CSMSS

Chh. Shahu College of Engineering

Department of Mechanical Engineering

A.Y. 2024-25

Semester	Subject Code	Name of subject	Co No.	Course outcomes
I	24AF1000 BS101	Engineering Mathematics-I	1	Student will be able to apply the matrix technique to find solutions of system of linear equations arising in many engineering problem.
			2	Student will be able to determine first and higher orders partial derivatives
			3	Student will be able to compute Jacobian of functions of several variables and their applications to engineering problems
			4	Student will be able to calculate advanced integration technique by reduction formulae and sketch of curves in various coordinate system
			5	Student will be able to compute multiple integrals and their applications to find area and volume.
I	24AF1CHE BS102	Engineering Chemistry	1	Students should be able to understand and explain the basic concepts of Water treatment and capable to explain softening processes and water characteristics.
			2	Students should be able to explain analysis, Calorific value of fuel and explain lubricants, its properties and industrial importance.
			3	Students should know the concepts of Electrochemistry and its importance.
			4	Student should be able to understand and explain various instrumental methods of Analysis.
			5	Student should be able to understand and explain properties and uses of Engineering materials such as Cement, Gypsum plaster, Rubber etc.
I	24AF1CHE BS103L	Engineering Chemistry Lab	1	Students should be able to understand and explain the basic concepts of Water treatment.
			2	Students should be able to understand and explain water characteristics.
			3	Students should be able to explain properties and industrial importance of lubricant.
I	24AF1EME S104	Engineering Mechanics	1	Determine Resultant with its magnitude and direction of the given force system
			2	Apply conditions of equilibrium to bodies at rest to find reactions under the action of active force.

			3	Compute Centre of gravity and Moment of Inertia of plane surfaces.
			4	Compute the motion characteristic of a body / particle in motion.
			5	Analyze relation between force and motion for bodies in motion.
I	24AF1EMES105L	Engineering Mechanics Lab	1	Investigate Study of Simple Machine , Simple screw jack, Differential Axle and Wheel , Worm and worm wheel
			2	Estimate acceleration due to gravity, Moment of Inertia, Beam Reaction, Application of spread Sheet, Application of Graphical method.
			3	Calculate coefficient of friction, Friction, coefficient of Restitution between two surfaces, Centroid of bodies.
			4	Verify law of Moments,Ploygon Law ,Law of Paralellogram, Lamis theorem
I	24AF1000ES106	Programming for problem Solving	1	CO 1. Gain a broad perspective about the uses of computers in engineering industry and C Programming.
			2	CO 2. Understand the use of Types, operators and expressions in programming.
			3	CO 3. Apply the knowledge of flow statements and functions for control based computational algorithms.
			4	CO 4. Understand the concepts of arrays ad pointers in C.
			5	CO 5. Apply the knowledge of structure in OS file management.
I	24AF1000ES107L	Programming for problem Solving Lab	1	CO 1. Understand the logic for a given problem.
			2	CO 2. Write the algorithm of a given problem.
			3	CO 3. Understand function declaration and definition.
			4	CO 4. Understand the concepts of arrays ad pointers in C.
			5	CO 5. Write, debug, and execute programs in a c programming language that effectively implement the developed algorithms.
I	24AF1000VS109	Communication Skills	1	Students will be able to understand communication process.
			2	Students will be able to apply speaking skills in professional as well as social situations.
			3	Demonstrate neutral accents while exercising English.
			4	Apply grammar correctly during speaking.
			5	Apply writing skills in professional and social situations.
I	24AF1000VS110L	Communication Skills Lab	1	Communicate effectively in personal and professional situations.
			2	Apply correct pronunciations of words in communication.
			3	Participate effectively in corporate activities like group discussion, presentation, interview etc.

I	24AF1000VS108L	Workshop Practices	1	Prepare simple wooden joints and parts using wood working tools and machines (Apply)
			2	Apply the fitting and plumbing skills and produce a job with specified dimensions (Apply)
			3	Practice sheet metal tools and machine to develop the sheet metal articles (Apply)
			4	Practice edge preparation for simple Lap, Butt, T joint using Arc/Gas/Resistance welding equipment (Understand)
			5	Demonstrate machining processes including turning, facing, step turning, drilling and parting (Understand)
I	24AF1000CC111A	Yoga Education	1	Learn Message of Vedas and Upanishads.
			2	Learn Four Streams of Yoga.
			3	Learn Shaddarshanas or the SIX systems of Indian Philosophy.
			4	Understand Life and message of spiritual masters and Indian Culture.
			5	Understand Anatomy and Physiology, Yoga and Exercise Physiology.
III	BTBS301	Engineering Mathematic -III	1	Students will be able to Identify the transforms of special functions such as periodic functions, Heaviside-unit step function, and Dirac delta function.
			2	Students will be able to Apply Laplce & Inverse Laplace transform methods to solve linear differential equations and systems with constant coefficients.
			3	Students will be able to Apply Fourier transforms and integral properties, including sine and cosine integrals and Parseval's identity, to transform functions.
			4	Students will be able to Apply techniques to form and solve partial differential equations, including linear equations and separation of variables for heat flow analysis.
			5	Students will be able to Solve the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
III	BTMC302	Fluid Mechanics	1	Students will be able to understand basic properties of fluid, fluid statics, kinematics and dynamics.
			2	Students will be able to Identify various types of flow, flow patterns and their significance.
			3	Students will be able to understand various equations in fluid mechanisms such as Euler's, Bernoulli's, Momentum, Continuity etc.
			4	Students will be able to analyse concepts of flow through pipes, boundary layer theory, forces on immersed bodies and dimensionless parameters.
			5	Students will be able to analyse problems related to properties of fluid, fluid kinematics, fluid dynamics, laminar flow, pipe flow, dimensional analysis, boundary layer theory, and forces on immersed bodies.
III	BTMC303	Thermodynamics	1	Students will be able to study various methods of temperature measurement for thermodynamic system analysis.
			2	Students will be able to apply first law of thermodynamics to a closed and open thermodynamic system and analysis thereon.

