



ACADEMIC YEAR 2020-21

COURSE OUTCOMES OF ALL THE COURSES OFFERED IN MEC I SEMESTER

Course Code	Course Name	L	T	P	C
MEC 101	Elements of Mechanical Engineering	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: 1) Describe energy scenario in the world, different types of energy resources, laws of thermodynamics, prime movers, and refrigeration and air-conditioning systems. And solve simple numericals related to thermodynamic laws. 2) Illustrate working principle of I C Engines and electric vehicles as a means of transportation and illustrate the role of e-mobility in offsetting the conventional transportation system. 3) Explain various power transmission systems used in Mechanical Engineering systems and solve basic numericals. 4) Distinguish between different metal joining processes like Welding, Brazing and Soldering. 5) Explain metal cutting processes using different machine tools used (Lathe, drilling and milling operations in industries. 6) Illustrate the concept of Additive manufacturing (3D printing) compared to conventional manufacturing, its applications and its role in the present manufacturing world.					

Course Code	Course Name	L	T	P	C
MEC 151	Workshop Practice	0	0	2	1
Course Outcomes: On successful completion of the course the students shall be able to: 1) Demonstrate the metal removal process by using appropriate fitting tools and assemble the parts. 2) Prepare sheet metal models by the application of concept of development of lateral surfaces of solids. 3) Produce various welded joints using the principle of arc welding. 4) Explain the connections pertaining to basic electrical house wiring techniques and plumbing methods. 5) Select measuring instrument to measure particular parameters in a work piece.					

Course Code	Course Name	L	T	P	C
MEC 152	Engineering Graphics	2	0	4	4
Course Outcomes: On successful completion of the course the students shall be able to: 1) Obtain single and multi-view drawings using AutoCAD software as per BIS conventions and Standards. 2) Use the knowledge of Orthographic projections to represent engineering information/ Concepts and present the same in the form of drawings. 3) Prepare isometric drawing of simple objects reading their orthographic projections. 4) Develop lateral surfaces of given object					

COURSE OUTCOMES OF ALL THE COURSES OFFERED IN MEC III SEMESTER

Course Code	Course Name	L	T	P	C
MEC 201	Basic Thermodynamics & MEC 201	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Summarize basic concept of thermodynamics. 2) Compute the properties of pure substance with the help of steam tables. 3) Apply the first law of thermodynamics to control mass and steady flow control volume system. 4) Apply second law of thermodynamics to different thermodynamic cycles (Heat Pump, refrigeration, Heat Engines). 5) Predict feasibility of thermodynamic process and availability of maximum work. 					

Course Code	Course Name	L	T	P	C
MEC 203	FLUID MECHANICS AND MACHINES	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Summarize the basic properties of fluids. 2) Employ the concept of hydrostatics to various pressure measuring devices. 3) Apply the principle of mass conservation to different types of fluid flows. 4) Apply the principle of energy conservation to fluid flow. 5) Interpret various energy losses for fluid flow through pipes. 					

Course Code	Course Name	L	T	P	C
MEC 205	Material Science & Metallurgy	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe the crystal structure, crystal imperfections and diffusion process in solids 2) Explain phases, phase diagrams and phase transformations 3) Discuss various heat treatment processes and their impact on material properties. 4) Classify various engineering materials and their applications. 					

Course Code	Course Name	L	T	P	C
MEC 206	Mechanics of Materials & MEC 206	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Compute the Normal Stress and Strain in Mechanical components 2) Compute the Bending Stress and Deflections of Beams 3) Compute Torsional Shear Stress and Strain in Shafts 4) Explain the concepts of Principle Stress and Strain Transformations 					

Course Code	Course Name	L	T	P	C
MEC 253	Computer Aided Machine Drawing	0	0	4	2
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Draw different fasteners, joints and sections of parts as per B.I.S.& Practices 2) Distinguish between cut sections of components and assembly by using knowledge of limits, fits and tolerances through drawings. 3) Demonstrate 3-D models of machine parts and assembly using CAD software enabling 2-D drawings. 4) Demonstrate the knowledge of surface modeling of 3-D components/parts 					

Course Code	Course Name	L	T	P	C
MEC 251	Fluid Mechanics and Machines Lab	0	0	4	2
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Analyze the flow in pipes, channels, weirs and notches using different flow measurement devices. 2) Explain the procedure of performance analysis of turbines and pumps under various operating conditions. 3) Find the energy losses in pipes and channels. 4) Predict the forces acting on the immersed bodies. 					

