

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)

MECHANICAL ENGINEERING DEPARTMENT

Flexible Scheme: Course Outcomes (COs) The course outcomes of the courses of 2021 admitted batch from 1st year to 2nd year of the undergraduate course of mechanical Engineering Program are given below:

Course	Course Outcomes	
100014: Engineering Graphics (ESC-1)	CO1	Visualize the geometric details of engineering objects
	CO2	Translate the geometric information of engineering objects into engineering drawings
	CO3	Draw orthographic projections and sections
	CO4	Develop knowledge to read, understand and explain drawing
	CO5	Improve their skills so that they can apply these skills in developing new products
	CO6	Prepare simple layout of factory, machine and buildings
120211: Material Science (DC-1)	CO1	State the principles of diffusion theory and various types of defects in materials
	CO2	Discuss mechanical properties of materials
	CO3	Compare the different processes to alter the material properties
	CO4	Determine the effect of different phases, impurities on the behavior of materials
	CO5	Analyze crystal structure and composition of different materials
	CO6	Create the different engineering materials and alloys
100021: Basic Mechanical Engineering (ESC-4)	CO1	Define the essential concepts of thermal, design and production used in Mechanical Engineering
	CO2	Summarize fundamental techniques and process used in power generating machines
	CO3	Solve the various problems based on basic concepts of Mechanical Engineering
	CO4	Analyze the various gas, steam and air cycles
	CO5	Evaluate the problems of Steam Generator, Thermodynamics, Steam and I.C. engines
	CO6	Generate the skills to demonstrate steam Generator and reciprocating machine in depth
100024: Manufacturing Practices (ESC-7)	CO1	Discuss the hand tools, machine tools and power tools
	CO2	Utilize appropriate tools required for specific operation.
	CO3	Apply safety measures required to be taken while using the tools in floor shops, Machine shops and carpentry shop
	CO4	Use the techniques, skills, and modern engineering tools necessary for manufacturing and production engineering
	CO5	Conduct experiments in the field of Production engineering
	CO6	Design a system, components, or process to meet desired needs, ethical, health and safety, manufacturability and sustainability

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100018: Engineering Graphics Lab	CO1	Visualize the geometric details of engineering objects
	CO2	Translate the geometric information of engineering objects into engineering drawings
	CO3	Draw orthographic projections and sections
	CO4	Develop knowledge to read, understand and explain drawing
	CO5	Improve their skills so that they can apply these skills in developing new products
	CO6	Prepare simple layout of factory, machine and buildings
100026: Basic Mechanical Engineering Lab	CO1	Define the essential concepts of thermal, design and production used in Mechanical Engineering
	CO2	Summarize fundamental techniques and process used in power generating machines
	CO3	Solve the various problems based on basic concepts of Mechanical Engineering
	CO4	Analyze the various gas, steam and air cycles
	CO5	Evaluate the problems of Steam Generator, Thermodynamics, Steam and I.C. engines
	CO6	Generate the skills to demonstrate steam Generator and reciprocating machine in depth
120311: Manufacturing Process (DC-2)	CO1	Describe the different types of manufacturing processes and their applications
	CO2	Identify suitable manufacturing process to achieve the required product shape with the aim of avoid defects, material and time wastage
	CO3	Illustrate the advantage and limitations of various manufacturing processes with regard to shape formation and surface quality.
	CO4	Analyse the manufacturing processes for given problem and able to select an appropriate process according to a specific requirement.
	CO5	Evaluate the procedures and techniques involved for the manufacturing of components for its optimization.
	CO6	Propose a simplified manufacturing processes with the aim of reduction of cost and manpower.
120312: Mechanics of Materials (DC-3)	CO1	Identify various structural elements and its application
	CO2	Illustrate different types of stress and strain on various types of structural elements like beam, shaft column etc
	CO3	Calculate principal stresses, maximum shearing stress, and the different stresses acting on a structural member.
	CO4	Analyse stresses and deflection for beam, shaft, long columns, thin cylinder etc
	CO5	Select appropriate materials in design considering engineering properties, sustainability, cost and weight
	CO6	Design simple bars, beams, and circular shafts to meet desired needs in terms of strength and deformation