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			2	Students will be able to apply first law of thermodynamics to a closed and open thermodynamic system and analysis thereon.

			3	Students will be able to evaluate performance of heat engine and refrigeration system using Second law of thermodynamics and entropy principle.
			4	Students will be able to calculate work and heat transfer in ideal gas processes.
			5	Students will be able to calculate various properties of steam along with comparison of methods for measurement of dryness fraction.
III	BTMES304	Materials science and metallurgy	1	Students will be able to analyze the structure of materials at different levels and understand concept of mechanical behavior of materials and calculations of same using appropriate equations
			2	Students will be able to explain the concept of phase and phase diagram and understand the basic terminologies associated with metallurgy.
			3	Students will be able to Understand and suggest the heat treatment process and Suggest appropriate heat treatment process for a given application.
			4	Students will be able to Prepare samples of different materials for metallography.
			5	Students will be able to Understand the strengthening mechanisms and suggest appropriate NDT technique.
III	BTMCL305	Machine Drawing and Cad Lab	1	Students will be able to interpret the object with the help of given sectional and orthographic views.
			2	Students will be able to construct the curve of intersection of two solids
			3	Students will be able to draw machine element using keys, cotter, knuckle ,bolted and welded joints
			4	Students will be able to assemble details of any given parts i.e. Valve. Pumps, machine tool parts etc.
			5	Students will be able to represent tolerances and level of surface finish on production drawing
			6	Students will be able to explain different types of 2D and 3D commands.
III	BTMCL306	Mechanical Engineering Lab-I	1	Students will be able to evaluate bernoulli's theorem
			2	Students will be able to determine critical reynolds number using reynolds apparatus
			3	Students will be able to determine viscosity using viscometer
			4	Students will be able to determine brinell hardness and rockwell hardness number
			5	Students will be able to study microstructures of cast irons
			6	Students will be able to study microstructures of non-ferrous alloys
III		Constitution of India	1	Describe history of the constitution writing and its importance for building a democratic India.
			2	Explain the functioning of three wings of the government i.e., executive, legislative and judiciary.
			3	Explain the value of the fundamental rights and duties for becoming good citizen of India.
			4	Analyse the decentralization of power between central, state and local self-government.
			5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for democracy.
V	BTMC 501	Heat Transfer	1	Students will be able to define the important modes of heat transfer and state their applications

			2	Students will be able to apply the general one and three dimensional heat conduction equations for steady state with and without heat generation
			3	Students will be able to analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation
			4	Students will be able to discuss the radioactive heat transfer between different surfaces
			5	Students will be to evaluate the thermal design performance of various Heat Exchangers.
V	BTMC 502	Machine Design – I	1	Students will be able to explain traditional and modern design methods, including ISO 9000 standards, and integrate aesthetic and ergonomic considerations into design.
			2	Students will be able to explain theories of failure and use these theories to design machine elements such as cotter and knuckle joints under static loading conditions.
			3	Students will be able to explain stress concentration and fatigue failure, and use Soderberg and Goodman diagrams to design components subjected to fluctuating loads.
			4	Students will be able to design transmission shafts, keys, and couplings, considering factors such as strength, rigidity, and compliance with ASME code standards.
			5	Students will be able to explain different types of joints and design threaded joints, mechanical springs, power screws, and welded joints.
V	BTMC 503	Theory of Machines-II	1	Student will able to Identify and select type of belt drive for a particular application
			2	Student will able to Evaluate gear tooth geometry and select appropriate gears, gear trains
			3	Student will able to characterize flywheels as per application requirement
			4	Student will able to appy principles of gyroscopic effects in ships, aeroplanes, and road vehicles.
			5	Student will able to appy principles to analyse free and forced vibrations of single degree freedom systems
V	BTAPE504 D	Automobile Engineering	1	Students will be able to identify the different parts of the automobile.
			2	Students will be able to explain the working of various parts like Steering Systems and Suspension Systems
			3	Students will be able to identify and demonstrate various types of clutch, gear box and different drive systems; front and rear wheels, two and four wheel drive
			4	Students will be able to identify and explain various types of brake system, wheels and tyres in automobile
			5	Students will be able to analyze the environmental implications of automobile emissions and also able to apply vehicle troubleshooting and maintenance procedure and identify and explain electrical system in vehicles
V	BTMC506	Applied Thermodynamics	1	Students will be able to define key terms used in fuels and combustion and calculate the air required for the combustion of fuel.
			2	Students will be able to classify the different types of boilers and boiler draught and select them for different applications based on performance.

