Lokmanya Tilak Jankalyan Shikshan Sanstha's
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DEPARTMENT OF MECHANICAL ENGINEERING
Academic Session 2024-25
COURSE OUTCOMES (COs)

B.Tech III Semester

Course Name: Applied Mathematics – III	**Course Code: BTME301T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Solve ordinary, integral, and integro-differential equations using Laplace Transform.
CO2	Analyze periodic functions with Fourier series and solve integral equations using Fourier Transform.
CO3	Apply differentiation, integration, and expansion of complex functions to evaluate integrals.
CO4	Solve partial differential equations using separation of variables.
CO5	Solve real-world problems using matrices.

Course Name: Manufacturing Processes	**Course Code: BTME302T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Demonstrate pattern making and moulding techniques, and design gating systems with suitable furnaces and casting methods.
CO2	Describe welding processes, types, defects, and their applications.
CO3	Illustrate metal forming processes and the working of rolling machines.
CO4	Explain press working processes, dies, and shaping operations.
CO5	Summarize the properties, applications, and forming methods of plastics, ceramics, and glasses.

Course Name: Manufacturing Processes	**Course Code: BTME302P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply engineering concepts in manufacturing through hands-on activities.
CO2	Interpret the use and importance of manufacturing techniques in real industries.
CO3	Design gating and riser systems for making defect-free castings.
CO4	Analyze welding settings and materials to make strong welded joints.
CO5	Describe how plastic, glass, and ceramic materials are processed and used in industries.

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COURSE OUTCOMES (COs)

Course Name: Fluid Mechanics	**Course Code: BTME303T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze fluid properties and flow types in real-world applications.
CO2	Apply fluid statics to find pressure, buoyancy, and stability.
CO3	Solve fluid dynamics problems using Bernoulli's and Navier-Stokes equations.
CO4	Differentiate between laminar and turbulent flows, and use dimensional analysis.
CO5	Calculate energy losses in pipes and analyze lift and drag forces.

Course Name: Kinematics of Machines	**Course Code: BTME304T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Evaluate motion and forces through kinematic and dynamic analysis. (Displacement, Velocity, acceleration, Inertia forces) of a given mechanism Using analytical and graphical method.
CO2	Generalize concept of compliant mechanisms.
CO3	Contrive or synthesize new mechanisms for specific requirements and Perform computer aided analysis of simple mechanisms.
CO4	Construct cam profiles and analyze the follower motion.
CO5	Distinguish geometry of gear, its types, identify the forces and motions of gear teeth. outline the gear trains and governors.

Course Name: Machine Drawing and Solid Modeling	**Course Code: BEME305P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Describe basic elements of machine drawings like lines, dimensions, tolerances, and symbols.
CO2	Create 2D detailed and sectional views from isometric drawings using standard drafting methods.
CO3	Apply Geometric Dimensioning and Tolerancing (GD&T) principles to make accurate part and assembly drawings.

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COURSE OUTCOMES (COs)

Course Name: Material Science and Engineering	**Course Code: BTME306T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Interpret microstructures and the Iron-Iron Carbide diagram to understand the effect of crystalline structure on metals.
CO2	Classify commercial steels based on their properties and industrial uses.
CO3	Apply suitable heat treatment processes based on material needs.
CO4	Evaluate different types of cast iron and their properties for engineering applications.
CO5	Explain the basics of powder metallurgy and its application in making components.

Course Name: Skill Development- (Basics of Computer Aided Drafting)	**Course Code: BTME307P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Create simple parts, assemblies, and drawings.
CO2	Use feature-based tools to build, review, and modify models.
CO3	Create assemblies and analyze their functionality.
CO4	Produce drawings with different views.
CO5	Apply dimensions and annotations to drawings.

Course Name: Sports	**Course Code: BTME308P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply the importance of physical fitness for well-being.
CO2	Demonstrate team spirit and leadership in group sports.
CO3	Practice ethical behavior, sportsmanship, and fair play.
CO4	Recognize the role of sports in mental health, social responsibility, and sustainable living.
CO5	Communicate effectively and manage events collaboratively in teams.