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120312(P): Mechanics of Materials lab	CO1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen under tension test
	CO2	Conduct the torsion test to determine the modulus of rigidity of given specimen
	CO3	Perform compression tests on spring and wood
	CO4	Justify the Rockwell hardness test over with Brinell hardness and measure the hardness of the given specimen
	CO5	Determine elastic constants using flexural and torsion tests
	CO6	Examine the stiffness of the open coil and closed coil spring and grade them
120313: Theory of Machines –I (DC-4)	CO1	Identify basic mechanisms in real life applications
	CO2	Discuss about mechanics of various machines
	CO3	Apply fundamental principles of statics and dynamics to machinery.
	CO4	Analyse various types of motions and mechanisms of machinery
	CO5	Compare various components suitable for different applications. e.g. different types of governor, clutch, brakes, flywheel etc
	CO6	Create the mechanism or components to justify the demands of work
120313(P): Theory of Machines –I lab	CO1	Design and analyze mechanism required for the specified type of motion
	CO2	Draw inversions and determine velocity and acceleration of different mechanisms
	CO3	Construct different types of cam profile for a given data.
	CO4	Analyse various motion transmission elements like gears, gear trains, cams, belt drive and rope drive.
	CO5	Compare the various components related to machines and mechanism
	CO6	Determine the degrees-of-freedom (mobility) of a mechanism
120314: Fluid Mechanics and Hydraulic Machines (DC-5)	CO1	Define the fundamental properties of fluids
	CO2	Relate the concepts of mechanics with various laws of fluid mechanics.
	CO3	Identify the laws of fluid mechanics applicable for the body in various fluids under different conditions
	CO4	Analyse various forces and their effects, related to fluids mechanics
	CO5	Measure and compare losses in different fluid flow conditions
	CO6	Compare different turbo machines depending on their behaviour and their merits and demerits

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120314(P): Fluid Mechanics and Hydraulic Machines lab	CO1	Conduct experiment with flow measurement devices like Venturi meter and orifice meter
	CO2	Estimate the friction and measure the frictional losses in fluid flow.
	CO3	Predict the coefficient of discharge for flow through pipes
	CO4	Evaluate pressure drop in pipe flow using Hagen-Poiseuille's equation for laminar flow in a pipe
	CO5	Calculate the Critical Reynolds's Number through Pipe Set Apparatus
	CO6	Apply thermodynamic concepts to analyze Fluid machines
120315: Software Lab (DLC-1)	CO1	Describe AutoCAD and CATIA toolbars
	CO2	Summarize 2D and 3D commands
	CO3	Solve real time problems using AutoCAD and CATIA software
	CO4	Analyse various mechanical engineering problems
	CO5	Evaluate technical drawings of machine assemblies as a design engineer
	CO6	Generate 2D and 3D solid models with new features in machine elements
120412: Design of Machine Elements (DC-6)	CO1	Describe the basic design process and function of Permanent and temporary joints used in Machine Design
	CO2	Summarize the design techniques, skills and tools used in design
	CO3	Solve the various design engineering problems by formulate and proper assumptions for practice
	CO4	Analyze the stress and strain on mechanical components; and understand, identify and quantify failure modes for mechanical parts
	CO5	Evaluate the cases of Temporary and permanent joints problems successfully
	CO6	Create design techniques for a mechanical component under variety of environmental and service conditions
120412(P): Design of Machine Elements lab	CO1	Design and analysis the different part of an I.C Engine like Piston, cylinder, connecting rod , crank shafts , flywheel
	CO2	Compare the materials used in designing the automobile engine parts
	CO3	Use the software like AUTO CAD , CATIA , PRO/E, SOLID WORKS
	CO4	Select the spring for a proper application also can select the proper material of spring
	CO5	Design the different types of gear like spur gear, helical gear , worm gear , bevel gear and also able to know their practical applications.
	CO6	Create a gear box for modern Automotive vehicles and can use this for the benefits of society.

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120413: Metal Cutting and Machine Tools (DC-7)	CO1	Apply cutting mechanics to metal machining based on cutting force and power consumption
	CO2	Operate lathe, milling machines, drill press, grinding machines, etc
	CO3	Select cutting tool materials and tool geometries for different metals
	CO4	Choose appropriate machining processes and conditions for different metals
	CO5	Optimize parameters for material removal in unconventional machining processes
	CO6	Identify the process parameters, their effect and applications of different processes
120414: Engineering Thermodynamics (DC-8)	CO1	Define energy interactions between system and surroundings
	CO2	Correlate the law of thermodynamics to real life applications
	CO3	Apply the laws of thermodynamics to analyze boilers, heat pumps, refrigerators, heat engines, compressors and nozzles
	CO4	Investigate the effectiveness of energy conversion device in mechanical power generation
	CO5	Analyze air standard cycles applied in prime movers
	CO6	Describe benefits of improvements to thermodynamic systems
120415: Production Lab (DLC-2)	CO1	Define the different conventional method of material removal and function of different parts
	CO2	Apply the theory of metal cutting in experiments
	CO3	Perform step, taper turning, knurling and threading
	CO4	Produce stepped surface using shaper and keyway using milling machine
	CO5	Demonstrate knowledge of different machine tools used in machine shop
	CO6	Evaluate the chip thickness ratio, shear angle and material removal rate