			3	Students will be able to explain and analyze gas power cycles, steam nozzle and vapor power cycles, and derive expressions for performance parameters.
			4	Students will be able to classify various types of condensers and nozzles, and derive equations related to their efficiency.
			5	Students will be able to construct p-v diagrams for single-stage reciprocating air compressors, with and without clearance volume, evaluate their performance, and differentiate between reciprocating and rotary air compressors.
V	BTMOE505 B	Renewable energy sources	1	Students will be able to Recall basic concepts of solar energy.
			2	Students will be able to explain the different types of solar collectors.
			3	Students will be able to Identify various applications of solar energy
			4	Students will be able to differentiate wind, biomass energies
			5	Students will be able to Compare the other renewable energy sources such as OTEC, Tidal, Geo-thermal, hydro-electric and Nuclear Energy.
V	BTMCL507	Mechanical Engineering Lab-III	1	Apply the general one and three dimensional heat conduction equations for steady state with and without heat generation.
			2	Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
			3	Students will be able to apply design principles to calculate the dimensions of machine component, and compile these calculations into a design report for practical application.
			4	Student will be able to analyze component behavior subjected to loads & identify failure criteria.
			5	Students will able to understand gear theory to design various gear trains and gear box.
			6	Students will able to demonstrate the kinematics of cams and followers, flywheel, governors, and their characteristics and also design cams and followers for specified motion profiles.
VII	BTMEC701	Mechatronics	1	Students will be able to explain working of various sensors used in mechatronics systems and their applications in engineering.
			2	Students will be able to explain signal conditioning & data representation techniques
			3	Students will able to design pneumatic and hydraulic circuits for a given application
			4	Students will be able to write a plc program using ladder logic for a given application
			5	Students will be able to apply block diagram reduction techniques in order to find a transfer function for a given system using.
			6	Students will be able to solve problems related to control systems by using the analytical skills.
VII	BTMOE704 B	Entrepreneurship Development	1	Students will be able to associate with rapid industrial development and discover entrepreneurship opportunities

			2	Students will be able to develop small and medium enterprises sector which is necessary for generation of employment
			3	Students will be able to predict potential of rural and backward regions for industrialization
			4	Students will be able to develop gainful self-employment to educated young men and women
			5	Students will be able to select the sources of entrepreneurship
VII	BTMPE703 C	Non-Conventional Machining	1	Students will be able to Understand the importance and trends in non-conventional machining processes
			2	Students will be able to describe the mechanism of material removal, key process parameters, and working principles of chemical and electrochemical machining techniques.
			3	Students will be able to Understand the process characteristics, parameters, and mechanisms of thermo-electrical machining processes like EDM, EBM, IBM, and PAM
			4	Students will be able to explain the principles and mechanisms of material removal in mechanical processes like USM, AJM, AFM, and water jet cutting.
			5	Students will be able to explain applications and benefits of advanced techniques like Shaped Tube Electrolytic Machining, Micro EDM, and ELID grinding.
			6	Students will be able to understand mechanism and working principle of micro machining using non-conventional processes.
VII	BTMEC705 B	Intellectual Property Rights	1	Students will be able to state the basic fundamental terms such as copyrights, patents, trademarks etc.,
			2	Students will be able to interpret laws of copy-rights, patents, trademarks and various ip registration processes.
			3	Students will be able to exhibit the enhance capability to do economic analysis of ip rights, technology and innovation related policy issues and firms commercial strategies.
			4	Students will be able to create awareness at all levels (research and innovation) to develop patentable technologies.
			5	Students will be able to apply trade mark law, copy right law, patent law and also carry out intellectual property audits
			6	Students will be manage and safeguard the intellectual property and protect it against unauthorized use
VII	BTMEC704	Industrial Engineering and Management	1	Students will be able to explain the historical development of management theories and apply fundamental principles of planning and organizing to real-world scenarios.
			2	Students will be able to describe human resource management strategies that enhance organizational performance and employee satisfaction.
			3	Students will be able to classify various production and operations management systems and apply them to enhance corporate profitability and competitiveness.
			4	Students will be able to apply operational systems for maximum efficiency and effectiveness.
			5	Students will be able to describe the historical development of industrial engineering and apply key principles to improve workplace efficiency.
			6	Apply ergonomic principles to design safer and more efficient work environments.

VII	BTMCL706	Mechanical Engineering Lab-V	1	Students will be able to demonstrate various types of sensors.
			2	Students will be able to perform speed control of various types of electrical motors.
			3	Students will be able to develop pneumatics circuits on pneumatic trainer kit.
			4	Students will be able to develop electro-pneumatics circuits on electro-pneumatic trainer kit.
			5	Students will be able to develop hydraulic circuits on hydraulic trainer kit.
			6	Students will be able to perform programming plc for given task.

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