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DEPARTMENT OF MECHANICAL ENGINEERING
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COURSE OUTCOMES (COs)

B.Tech IV Semester

Course Name: Machining Processes	**Course Code: BTME401T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain fundamentals of metal cutting
CO2	Describe basic construction and operations of lathe shaping, planning
CO3	Illustrate basics of milling and milling cutters. slotting
CO4	Describe the surface finishing processes.
CO5	Explain the basics of drilling, boring, reaming and broaching.

Course Name: Machining Processes	**Course Code: BTME401P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Describe basic cutting tools.
CO2	Explain Working of lathe and turning operation.
CO3	Demonstrate Shaping and planning operation.
CO4	Illustrate Milling and drilling operation.
CO5	Describe Grinding and surface finishing.

Course Name: Hydraulic Machines	**Course Code: BTME402T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Classify turbomachines, components of HEPP, and design a Pelton wheel.
CO2	Design Francis and Kaplan turbines and their governing systems.
CO3	Design of centrifugal Pumps.
CO4	Design of reciprocating Pumps.
CO5	Explain various Water Lifting Devices.

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COURSE OUTCOMES (COs)

Course Name: Fluid Mechanics & Hydraulic Machines	**Course Code: BTME402P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain what is Stability condition of floating bodies, Law of conservation of Energy.
CO2	Apply Frictional losses and Hydraulic co-efficient in the pipe flow.
CO3	Estimate the Performance characteristics of Pelton Turbine
CO4	Estimate the Performance characteristics of Francis Turbine & Kaplan Turbine.
CO5	Estimate the Performance characteristics of Centrifugal Pump & Reciprocating Pump.

Course Name: Mechanics of Material	**Course Code: BTME403T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain the fundamental concepts of various types of loading and the resulting stresses induced in structural members.
CO2	Construct Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD) for beams under different loading and support conditions
CO3	Estimate strain energy in mechanical elements and analyze deflection in beams using appropriate methods.
CO4	Design shafts subjected to various loading conditions based on strength and stiffness criteria.
CO5	Interpret the theories of failure and evaluate the design of columns and struts for effective load-bearing performance.

Course Name: Material Testing Lab	**Course Code: BTME403P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze the microstructure of ferrous and non-ferrous materials to determine their mechanical properties.
CO2	Apply the principles of tensile and shear forces to real-life engineering problems involving different materials.
CO3	Explain the microstructures of materials and relate them to their functional applications.
CO4	Measure torsional strength and hardness of materials using appropriate testing methods.
CO5	Integrate fundamental material science concepts in the design of engineering components.

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Course Name: Engineering Thermodynamics	**Course Code: BTME404T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply thermodynamic concepts and ideal gas laws to determine energy transfer in terms of heat and work for different processes.
CO2	Evaluate energy interactions in open and closed systems, thermal components, and devices using the first law of thermodynamics.
CO3	Evaluate the performance of heat engines, heat pumps, and refrigerators using the second law of thermodynamics and entropy concepts.
CO4	Analyze steam properties and thermodynamic processes using steam as the working fluid to determine energy transfer in terms of heat and work.
CO5	Compare various power cycles to determine energy transfer and assess their efficiencies.

Course Name: Computer Programming	**Course Code: BTME405P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain basic programming concepts such as data types, input/output functions, operators, control structures, and user-defined functions.
CO2	Develop the ability to write optimized, robust, and reusable C programs by applying best practices in coding.
CO3	Apply concepts of data structures such as arrays and structures to implement programs for solving various practical problems.

