MAR ATHANASIUS COLLEGE OF ENGINEERING KOTHAMANGALAM

MECHANICAL ENGINEERING DEPARTMENT LIST OF COURSE OUTCOME

B. TECH 2024 SCHEME

SEMESTER	SUBJECT CODE	SUBJECT NAME	CO NO:	CO DESCRIPTION
S1	B24MA1T01	LINEAR ALGEBRA AND MULTIVARIABLE CALCULUS	1	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms (Cognitive Knowledge level: Apply)
			2	Compute the partial and total derivatives and maxima and minima of multivariable functions (Cognitive Knowledge Level: Apply)
			3	Compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas. (Cognitive Knowledge Level: Apply)
			4	Compute the derivatives and line integrals of vector functions and learn their applications (Cognitive Knowledge Level: Apply)
			5	Evaluate surface and volume integrals and learn their inter-relations and applications. (Cognitive Knowledge Level: Apply)
S1	B24ES1T01B	PROBLEM SOLVING AND PROGRAMMING TECHNIQUES (B)	1	Understand fundamental computing concepts, including algorithms, pseudocode, flowcharts, and algorithmic problem-solving techniques. (Cognitive Knowledge Level: Apply)
			2	Develop proficiency in using Python's data structures, control flow statements, and loops to effectively manage and manipulate data. (Cognitive Knowledge Level: Apply)
			3	Acquire skills in defining and calling functions, using modules and packages, and working with Python's standard libraries to create modular and efficient code (Cognitive Knowledge Level: Apply)
			4	Learn file handling techniques in Python (Cognitive Knowledge Level: Apply)
			5	Utilize Python for mathematical computations and understand its role in data analysis. (Cognitive Knowledge Level: Analyse)
S1	B24ES1T07		1	Understand the fundamental concepts of electric circuits and apply circuit laws to solve basic

		FUNDAMEN- TALS OF ELECTRICAL ENGINEERING		DC electric circuits. (Cognitive Knowledge Level: Apply)
			2	Analyse the characteristics of DC machines and select appropriate machines for different applications. (Cognitive Knowledge Level: Analyse)
			3	Understand the fundamental concepts of AC systems and analyse single-phase AC circuits with series combinations of R, L, and C. (Cognitive Knowledge Level: Analyse)
			4	Explain the working of transformers and induction motors and identify their applications. (Cognitive Knowledge Level: Apply)
			5	Describe the operation of alternators and BLDC motors and their applications. (Cognitive Knowledge Level: Apply)
S1	B24ES1T05B	BASIC CIVIL AND MECHANICAL ENGINEERING (B)	1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering. (Cognitive Knowledge Level: Understand)
			2	Discuss the Materials, energy systems, water management and environment for green buildings. (Cognitive Knowledge Level: Apply)
			3	Explain different types of buildings, building components, building materials and building construction. (Cognitive Knowledge Level: Apply)
			4	Understand the basic Thermodynamic concepts and Illustrate the working of IC engines. (Cognitive Knowledge Level: Understand)
			5	Understand the basic principle of power transmission elements and material handling devices. (Cognitive Knowledge Level: Understand)
			6	Describe the fundamentals of Refrigeration and air conditioning systems and basic knowledge on manufacturing and metal joining processes. (Cognitive Knowledge Level: Apply)
S1	B24ME1T01	ENGINEERING GRAPHICS	1	Draw the projection of points and lines located in different quadrants. (Cognitive Knowledge Level: Analyse)
			2	Prepare multi view orthographic projections of objects by visualizing them in different positions. (Cognitive Knowledge Level: Apply)