Course Code	Course Name	L	T	P	C
MEC 324	Control Engineering & MEC 324	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Identify the type of control system, controllers, various test signals, compensators, stability, concepts, analogous systems and frequency response terminologies, 2) Develop mathematical models of mechanical, electrical, electro-mechanical and hydraulic control systems in order to obtain system response for given input test signals, 3) Obtain the transfer functions by applying block diagrams reduction techniques and signal flow graphs for different applications of control system. 4) Predict the stability of a control system by developing R-H criterion, polar, bode and root locus plots. 					

COURSE OUTCOMES OF ALL THE COURSES OFFERED IN MEC V SEMESTER

Course Code	Course Name	L	T	P	C
MEC 207	Production Technique II	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Explain various single point cutting tool forces and different tool material properties. 2) Identify various process parameters during a machine tool operation. 3) Explain the basic working of various nontraditional machining processes. 4) Identify different basic programs in CNC machining processes. 5) Explain different powder metallurgy characteristics and lean manufacturing principles. 					

Course Code	Course Name	L	T	P	C
MEC 210	Design of Machine Elements I	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Explain the fundamental theories of failure of machine components. 2) Understand basic design principles to prevent fatigue failure of machine elements. 3) Apply theories of failure concept in the design of machine components like shafts, key and couplings. 4) Estimate the capacities of various mechanical joints using design principles. 5) Illustrate the design procedure of power screws. 					

Course Code	Course Name	L	T	P	C
MEC 214	Dynamics of Machines	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Identify the force-motion relationship in components subjected to external forces and analysis of standard mechanisms. 2) Compute the flywheel dimensions for engine and punching press applications 					

- 3) Employ analytical and graphical methods to balance rotating and reciprocating masses
- 4) Illustrate the effect of gyroscopic couple on aero planes, ships and automotive vehicles
- 5) Relate various operational parameters like speed, lift, effort, force and stability of a governor

Course Code	Course Name	L	T	P	C
MEC 217	Finite Element Analysis	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Apply the principle of variational techniques in seeking solutions to problems related to springs, bars, and beams. 2) Derive the expressions for elemental characteristics. 3) Computation of strain and stresses using the concept of global stiffness matrix in bars, stepped bars, and tapered plates. 4) Apply the method of elimination approach and determine the stresses and strain in trusses and beams subjected to different types of loads. 5) Compute the temperature distribution in composite walls. 					

Course Code	Course Name	L	T	P	C
MEC 257	Foundry, Forging & Welding Lab	0	0	2	1
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Prepare green sand moulds using different patterns. 2) Analyze different properties required in mould sand and core sand. 3) Explain the procedure of making a casting. 4) Demonstrate different forging operations. 5) Demonstrate different welding operations. 					

Course Code	Course Name	L	T	P	C
MEC 258	Energy Conversion Engineering Lab	0	0	2	1
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Differentiate among different internal combustion engine designs. 2) Identify the various properties of fuels and lubricating oils. 3) Evaluate the engines performance characteristics of various engines. 4) Analyze the performance of the engine with computerized set up which enables the understanding of pressure variation with crank angle during a cycle of operation 					

Course Code	Course Name	L	T	P	C
MEC 301	Power Plant Engineering	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Enlist the different types of load pattern such as industrial, urban traction load, power plants. 2) Prepare a Heat Balance Sheet for the steam power plant. 3) Analyze the steam cycles, reheat and regeneration cycles. 4) Sketch the flow diagram and performance study of diesel power plant, gas turbine power plant and nuclear power plant. 5) Explain the Renewable energy resources, Photovoltaic cell, Solar power plant, Wind turbines for power producing sectors. 					

Course Code	Course Name	L	T	P	C
MEC 307	Computational Fluid Dynamics	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Understand the fundamentals of CFD and deriving governing equations. 2) To give a basic understanding to the discretization of equations of mass, momentum and energy. 3) Apply different CFD techniques to diffusion problems. 4) Solving convection-diffusion problems and N-S equation. 5) Understand numerical grid generation and apply time integration and turbulence methods to complex flows 					

Course Code	Course Name	L	T	P	C
MEC 311	Industrial Engineering Techniques	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Select the inventory management tools for managing inventory. 2) Apply quality tools and control charts for quality management. 3) Prepare optimization models like CPM, PERT to improve decision –making and develop critical thinking and objective analysis of decision problems. 4) Summarize the basic concepts used to determine process cost and cost of production. 					

Course Code	Course Name	L	T	P	C
MEC 313	ROBOTICS	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Apply the concepts of inverse manipulator kinematics to a robot. 2) Apply the concepts of kinetics and kinematics to a robot. 3) Choose suitable trajectory generation scheme for a robot tasks. 4) Identify the types of sensor used in various applications. 					

Course Code	Course Name	L	T	P	C
MEC 314	Smart Manufacturing	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Outline the designing industrial internet systems. 2) Explain the security of the Industrial Internet 3) Outline the active part of industry 4.0 (Fourth Industrial Revolution). 4) Explain the economic aspects and applications of day to day life smart factories. 					