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Course Name: Professional Ethics	**Course Code: BTME406T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Illustrate the basic purpose of the profession, professional ethics and various moral and social issues.
CO2	Analyze various moral issues and theories of moral development.
CO3	Realize their roles of applying ethical principles at various professional levels
CO4	Identify their responsibilities for safety and risk benefit analysis.
CO5	Interpret their roles in dealing various global issues

Course Name: Skill Development- (Training on MATLAB)	**Course Code: BTME407P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Develop MATLAB models for mechanical engineering applications such as dynamic and static systems.
CO2	Design MATLAB-based simulations to analyze mechanical vibrations and control systems.
CO3	Simulate mechanical engineering problems using MATLAB to predict system behavior.
CO4	Test and validate MATLAB models to ensure their accuracy before real-world application.
CO5	Solve engineering problems related to statics, vibrations, and control systems using MATLAB tools.

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DEPARTMENT OF MECHANICAL ENGINEERING
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COURSE OUTCOMES (COs)

B.Tech V Semester

Course Name: Heat Transfer	**Course Code: BTME501T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain different modes of heat transfer, calculate thermal resistance and heat transfer through plane and composite walls, cylinders, and spheres, with and without thermal contact resistance.
CO2	Apply the concept of internal heat generation to compute heat transfer in plane walls, cylinders, and spheres; explain the role of various fins and analyze their significance in steady-state conduction; interpret the concept of unsteady-state heat transfer.
CO3	Apply appropriate empirical correlations to estimate forced and natural convection heat transfer for internal and external flows.
CO4	Evaluate radiative heat transfer from ideal and real surfaces, including enclosures of various geometries.
CO5	Evaluate heat exchanger performance based on given conditions and design appropriate heat exchanger geometries to meet specified heat transfer requirements.

Course Name: Heat Transfer Lab	**Course Code: BTME501P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Determine the heat transfer rates through various cross-sections and mediums in different modes.
CO2	Acquire, tabulate, analyze experimental data, and draw interpretation and conclusions.
CO3	Calculate radiation heat transfer and utilize that knowledge in designing any heat transfer application.
CO4	Describe heat exchanger analysis.
CO5	Select the proper heat exchangers per system requirements.

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COURSE OUTCOMES (COs)

Course Name: Energy Conversion-I	**Course Code: BTME502T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze steam generators (boilers), boiler mountings & accessories, and evaluate boiler performance parameters.
CO2	Evaluate fluidized bed boilers, various draught systems, and performance parameters of natural draught systems (chimney).
CO3	Determine the throat area, exit area, and exit velocity of steam nozzles; and compare impulse and reaction turbines including governing methods.
CO4	Analyze compounding methods, energy losses, and velocity diagrams to evaluate blade angles, work done, thrust, power, and turbine efficiencies.
CO5	Classify steam condensers and cooling towers, and evaluate the performance of surface condensers.

Course Name: Design of Machine Elements	**Course Code: BTME503T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply principals of static loading for design of Cotter joint, Knuckle joint.
CO2	Design bolted, welded joints, power screws & pressure vessels
CO3	Design the power transmission shaft & coupling
CO4	Analyze components subjected to fatigue and bending stresses in curved beam designs such as crane hooks and C-Frames.
CO5	Design clutches, brakes and springs

Course Name: Industrial Economics & Management	**Course Code: BTME504T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Discuss the concept of demand and supply and demonstrate its relationship with price.
CO2	Identify and classify various factors of production with reference to different economic sectors.
CO3	Analyze the causes and effects of inflation and differentiate between various types of market structures.
CO4	Describe the functions of management and illustrate the principles of marketing management.
CO5	Interpret the concepts of financial management and evaluate their role in business growth.

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COURSE OUTCOMES (COs)

Course Name: Mechanical Measurement and Metrology	**Course Code: BTME505T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze statistical characteristic of system.
CO2	Evaluate the system response.
CO3	Illustrate the instrumentation process.
CO4	Differentiate limits, fits and tolerance.
CO5	Demonstrate the basics of various metrology measurement terms and technique.

Course Name: Mechanical Measurement and Metrology Lab	**Course Code: BTME505P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Perform the instrumentation.
CO2	Use the instrumentation for measurement of thermal properties.
CO3	Obtain the response from the instruments also can be able to calibrate the instruments.
CO4	Calculate the limits and allowances to obtain the proper fit.
CO5	Illustrate the surface roughness using optical flat.