			3	Draw sectional views and develop surfaces of a given object. (Cognitive Knowledge Level: Apply)
			4	Prepare pictorial drawings using the principle of isometric projections and convert 3D views to orthographic views. (Cognitive Knowledge Level: Analyse)
			5	Prepare pictorial drawings using the principle of perspective projections. (Cognitive Knowledge Level: Apply)
S1	B24ES1L04B	BASIC CIVIL AND MECHANICAL WORKSHOP	1	Identify and select appropriate plumbing materials for different applications and Familiarize with a range of building materials, their properties, and applications in construction. (Cognitive Knowledge Level: Apply)
			2	Develop proficiency in using standard measuring tape and digital distance measuring devices to accurately calculate the area of built-up spaces and small parcels of land and compute the area and or volume of various features in a structure. (Cognitive Knowledge Level: Apply)
			3	Develop skills in drawing foundation plans, indicating wall thickness and foundation width, emphasizing the importance of accurate planning in construction. (Cognitive Knowledge Level: Analyse)
			4	Identify and use various tools in carpentry & sheet metal work and perform multiple operations for the preparation of joints using wood and fabrication using sheet metal. (Cognitive Knowledge Level: Apply)
			5	Identify and use various tools in smithy & foundry and to practice forging, moulding, and casting. (Cognitive Knowledge Level: Apply)
			6	Identify and use various tools used in fitting and welding and perform operations such as chipping, filing, cutting, drilling, etc., and prepare multiple joints and welds. (Cognitive Knowledge Level: Analyse)
S1	B24ES1L01B	PROGRAMMING LAB (B)	1	Use fundamental Python constructs to solve basic computational problems (Cognitive Knowledge Level: Apply)
			2	Solve problems using data structures, logical conditions, and control loops enhancing their problem-solving skills (Cognitive Knowledge Level: Apply)
			3	Create functions and use inbuilt Python libraries to perform calculations and solve

				practical problems (Cognitive Knowledge Level: Apply)
			4	Manage and manipulate files and directories in Python (Cognitive Knowledge Level: Apply)
			5	Manipulate data using fundamental Python packages/libraries to perform mathematical operations and statistical analysis (Cognitive Knowledge Level: Analyse)
S1	B24MC1T01	LIFE SKILLS	1	Empower individuals with the knowledge and practical skills needed to navigate life challenges and to cope with emotions and stress. (Cognitive Knowledge Level: Apply)
			2	Develop a profound understanding of themselves and others, leading a fulfilling professional life by embracing a holistic approach to well being (Cognitive Knowledge Level: Analyze)
			3	Provide a solid foundation in leadership principles and team dynamics. (Cognitive Knowledge Level: Apply)
			4	Basic understanding of financial concepts for financial well being. (Cognitive Knowledge Level: Apply)
S1	B24MC1T02	DESIGN THINKING	1	Exhibit/show a thorough understanding of the fundamental principles of the de-sign thinking methodology. (Cognitive Knowledge Level: Understand)
			2	Utilize diverse techniques effectively to generate creative concepts, adopting in-novation and ideation. (Cognitive Knowledge Level: Apply)
			3	Demonstrate expertise in ideating prototypes, models, and proof-of-concept iterations. (Cognitive Knowledge Level: Analyse)
			4	Analyze real-world challenges and develop a practical design thinking framework suitable for their professional endeavors. (Cognitive Knowledge Level: Create)
S1	B24MC1L01	YOGA AND SPORTS	1	Demonstrate the need of physical activities and Yoga for the strength, flexibility, and relaxation of mind and body. (Cognitive Knowledge Level :Apply))
			2	Use scientific principles of exercise and training in daily routine. (Cognitive Knowledge Level :Apply)
			3	Apply first aid promptly and appropriately whenever and wherever the need arises. (Cognitive Knowledge Level: Apply)

