyze the stresses and deformations in shell structures and estimate the strain energy in mechanical elements.
MEC302.6	The students will be able to analyze buckling phenomenon and estimate load carrying capacity of columns The students will be able to estimate load carrying capacity of columns and struts

MEC303 Production Processes

MEC303.1	The students will be able to classify different various production processes, metal casting and special casting processes and discuss the effect of various parameters on cast components.
MEC303.2	The students will be able to classify different metal joining processes, explain the applications of welding processes and identify various welding defects.
MEC303.3	The students will be able to explain the principle and characteristics of different metal forming processes and also discuss the effect of process parameters in rolling, Extrusion and sheet metal working processes.
MEC303.4	The students will be able to classify different machine tools for metal removal processes and describe various gear cutting and chip formation methods.
MEC303.5	The students will be able to Illustrate principles and working of non-traditional manufacturing.
MEC303.6	The students will be able to describe the basic concepts in different moulding processes for plastics and ceramics and Understand the manufacturing technologies enabling Industry 4.0.

MEC304 – Materials and Metallurgy

MEC304.1	The students will be able to classify the different types of materials used in engineering applications and identify various crystal imperfections, deformation mechanisms and strengthening mechanisms.
MEC304.2	The students will be able to interpret iron-iron carbide phase diagram, outline various phases present at different conditions and describe the theory of alloying.
MEC304.3	The students will be able to discuss various heat treatment processes, their effects and applications for different ferrous alloys reviewing iron-iron carbide phase diagram and TTT diagram and also explain the effect of alloying elements on properties of various steels and distinguish between tool steel and stainless steel.
MEC304.4	The students will be able to describe the various modes of failure mechanisms in engineering materials like fracture, fatigue and creep failure.
MEC304.5	The students will be able to distinguish between composites, Nano-materials and smart materials.
MEC304.6	The students will be able to distinguish between composites, Nano-materials and smart materials.

MEC305 – Thermodynamics

MEC305.1	The students will be able to define and exemplify basic concepts of classical thermodynamics and Define first law of thermodynamics and apply the law to various processes, thermodynamic cycles, and write steady flow energy equation for various open systems.
MEC305.2	The students will be able to define and interpret the Second law of thermodynamics and recognize the importance of entropy in different process to compute heat and work interactions in thermodynamic systems.
MEC305.3	The students will be able to demonstrate the inter relations between thermodynamic functions to solve practical problems. Identify grades and availability of energy with respect to a process and cycle.
MEC305.4	The students will be able to explain pure substance and Use steam table and Mollier Chart to compute thermodynamics interactions. Explain the fundamental principles and operations of vapour power cycles.
MEC305.5	The students will be able to explain the fundamental principles and operations of various practical thermodynamic cycles such as gas power cycles and heat engine s to compute efficiencies, and apply the acquired knowledge to evaluate, interpret and compare performance parameters of these cycles used in I C engines, Gas turbines and Jet propulsion.
MEC305.6	The students will be able to apply the fundamentals of compressible fluid flow to the relevant systems. Define Mach number thereby describing the propagation of waves in compressible flow and applying the conservation equations to steady state conditions.

MEL301 – Materials Testing Lab

MEL301.1	The students will be able to prepare metallic samples for studying its microstructure following the appropriate procedure.
MEL301.2	The students will be able to identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test.
MEL301.3	The students will be able to perform Fatigue Test and draw S-N curve
MEL301.4	The students will be able to perform Tension test to Analyze the stress - strain behaviour of materials.
MEL301.5	The students will be able to measure torsional strength, hardness and impact resistance of the material.
MEL301.6	The students will be able to perform flexural test with central and three point loading conditions.

MEL302 – Machine Shop Practice (Skill based Lab)

MEL302.1	The students will be able to know the specifications, controls and safety measures related to machines and machining operations.
MEL302.2	The students will be able to use the machines for making various engineering jobs.
MEL302.3	The students will be able to perform various machining operations
MEL302.4	The students will be able to perform Tool Grinding
MEL302.5	The students will be able to perform welding operations

MESBL301 – CAD – Modelling (Skill based Lab)

MESBL301.1	The students will be able to Illustrate basic understanding of types of CAD model creation.
MESBL301.2	The students will be able to Visualize and prepare 2D modelling of a given object using modelling software.
MESBL301.3	The students will be able to Build solid model of a given object using 3D modelling software.
MESBL301.4	The students will be able to Visualize and develop the surface model of a given object using modelling software.
MESBL301.5	The students will be able to Generate assembly models of given objects using assembly tools of a modelling software.
MESBL301.6	The students will be able to Perform product data exchange among CAD systems.