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Course Name: Industrial Visit	**Course Code: BTME506P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Interact effectively with industry experts to gain practical insights and professional guidance.
CO2	Reflect on and document the learning experiences gained through industry exposure.
CO3	Demonstrate increased employability by understanding industry expectations and exploring opportunities such as PPOs.
CO4	Develop interpersonal and teamwork skills through collaborative activities and professional interactions.
CO5	Outline in-depth knowledge of industrial processes and innovative technologies used in modern industries.

Course Name: Performing Art	**Course Code: BTME507P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Develop problem-solving skills applicable to real-world scenarios.
CO2	Enhance analytical thinking to assess and interpret various situations effectively.
CO3	Demonstrate effective communication skills suitable for professional and academic environments.
CO4	Apply essential soft skills required for employability in reputed companies.
CO5	Explore diverse career opportunities and make informed decisions for future growth.

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COURSE OUTCOMES (COs)

B.Tech VI Semester

Course Name: Automaton in Production	**Course Code: BTME601T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain automation, its types, strategies, assembly line balancing and its analysis, and methods of work part transport.
CO2	Recognize fundamentals and constructional features of N.C, CNC and D.N.C machines and prepare a CNC program for given part.
CO3	Apply the knowledge of Robotic Configuration, Types of Links, Joints, Grippers, Industrial Robotics and Robot Applications
CO4	Analyze automated material handling systems, including automated storage and retrieval systems (AGVS, AS/RS), and their operational characteristics.
CO5	Describe automated inspection systems (CAPP, CAQC, CMM) and the concept of Group Technology.

Course Name: Automaton in Production	**Course Code: BTME601P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Recognize automation, corroborating this knowledge with case studies on automation systems. study and analyze the material handling systems, robots and GT.
CO2	Demonstrate NC programming (manual/apt).
CO3	Simulate program on CNC milling/ lathe.
CO4	Work on CNC milling/ lathe.

Course Name: Energy Conversion-II	**Course Code: BTME602T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain the construction and working of I.C. engines, stages of combustion in SI & CI engines, knocking, supercharging, and fuel supply systems.
CO2	Evaluate the performance parameters of I.C. engines and heat balance sheet.
CO3	Analyze the working of refrigeration systems and problems related to single-stage vapor compression refrigeration cycle.
CO4	Apply the principles of air-conditioning systems to solve problems based on psychrometric properties and processes.
CO5	Compare different types of air compressors and performance parameters of reciprocating air compressors.

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COURSE OUTCOMES (COs)

Course Name: Energy Conversion Lab	**Course Code: BTME602P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Discuss the different components of I.C. engine, air compressor and Vapour Compression Refrigeration system (VCRS)
CO2	Demonstrate and determine the performance parameters of I.C. engine and preparation of its Heat balance sheet
CO3	Determine B.E, IP, and F.P. by using Morse Test on Multi cylinder C.I. Engine or S.I. Engine
CO4	Demonstrate and determine the performance parameters of Vapour Compression Refrigeration system.
CO5	Analyze the performance parameters of Multistage reciprocating air compressor

Course Name: Dynamics of Machines	**Course Code: BTME603T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Comprehend the machine dynamics through basic principles to interpret their application and examine near to life problems due gyroscopic effects and determine the conditions for stability of ships, airplanes and automobile.
CO2	Diagnose dynamic force conditions in planer linkages and cams to determine required driving torque condition (graphically/ analytically).
CO3	Estimate the unbalanced forces due to rotating and reciprocating masses in a mechanical system and calculate (graphically/ analytically) the balancing masses required for safe/ smooth operation of these mechanical systems.
CO4	Identify the requirement of flywheel, brakes, and dynamometers in a mechanical system and calculate inertia of flywheel and braking condition to be incorporated in engines and machines.
CO5	Recognize and interpret the concept of vibration in various mechanical systems and distinguish vibration characteristics for 1 & 2 DOF systems to evaluate the conditions for its control/ use.

