



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - III</b>	
<b>Course Code: MEC301</b>	
<b>Course Name: Engineering Mathematics-III</b>	
MEC301.1	Apply the concept of Laplace transform to solve the real integrals in engineering problems.
MEC301.2	Apply the concept of inverse Laplace transform of various functions in engineering problems.
MEC301.3	Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
MEC301.4	Find orthogonal trajectories and analytic function by using basic concepts of complex variable theory.
MEC301.5	Apply Matrix algebra to solve the engineering problems.
MEC301.6	Solve Partial differential equations by applying numerical solution and analytical methods for one dimensional heat and wave equations.
<b>Course Code: MEC302</b>	
<b>Course Name: Strength of Materials</b>	
MEC302.1	Demonstrate fundamental knowledge about various types of loading and stresses induced.
MEC302.2	Draw the SFD and BMD for different types of loads and support conditions.
MEC302.3	Analyse the bending and shear stresses induced in the beam.
MEC302.4	Analyse the deflection in beams and stresses in the shaft.
MEC302.5	Analyse the stresses and deflection in beams and Estimate the strain energy in mechanical elements.
MEC302.6	Analyse buckling phenomenon in columns.
<b>Course Code: MEC303</b>	
<b>Course Name: Production Processes</b>	
MEC303.1	Demonstrate an understanding of the casting process.
MEC303.2	Illustrate principles of forming processes.
MEC303.3	Demonstrate applications of various types of welding processes.
MEC303.4	Differentiate chip forming processes such as turning, milling, drilling, etc.
MEC303.5	Illustrate the concept of producing polymer components and ceramic components.
MEC303.6	Illustrate principles and working of non-traditional manufacturing 7. Understand the manufacturing technologies enabling Industry 4.0.



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - III</b>	
<b>Course Code: MEC304</b>	
<b>Course Name: Materials and Metallurgy</b>	
MEC304.1	Identify the various classes of materials and comprehend their properties.
MEC304.2	Apply phase diagram concepts to engineering applications.
MEC304.3	Apply particular heat treatment for required property development.
MEC304.4	Identify the probable mode of failure in materials and suggest measures to prevent them.
MEC304.5	Choose or develop new materials for better performance.
MEC304.6	Decide an appropriate method to evaluate different components in service.
<b>Course Code: MEC305</b>	
<b>Course Name: Thermodynamics</b>	
MEC305.1	Demonstrate application of the laws of thermodynamics to a wide range of systems.
MEC305.2	Compute heat and work interactions in thermodynamic systems.
MEC305.3	Demonstrate the interrelations between thermodynamic functions to solve practical problems.
MEC305.4	Compute thermodynamic interactions using the steam table and Mollier chart.
MEC305.5	Compute efficiencies of heat engines, power cycles.
MEC305.6	Apply the fundamentals of compressible fluid flow to the relevant systems.
<b>Course Code: MEL301</b>	
<b>Course Name: Materials Testing</b>	
MEL301.1	Prepare metallic samples for studying its microstructure following the appropriate procedure.
MEL301.2	Identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test.
MEL301.3	Perform Fatigue Test and draw S-N curve.
MEL301.4	Perform Tension test to Analyze the stress - strain behaviour of materials.
MEL301.5	Measure torsional strength, hardness and impact resistance of the material.
MEL301.6	Perform flexural test with central and three-point loading conditions.



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - III</b>	
<b>Course Code: MEL302</b>	
<b>Course Name: Machine Shop Practice</b>	
MEL302.1	Know the specifications, controls and safety measures related to machines and machining operations.
MEL302.2	Use the machines for making various engineering jobs.
MEL302.3	Perform various machining operations.
MEL302.4	Perform Tool Grinding.
MEL302.5	Perform welding operations.
<b>Course Code: MESBL301</b>	
<b>Course Name: CAD – Modeling</b>	
MESBL301.1	Illustrate basic understanding of types of CAD model creation.
MESBL301.2	Visualize and prepare 2D modeling of a given object using modeling software.
MESBL301.3	Build solid model of a given object using 3D modeling software.
MESBL301.4	Visualize and develop the surface model of a given object using modeling software.
MESBL301.5	Generate assembly models of given objects using assembly tools of a modeling software.
MESBL301.6	Perform product data exchange among CAD systems.
<b>Course Code: MEPBL301</b>	
<b>Course Name: Mini Project - 1A</b>	
MEPBL301.1	Identify problems based on societal /research needs.
MEPBL301.2	Apply Knowledge and skill to solve societal problems in a group.
MEPBL301.3	Develop interpersonal skills to work as a member of a group or leader.
MEPBL301.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
MEPBL301.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
MEPBL301.6	Use standard norms of engineering practices.
MEPBL301.7	Excel in written and oral communication.
MEPBL301.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
MEPBL301.9	Demonstrate project management principles during project work.