			4	Understand the importance of postures and nutrition (Cognitive Knowledge Level: Understand)
S2	B24MA1T02	ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORMS	1	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients (Cognitive Knowledge Level: Apply)
			2	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent (Cognitive Knowledge Level: Apply)
			3	Determine the Taylor and Fourier series expansion of functions and learn their applications. (Cognitive Knowledge Level: Apply)
			4	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering (Cognitive Knowledge Level: Apply)
			5	Compute Laplace transform and apply them to solve ordinary differential equations arising in engineering (Cognitive Knowledge Level: Apply)
S2	B24PH1T01B	ENGINEERING PHYSICS (B)	1	Analyze the phenomenon of oscillations and quantify the distinction between undamped, damped and forced oscillations. (Cognitive Knowledge Level: Apply)
			2	Apply laws of Physics in the design and analysis of different types of sensors. (Cognitive Knowledge level: Apply)
			3	Understand the different types of chemical bonds, the concept of dislocations in materials and their influence on the mechanical properties of materials. (Cognitive Knowledge level: Apply)
			4	Quantify architectural and acoustic characteristics of buildings, gain familiarity with the principles and applications of ultrasonic testing for flaw detection and the design of ultrasonic transducers and systems. (Cognitive Knowledge level: Apply)
			5	Understand the principle and structure of lasers and the working of optical fibers. (Cognitive Knowledge level: Apply)
S2	B24CY1T01A	ENGINEERING CHEMISTRY (A)	1	Develop a comprehensive understanding of nanoscale materials, including their

				synthesis, fundamental properties and diverse applications. (Cognitive Knowledge Level: Apply)
			2	Understand the principles and applications of various spectroscopic techniques and microscopic techniques such as SEM. (Cognitive Knowledge Level: Apply)
			3	Demonstrate an inclusive understanding of the principles of electrochemistry and corrosion. Also gain knowledge about various corrosion control methods. (Cognitive Knowledge Level: Apply)
			4	Learn about the basics of energy harvesting methods and its application. Apply the knowledge of battery, hydrogen generation and fuel cells in engineering. (Cognitive Knowledge Level: Apply)
			5	Apply the knowledge of conducting polymers and advanced materials in engineering. (Cognitive Knowledge Level: Apply)
S2	B24ES1T08	FUNDAMEN- TALS OF ELECTRONICS ENGINEERING	1	Identify the active and passive electronic components and their specifications. (Cognitive Knowledge Level-Remember).
			2	Understand the working principle of semiconductor devices and Analyze different types of rectifier circuits (Cognitive Knowledge Level-Apply).
			3	Comprehend the structure and operation of bipolar junction transistors and Explain the working principle of amplifiers (Cognitive Knowledge Level-Understand).
			4	Identify and describe the basic functions and types of operational amplifiers filters, and signal converters (Cognitive Knowledge Level-Apply).
			5	Demonstrate proficiency in electronic instrumentation and digital electronics (Cognitive Knowledge Level-Understand).
S2	B24ME1T02	STATICS AND DYNAMICS FOR ENGINEERS	1	Understand the rigid body mechanics theorems and principles. (Cognitive Knowledge Level: Apply)
			2	To apply the conditions of equilibrium to various practical problems involving different force systems. (Cognitive Knowledge Level: Apply)
			3	Determine the centroid and moment of inertia of various surfaces and solids. (Cognitive Knowledge Level: Apply)