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Course Name: Dynamics of Machines	**Course Code: BTME603P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Demonstrate the concept of gyroscopic effect through the working model.
CO2	Analyze the performance of mechanisms and perform dynamic force analysis of linkages and cams.
CO3	Demonstrate record and interpret data of vibration characteristics of mechanical vibratory systems.
CO4	Perform analysis of brakes, dynamometers and flywheels.
CO5	Identify the importance of safety, team work and effective communication for conduction of activity.

Course Name: Operation Research (Elective-I)	**Course Code: BTME604T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Formulate real-world problems into mathematical models and synthesize optimal solutions using algorithms like simplex or dynamic programming.
CO2	Apply Operations Research models to solve practical problems such as production scheduling or logistics optimization.
CO3	Optimize project parameters using CPM/PERT techniques and analyze trade-offs to ensure efficient resource allocation.
CO4	Evaluate equipment replacement strategies by comparing maintenance costs, depreciation, and performance metrics to justify optimal replacement intervals.
CO5	Design simulation models to test system behavior under varying conditions and propose data-driven improvements.

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COURSE OUTCOMES (COs)

Course Name: Advanced Manufacturing Techniques (Elective II)	**Course Code: BTME605T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain Non-Traditional Machining processes along with their need, economics, applications, historical development, and the basics of High-Speed Grinding, Hot and Cold Machining.
CO2	Illustrate the working principles of Abrasive Jet Machining (AJM), Ultrasonic Machining, and Water Jet Machining.
CO3	Describe the principles and operations of Electrochemical Machining (ECM), Electrochemical Grinding (ECG), Electric Discharge Machining (EDM), Electron Beam Machining (EBM), Laser Beam Machining (LBM), and Plasma Arc Machining (PAM).
CO4	Explain the fundamentals of Unconventional Welding Techniques and Solid Phase Welding Techniques.
CO5	Describe the basic principles of Advanced Casting Processes.

Course Name: Environmental Engineering (Open Elective-I)	**Course Code: BECVE605T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explore the components of biosphere and impact of human activity on environment.
CO2	Summarize the causes and sources of pollutants, and their impact on global environment
CO3	Develop ethics and scientific awareness about waste generation and treatment.
CO4	Identify sources and types of wastes and its management.
CO5	Report noise, noise pollution and control.

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COURSE OUTCOMES (COs)

Course Name: Data Science (Open Elective-I)	**Course Code: BEIT605T.1**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply quantitive modelling and data analysis techniques.
CO2	Apply principle of data science techniques to the analysis of business problem.
CO3	Use of Numpy libries and Pandas Libries for Data Analysis.
CO4	Display data graphical way by using Libries matplotlib and seaborn.
CO5	Build machine learning intelligence.

Course Name: Environment Science	**Course Code: BTME607T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Identify different types of air pollutions as well as explain their causes, detrimental effects on environment and effective control measures.
CO2	Recognize various sources of water pollutants and interpret their causes and design its effective control measure.
CO3	Illustrate various types of pollutants and waste management.
CO4	Analyze various issues related to environment and challenges in implementation of environmental laws.

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DEPARTMENT OF MECHANICAL ENGINEERING
Academic Session 2024-25
COURSE OUTCOMES (COs)

B.Tech VII Semester

Course Name: Computer Aided Design (Elective – III)	**Course Code: BTME701T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Design graphic systems by selecting suitable input/output devices and developing algorithms for geometrical entities, and implement them as computer programs.
CO2	Develop algorithms for 2D and 3D geometric transformations using mathematical formulations and convert them into computer programs.
CO3	Explain geometric modeling techniques, synthetic curves, methods of assembly modeling, and parametric representations of space curves and surfaces.
CO4	Apply the finite element method to one-dimensional problems for determining field variables using numerical analysis techniques.
CO5	Analyze trusses and beams using the finite element method to compute nodal displacements, reaction forces, and element stresses.

Course Name: Advancements in Automobile Engineering (Elective – III)	**Course Code: BTME701T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Classify the main components of an automobile and explain the construction and working of IC engines, fuel supply, cooling, and lubrication systems.
CO2	Illustrate the working and applications of automobile clutches, gearboxes, and transmission components such as the propeller shaft, drive systems, differential, and axles.
CO3	Describe steering, suspension, and brake systems along with their components and applications.
CO4	Demonstrate automotive safety considerations, recent safety technologies, and procedures for maintenance, troubleshooting, servicing, overhauling, and engine tune-up.
CO5	Explain the working principles of electric, hybrid, and fuel cell vehicles, and the significance of alternative energy sources, pollution norms, and control methods.

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COURSE OUTCOMES (COs)

Course Name: Computer Aided Design (Elective – III)	**Course Code: BTME701P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Develop algorithms to construct geometric entities and generate corresponding computer programs.
CO2	Analyze engineering problems by developing finite element models, applying boundary and loading conditions, and solving them using analysis software.
CO3	Write computer programs to perform 2D and 3D transformations on geometric objects.
CO4	Generate 2D and 3D geometric models of engineering objects using construction and modification commands in CAD software.

Course Name: Advancements in Automobile Engineering (Elective – III)	**Course Code: BTME701P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain the basic concepts, requirements, and working principles of various automobile components.
CO2	Demonstrate the procedures for assembling and disassembling the engine, clutch, and brakes, as well as the processes of wheel alignment, balancing, and battery testing.
CO3	Identify the components of the transmission system, brakes, steering, and suspension systems.
CO4	Describe the fundamentals of automotive electronics and recent technological advancements in automobiles.
CO5	Explain the importance of safety considerations in automobiles, along with maintenance and overhauling procedures.

Course Name: Energy Conversion-III	**Course Code: BTME702T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze the performance of gas turbines and jet propulsion systems under varied conditions.
CO2	Design hydraulic circuits by selecting appropriate pumps and valves.
CO3	Design pneumatic circuits using suitable air compressors and control valves.
CO4	Explain the working of solar power systems and their future opportunities.
CO5	Describe various non-conventional energy sources and their applications.

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Course Name: Bioengineering (Open Elective-II)	**Course Code: BEETC-704OE**
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze the biomedical signal.
CO2	Compare biomedical sensor.
CO3	Categorize X-ray,MRI,CT,VR technologies and infra red imaging.
CO4	Discuss different medical instruments & their applications.
CO5	Summarize hospital information system as well as simulation technologies.

Course Name: Design of Transmission Systems	**Course Code: BTME704T**
COs	**Statement**
At the end of course students will be able to –	
CO1	Select appropriate journal, thrust, and rolling contact bearings based on load, speed, and application requirements.
CO2	Optimize flexible transmission drives by evaluating power transmission efficiency, wear resistance, and operational constraints.
CO3	Synthesize spur and helical gear designs by applying gear mechanics, material selection, and stress analysis to meet torque and speed requirements.
CO4	Construct worm and bevel gear systems by integrating geometric, thermal, and lubrication considerations for efficient power transmission.
CO5	Develop flywheel designs for energy storage by balancing inertia, material strength, and rotational speed to minimize energy loss.

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COURSE OUTCOMES (COs)

Course Name: Summer Internship	**Course Code: BTME705P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Apply mechanical engineering concepts in real-world industrial or research settings.
CO2	Examine industrial processes, machinery, and maintenance practices relevant to mechanical engineering.
CO3	Analyze the role of mechanical systems in achieving productivity, safety, and efficiency within an organization.
CO4	Develop technical and professional skills through hands-on experience and interaction with industry professionals.
CO5	Prepare a comprehensive report and presentation summarizing the internship experience, key learning, and project contributions.

Course Name: Project Phase I	**Course Code: BTME706P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Identify and define a real-world engineering problem through literature survey and gap analysis.
CO2	Formulate project objectives, scope, and methodology.
CO3	Apply mechanical engineering fundamentals to develop a conceptual solution/design.
CO4	Demonstrate teamwork, planning, and time management skills.
CO5	Prepare and present a structured technical report.

Course Name: Employability Enhancement	**Course Code: BTME707P**
COs	**Statement**
At the end of course students will be able to –	
CO1	Improve aptitude, logical reasoning, and analytical thinking relevant to engineering problem-solving.
CO2	Develop effective verbal and written communication skills for technical and professional interactions.
CO3	Exhibit teamwork, leadership, and interpersonal skills through group tasks and activities.
CO4	Demonstrate awareness of industry expectations and career readiness through mock interviews, GDs, and resume preparation.
CO5	Develop lifelong learning habits and adaptability for professional growth in changing technology landscapes.

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COURSE OUTCOMES (COs)

B.Tech VIII Semester

Course Name: Industrial Engineering	Course Code: BTME801T
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze the impact of productivity and method study on work efficiency.
CO2	Design ergonomically sound systems based on accurate work time measurements.
CO3	Apply forecasting techniques and breakeven analysis for decision-making in operations.
CO4	Evaluate maintenance strategies to improve equipment reliability and operational efficiency.
CO5	Identify quality control tools and techniques to improve product quality.

Course Name: Refrigeration & Air-conditioning (Elective – IV)	Course Code: BTME802T
COs	**Statement**
At the end of course students will be able to –	
CO1	Analyze the basic concepts of refrigeration, refrigeration cycles, and types of refrigerants.
CO2	Describe the working principles of vapour absorption refrigeration, air refrigeration systems, and applications of cryogenics.
CO3	Apply the concept of psychrometry to perform heat load calculations.
CO4	Explain the concept and functioning of air distribution systems and air handling units.
CO5	Design air-conditioning systems and select appropriate control devices for applications.

Course Name: Refrigeration & Air-conditioning (Elective – IV)	Course Code: BTME802P
COs	**Statement**
At the end of course students will be able to –	
CO1	Evaluate the performance of vapour compression refrigeration systems.
CO2	Analyze the components of refrigeration system and Absorption Refrigeration System.
CO3	Synthesize the concept of compound refrigeration system.
CO4	Explain the maintenance and analysis of refrigeration system.
CO5	Identify the concept of Psychometry and comfort air conditioning.

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Course Name: Total Quality Management (Elective – V)	Course Code: BTME803T
COs	**Statement**
At the end of course students will be able to –	
CO1	Explain quality concepts.
CO2	Implement the Total Quality Principles to employees and supplier partnership. Apply Total Quality Principles in employee and supplier partnerships.
CO3	Implement Statistical Process Control and Process Capability techniques to enhance quality.
CO4	Utilize tools for implementing Total Quality Principles.
CO5	Describe quality systems, quality audits, leadership roles, quality councils, and software used in TQM.

Course Name: Green & Sustainable Manufacturing (Elective – VI)	Course Code: BTME804T
COs	**Statement**
At the end of course students will be able to –	
CO1	Describe the current global and Indian manufacturing scenarios and environmental challenges.
CO2	Explain the concept and need of green manufacturing in the global and Indian context.
CO3	Identify key green manufacturing operational technologies, approaches, strategies, and elements.
CO4	Summarize international and national green regulations and treaties supporting green manufacturing.
CO5	Analyze the conceptual green manufacturing model, performance measurement tools, green economics, and sustainability assessment tools including Life Cycle Assessment.

Course Name: Project Phase II	Course Code: BTME805P
COs	**Statement**
At the end of course students will be able to –	
CO1	Implement the proposed design/solution using appropriate tools, techniques, and engineering practices.
CO2	Analyze the performance of the developed system/product using experimental or simulation methods.
CO3	Evaluate the results with respect to design objectives, constraints, and standards to ensure effectiveness and feasibility.
CO4	Demonstrate professional skills including teamwork, project management, ethics, and communication during project execution.
CO5	Present the project outcomes through a comprehensive report, technical paper/poster, and viva-voce.

Head of Department