**Program : Mechanical Engineering**

**Second Year : Semester - IV**

**Course Code: MEC401**

**Course Name: Engineering Mathematics-IV**

MEC401.1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
MEC401.2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
MEC401.3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
MEC401.4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
MEC401.5	Apply the concept of probability distribution to engineering problems & testing hypothesis of small samples using sampling theory.
MEC401.6	Apply the concepts of parametric and nonparametric tests for analyzing practical problems.

**Course Code: MEC402**

**Course Name: Fluid Mechanics**

MEC402.1	Define properties of fluids, classify fluids and evaluate hydrostatic forces on various surfaces.
MEC402.2	Illustrate understanding of dimensional analysis of Thermal and Fluid systems.
MEC402.3	Differentiate velocity potential function and stream function and solve for velocity and acceleration of a fluid at a given location in a fluid flow.
MEC402.4	Formulate and solve equations of the control volume for fluid flow systems and Apply Bernoulli's equation to various flow measuring devices.
MEC402.5	Calculate pressure drop in laminar and turbulent flow, evaluate major and minor losses in pipes.
MEC402.6	Calculate resistance to flow of incompressible fluids through closed conduits and over surfaces.

**Course Code: MEC403**

**Course Name: Kinematics of Machinery**

MEC403.1	Identify various components of mechanisms.
MEC403.2	Develop mechanisms to provide specific motion.
MEC403.3	Draw velocity and acceleration diagrams of various mechanisms.
MEC403.4	Choose a cam profile for the specific follower motion.
MEC403.5	Predict condition for maximum power transmission in the case of a belt drive.
MEC403.6	Illustrate requirements for an interference-free gear pair.



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - IV</b>	
<b>Course Code: MEC404</b>	
<b>Course Name: CAD/CAM</b>	
MEC404.1	Identify suitable computer graphics techniques for 3D modeling.
MEC404.2	Transform, manipulate objects & store and manage data.
MEC404.3	Develop a 3D model using various types of available biomedical data.
MEC404.4	Create the CAM Toolpath for specific given operations.
MEC404.5	Build and create data for 3D printing of any given object using rapid prototyping and tooling processes.
MEC404.6	Illustrate understanding of various cost-effective alternatives for manufacturing products.
<b>Course Code: MEC405</b>	
<b>Course Name: Industrial Electronics</b>	
MEC405.1	Illustrate construction, working principles and applications of power electronic switches.
MEC405.2	Identify rectifiers and inverters for dc and ac motor speed control.
MEC405.3	Develop circuits using OPAMP and Timer IC 555.
MEC405.4	Identify digital circuits for industrial applications.
MEC405.5	Demonstrate the knowledge of basic functioning of microcontrollers.
MEC405.6	Analyze speed-torque characteristics of electrical machines for speed control.
<b>Course Code: MEL401</b>	
<b>Course Name: Industrial Electronics</b>	
MEL401.1	Demonstrate characteristics of various electrical and electronics components.
MEL401.2	Develop simple applications built around these components.
MEL401.3	Identify use of different logic gates and their industrial applications.
MEL401.4	Built and demonstrate parameter measurements using microcontroller.
MEL401.5	Test and Analyze speed-torque characteristics of electrical machines for speed.



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - IV</b>	
<b>Course Code: MEL402</b>	
<b>Course Name: Kinematics of Machinery</b>	
MEL402.1	Draw velocity diagram using Instantaneous Centre method.
MEL402.2	Find velocity and acceleration of a point on a four-bar mechanism by using Relative method.
MEL402.3	Analyze velocity and acceleration of a specific link of a slider crank mechanism using graphical approach by Relative method.
MEL402.4	Plot displacement-time, velocity-time, and acceleration-time diagrams of follower motion.
MEL402.5	Draw cam profile for the specific follower motion.
MEL402.6	Develop and build mechanisms to provide specific motion.
<b>Course Code: MEL403</b>	
<b>Course Name: Python Programming</b>	
MEL403.1	Demonstrate understand of basic concepts of python programming.
MEL403.2	Identify, install and utilize python packages.
MEL403.3	Develop and execute python programs for specific applications.
MEL403.4	Develop and build python program to solve real-world engineering problems.
MEL403.5	Prepare a report on case studies selected.
<b>Course Code: MESBL401</b>	
<b>Course Name: CNC and 3-D Printing</b>	
MESBL401.1	Develop and execute part programing for any given specific operation.
MESBL401.2	Build any given object using various CNC operations.
MESBL401.3	Demonstrate CAM Tool path and prepare NC- G code.
MESBL401.4	Develop 3D model using available biomedical data.
MESBL401.5	Build any given real life object using 3D printing process.
MESBL401.6	Convert 2D images into 3D model.



<b>Program : Mechanical Engineering</b>	
<b>Second Year : Semester - IV</b>	
<b>Course Code: MEPBL401</b>	<b>Course Name: Mini Project - 1B</b>
MEPBL401.1	Identify problems based on societal /research needs.
MEPBL401.2	Apply Knowledge and skill to solve societal problems in a group.
MEPBL401.3	Develop interpersonal skills to work as member of a group or leader.
MEPBL401.4	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
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