Course Code	Course Name	L	T	P	C
MEC 320	Machine Tool Design	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe various types of motions in a machine tool. 2) Explain the basic principles of design for designing machine tools. 3) Select an appropriate material for designing a machine tool. 4) Discuss advantages and limitations of machine tools. 5) Recognize the various control systems for machine tools. 					

Course Code	Course Name	L	T	P	C
MEC 323	Non-Destructive Testing	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe various types of nondestructive testing methods. 2) Explain the basic principles of various techniques of NDT methods. 3) Select an appropriate NDT method for a specific material. 4) Discuss advantages and limitations of nondestructive testing methods. 5) Recognize the developments and future trends in NDT. 					

Course Code	Course Name	L	T	P	C
MEC 326	Smart materials	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Explain the characteristics of smart materials. 2) Identify different types of sensors and actuation systems with their applications. 3) Describe properties of shape memory alloys along with other class of materials. 4) Brief the utilization of Piezoelectric Materials and Magnetostrictive materials in the design of different actuators. 5) Evaluate the Electro, Magneto Rheological fluids for various mechanical systems. 6) Analyze the properties of MEMS and micro fluidics, with the applications and select suitable procedure for fabrication. 					

Course Code	Course Name	L	T	P	C
MEC 304	Production Planning & Control	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe the types, marketing, functional and operational aspects of production planning. 2) Explain the processes and the imperfections in product and process planning. 3) Prepare the production schedules and their impact charts for the shop floor. 4) Schedule the requirements of materials and resource for the inventory control. 5) Apply Quality control tools for continuous improvement of the systems. 					

COURSE OUTCOMES OF ALL THE COURSES OFFERED IN MEC VII SEMESTER

Course Code	Course Name	L	T	P	C
MEC 213	I C Engines and Fuels	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe basic concepts of Internal Combustion Engines. 2) Discuss different conventional and alternate fuels performance and its emission characteristics. 3) Select appropriate injection systems for the given Engine. 4) Explain the stages of combustion in both SI and CI Engines and its Knock characteristics. 5) Explain the Emission Norms and Emission Control packages. 					

Course Code	Course Name	L	T	P	C
MEC 218	Mechatronics	3	1	0	4
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe the fundamentals of mechatronic system and its applications. 2) Identify the types of sensors, transducers and signal conditioning processes used in automated machines. 					

- 3) Recognize sequencing schedule for a specific process using various actuating systems.
- 4) Describe logic gates and working of controllers.

Course Code	Course Name	L	T	P	C
MEC 256	Mechatronics Laboratory	0	0	2	1
<ol style="list-style-type: none"> 1) To practically use the hydraulic and pneumatic circuits for given application. 2) To identify the correct sequencing of pneumatic circuits and simulate in AUTOSIM-200 software. 3) To understand the working principles of electric motors. 4) Perform the experiment on speed control of stepper motors 					

Course Code	Course Name	L	T	P	C
MEC 259	Mechanisms, Machines and Design Laboratory	0	0	2	1
<p>Course Outcomes: On successful completion of the course the students shall be able to:</p> <ol style="list-style-type: none"> 1) To practically relate to concepts discussed in Design of Machine Elements, Mechanical Vibrations & Dynamics of Machines courses. 2) To identify forces and moments in mechanical system components and identify vibrations in machine elements and design appropriate damping methods. 3) To understand the working Principles of machine elements such as Governors, Gyroscopes and measure strain in various machine elements using strain gauges. 4) Perform the journal bearing experiments and record the observation 					

Course Code	Course Name	L	T	P	C
MEC 302	Computer Integrated Manufacturing	3	0	0	3
<p>Course Outcomes: On successful completion of the course the students shall be able to:</p> <ol style="list-style-type: none"> 1) Describe various types of automation and production concept 2) Distinguish various automated flow line and Assembly line. 3) Outline Flexible manufacture system and group technology. 4) Apply CNC Part Programming and inspection principles. 5) Explain the Computer aided process planning and concurrent engineering. 					

Course Code	Course Name	L	T	P	C
MEC 304	Production Planning & Control	3	0	0	3
<p>Course Outcomes: On successful completion of the course the students shall be able to:</p> <ol style="list-style-type: none"> 1) Describe the types, marketing, functional and operational aspects of production planning. 2) Explain the processes and the imperfections in product and process planning. 3) Prepare the production schedules and their impact charts for the shop floor. 4) Schedule the requirements of materials and resource for the inventory control. 5) Apply Quality control tools for continuous improvement of the systems. 					