			4	To apply principles of kinematics to bodies in motion. (Cognitive Knowledge Level: Apply)
			5	To solve problems involving rigid bodies, applying the properties of distributed areas and Masses. (Cognitive Knowledge Level: Apply)
S2	B24ES1L05	ELECTRICAL AND ELECTRONICS WORKSHOP	1	Identify electrical symbols, measuring instruments, accessories, and tools used for electrical wiring. (Cognitive Knowledge Level: Apply)
			2	Understand the distribution system and safety measures against electrical shocks and select the fuse unit for a given electrical circuit. (Cognitive Knowledge Level – Understand)
			3	Analyze the performance of AC and DC machines. (Cognitive Knowledge Level – Analyze)
			4	Demonstrate proficiency in identifying various electronic components, including active, passive, electrical, electronic, and electromechanical components. (Cogni- tive Knowledge Level-Understand)
			5	Develop and illustrate electronic circuit diagrams using recognized standards such as BIS/IEEE symbols and utilize Electronic Design Automation (EDA) tools for schematic capture and simulation. (Cognitive Knowledge Level-Apply)
			6	Design and fabricate electronic circuits on boards, trouble shooting of minor problems in electronic equipment and handling of test and measuring equipment. (Cognitive Knowledge Level-Apply)
S2	B24ME1L01	COMPUTER AIDED MACHINE DRAWING	1	Apply the knowledge of engineering drawings and standards to prepare standard dimensioned drawings of machine parts and other engineering components. (Cog- nitive Knowledge Level: Apply)
			2	Apply limits and tolerances to components and choose appropriate fits for given assemblies, surface roughness required. (Cognitive Knowledge Level: Apply)
			3	Draw the machine elements detachable joints. (Cognitive Knowledge Level: Un- derstand)
			4	Draw the machine elements permanent joints. (Cognitive Knowledge Level: Un- derstand)

			5	Prepare part and assembly drawings and Bill of Materials of machine components and valves using CAD software. (Cognitive Knowledge Level: Apply)
S2	B24PH1L01B	ENGINEERING PHYSICS LAB (B)	1	Develop analytical / experimental skills and impart prerequisite hands-on experience for engineering laboratories. (Cognitive Knowledge Level: Apply)
			2	Understand the need for precise measurement practices for data recording. (Cognitive Knowledge Level: Apply)
			3	Understand the principle, concept, working and applications of relevant technologies and compare results with theoretical calculations. (Cognitive Knowledge Level: Apply)
			4	Develop technical skills associated with the usage of modern scientific tools. (Cognitive Knowledge Level: Apply)
			5	Develop basic communication skills through working in groups in performing the laboratory experiments and interpreting the results. (Cognitive Knowledge Level: Apply)
S2	B24CY1L01A	ENGINEERING CHEMISTRY LAB (A)	1	Understand and practice fundamental techniques in chemistry to generate experimental skills. (Cognitive Knowledge Level: Apply)
			2	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments. (Cognitive Knowledge Level: Apply)
			3	Acquire the ability to understand different methods of chemical synthesis and instrumental techniques to solve various engineering problems. (Cognitive Knowledge Level: Apply)
			4	Function as a team member, communicate effectively and engage in further learning while carrying out the experiment. (Cognitive Knowledge Level: Apply)
			5	Understand the importance of chemistry in the curriculum and how it addresses the social, economical and environmental problems. (Cognitive Knowledge Level: Apply)
S2	B24MC1T03	PROFESSIONAL COMMUNICA- TION AND ETHICS	1	Expand vocabulary and linguistic proficiency pertinent to the field of engineering

				(Cognitive Knowledge Level: Apply)
			2	Examine, comprehend, and succinctly describe a range of textual material. (Cognitive Knowledge Level: Apply)
			3	Produce clear, technically sound documents and presentations that follow all required conventions. (Cognitive Knowledge Level: Apply)
			4	Manifest acute ethical awareness and effectively apply ethical principles in practical engineering scenarios. (Cognitive Knowledge Level: Apply)
			5	Analyze and address global ethical issues, showcasing an understanding of their roles as ethical leaders and contributors to technological development. (Cognitive Knowledge Level: Apply)
S2	B24MC1L02	IDEA LAB	1	Create 2D and 3D models using appropriate tools. (Cognitive Knowledge Level : Analyse)
			2	Design and fabricate circuits using PCB Design and fabrication mechanisms. (Cognitive Knowledge Level : Analyse)
			3	Develop project using appropriate Micro controller Programming. (Cognitive Knowledge Level: Apply)
			4	Build a product for some applications using design and fabrication technologies. (Cognitive Knowledge Level: Create)
			5	Create electronic documentation for the system/project using appropriate tools .(Cognitive Knowledge Level: Apply)