Course Code	Course Name	L	T	P	C
MEC 305	Product Design and Development	3	0	0	3
<p>Course Outcomes: On successful completion of the course the students shall be able to:</p> <ol style="list-style-type: none"> 1) Describe the different types of product and its specifications. 2) Explain phases of Product Development. 3) Discuss various cost estimation, cost reduction techniques and their impact on Product life cycle. 4) Classify various human factors in decision making approach. 					

Course Code	Course Name	L	T	P	C
MEC 310	Flexible Manufacturing Systems	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Explain the function of NC, CNC and DNC machines 2) Analyze the Quantitative aspects of FMS. 3) Explain the Machine cell design and part families. 4) Outline the various production control issues and tool management. 5) Explain the economic aspects and justification of FMS. 					

Course Code	Course Name	L	T	P	C
MEC 313	Robotics	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Apply the concepts of inverse manipulator kinematics to a robot. 2) Apply the concepts of kinetics and kinematics to a robot. 3) Choose suitable trajectory generation scheme for a robot tasks. 4) Identify the types of sensor used in various applications. 					

Course Code	Course Name	L	T	P	C
MEC 316	Mechanics of Composite Material	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Understand the significance of replacing existing metal structures with composite materials wherever beneficial. 2) Identify the properties of metal and matrix materials used in commercial composites, as well as some common manufacturing techniques. 3) Predict the failure strength of a laminated composite plate by analyzing the linear elasticity with emphasis on the difference between isotropic and anisotropic material behavior. 4) Summarize the appropriate use of composite structures in the industry. 					

Course Code	Course Name	L	T	P	C
MEC 323	Non-Destructive Testing	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Describe various types of nondestructive testing methods. 2) Explain the basic principles of various techniques of NDT methods. 3) Select an appropriate NDT method for a specific material. 4) Discuss advantages and limitations of nondestructive testing methods. 5) Recognize the developments and future trends in NDT. 					

Course Code	Course Name	L	T	P	C
MEC 324	Control Engineering	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Identify the type of control system, controllers, various test signals, compensators, stability, concepts, analogous systems and frequency response terminologies, 2) Develop mathematical models of mechanical, electrical, electro-mechanical and hydraulic control systems in order to obtain system response for given input test signals, 3) Obtain the transfer functions by applying block diagrams reduction techniques and signal flow 					

graphs for different applications of control system.

- 4) Predict the stability of a control system by developing R-H criterion, polar, bode and root locus plots.

Course Code	Course Name	L	T	P	C
MEC 401	Automotive Vehicles	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Identify the different components and system of the automobile. 2) Describe the working of various parts of transmission and ignition system. 3) Describe the different types of lubrication, cooling and fuel ignition system. 4) Identify the different structure of chassis and suspension system. 5) Explain different types of brakes and steering system. 					

Course Code	Course Name	L	T	P	C
MEC 402	Nanotechnology	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Recognize the basic properties of Nano materials. 2) Distinguish between various Nano material perspectives applicable to Nano technology. 3) Summarize the effect of Nano fluids on the boiling heat transfer. 4) Identify the processing techniques involved in investigation of Nano technology. 					

Course Code	Course Name	L	T	P	C
MEC 406	Operations Research for Engineers	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to: <ol style="list-style-type: none"> 1) Translate the verbal description of the real system to linear programming mathematical models. 2) Apply the concept of transportation and assignment problems to minimize the cost and time. 3) Influence the decision making processes of other individuals and groups. 4) Solve waiting line problems for M/M/1 and M/M/C models. 					

Course Code	Course Name	L	T	P	C
MEC 407	Operations Management	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to <ol style="list-style-type: none"> 1) Identify Operations Management Strategies for Competitive Advantage. 2) Define Productivity and Sustainability. 3) Describe Fundamentals of Supply Chain Management. 4) Predict Forecasting Method for Decision Making. 5) Apply Material Requirements Planning and Scheduling Concepts. 					

Course Code	Course Name	L	T	P	C
MEC 410	Organizational Behaviour	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to <ol style="list-style-type: none"> 1) Understand the importance, necessity and challenges of organizational behavior in current industrial setting. 2) Analyze and assess individual characteristics and its impact on the organization. 3) Understand group behavior in organizations, including communication, leadership, power and politics, conflict, and negotiations. 4) Evaluate the importance of managing and motivating people towards the achievement of organizational goals. 					

5) Understand the organizational system, including organizational structures, culture, human resources, and change.

Course Code	Course Name	L	T	P	C
MEC 411	Renewable Energy Systems	3	0	0	3
Course Outcomes: On successful completion of the course the students shall be able to					
1) Identify the different types of non-conventional energy sources and compare with various conventional energy systems, their prospects and limitations.					
2) Describe the use of solar energy and the various components used in the energy production with respect to applications.					
3) Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.					
4) Employ the concept of Biomass energy resources and their classification, types of biogas Plants-applications					
5) Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications					