

B.Tech (Mechanical Engineering)	
1st SEMESTER	
Course Name: Chemistry-1 (BTCH101-18)	
CO1	State the periodic functions, theories and solutions of Quantum mechanics.
CO2	Explain spectroscopic techniques and behaviour of metallurgical systems.
CO3	Explain the principles of intermolecular interactions and geometrical features of stereochemistry.
CO4	State the organic reactions, basic principles and the processes of thermodynamic system.
CO5	Illustrate the properties of water corrosion and its remedial effects.
Course Name: Chemistry-1 Lab (BTCH102-18)	
CO1	Synthesize a small drug molecule and analyse a salt sample
CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water
CO3	Analyze the acid content of different lubricating oils used in daily life.
CO4	Acquire some technical, theoretical as well as a practical knowledge for introduction to principles and techniques of chromatography
CO5	Study the arrangement of atoms in different structures.
Course Name: Maths -I (BTAM101-18)	
CO1	To recall Rolle's theorem and discuss its applicability to different engineering problems and to extend the use of differentiation
CO2	Integration to calculate maxima, minima, improper integrals and its applications.
CO3	To gain the knowledge of different concepts of differentiation and integration and demonstrate its applications.
CO4	To discuss the convergence of sequence and series and to apply different tests of convergence.
CO5	To understand essential tool of matrices and linear algebra in a comprehensive manner.
Course Name: Programming for Problem Solving (BTPS 101-18)	
CO1	Explain the basics of computer hardware and software, algorithm, pseudo codes and programming structures.
CO2	Illustrate the use syntax, semantics and constructs to solve mathematical and logical problems in 'C' language.
CO3	Identify the role of simple data structures, memory allocation and data handling for various applications in 'C'.
CO4	Identify the concept of functions.
CO5	Make use of structures, pointers and file handling to perform various file related operations.
Course Name: Programming for Problem Solving Lab (BTPS 102-18)	
CO1	Determine the algorithms for simple problems using arithmetic expressions.
CO2	Outline problems involving if-then-else structures.
CO3	Devise iterative as well as recursive programs.
CO4	Interpret data in arrays, strings and structures and manipulate them.
CO5	Review the pointers of different types and use them in defining self-referential structures.

Course Name: Workshop/ Manufacturing Practices (BTMP 101-18)	
CO1	Define different manufacturing processes employed in workshop.
CO2	Demonstrate the various process parameters.
CO3	Compare theoretical and practical aspects of the dimensional accuracies and tolerances of different manufacturing processes
CO4	Illustrate the knowledge of different job shops.
CO5	Define the advance manufacturing practices.
Course Name: English (BTHU 101-18)	
CO1	Construct sentences using different forms of a word and illustrate significance of using formal & in-formal words in different context.
CO2	Identify the importance of using formal grammar (such as rules, proper order of words and sequence of sentences) and spot grammatical errors.
CO3	Classify different types of sentence structures (such as simple, compound and complex sentences) and remember usage of it in different contexts.
CO4	Summarize factual information from a text and then paraphrase it using techniques of writing precisely.
CO5	Organize formal writings (business, report, proposal, E-mail, writings) and informal writings such as personal letter & e-mails etc. using a specified format.
Course Name: English Lab (BTHU 102-18)	
CO1	Comprehend spoken English (such as pronunciation of weak forms and contractions, via listening to audio-video aids) and summarize it.
CO2	Identify difference between formal & informal ways (use of body language, gestures, verbal and facial expressions) of holding discussions in a group.
CO3	Illustrate different functions of English Language and make use of them to handle daily routine conversation and dialogues.
CO4	Apply grammatically error free interrogative and affirmative statements while facing interviews.
CO5	Utilize formal & informal vocabulary (such as idioms and phrases) to give presentations.

2nd SEMESTER	
Course Name: Electromagnetism (BTPH103-18)	
CO1	Explain the theories of electrostatics.
CO2	Illustrate the relationships for dynamic electric and magnetic fields.
CO3	Apply the static, dynamic electric and magnetic fields for structural applications.
CO4	Relate the voltage induced by laws of magnetic field
CO5	Apply the Maxwell equation and electromagnetic field theory in electro-magnetic wave systems.
Course Name: Electromagnetism Lab (BTPH 113-18)	
CO1	Identify the physical principle involved in the various instruments.
CO2	Verify some of the theoretical concepts learnt in the theory courses.
CO3	Draw conclusions from data and develop skills in experimental design.
CO4	Summarize technical report which communicates scientific information in a clear and concise manner.
CO5	Demonstrate to the methods used for estimating and dealing with experimental uncertainties and systematic "errors."
Course Name: Maths -II (BTAM 203-18)	
CO1	Solve the first and second order linear differential equations with constant and variable coefficients
CO2	Solve the first and second order linear partial differential equations
CO3	Apply algebraic and transcendental equations to extrapolate the available data.
CO4	Make use of different numerical methods for solving ordinary differential equations.
CO5	Make use of different numerical methods for solving partial differential equations.
Course Name: Basic Electrical engineering (BTEE 101-18)	
CO1	Outline the basic concept of DC and AC Electrical circuits
CO2	Apply the fundamental principles of DC & AC electrical circuits to solve the problems related to electrical circuits
CO3	Interpret the physical components and working of transformer.
CO4	Demonstrate the working and constructional details of DC machines and Induction Motors.
CO5	Summarize the different electrical components ,wiring and earthing for electrical installations.
Course Name: Basic Electrical engineering Lab (BTEE 102-18)	
CO1	Identify the physical principle involved in the various instruments.
CO2	Verify some of the theoretical concepts learnt in the theory courses.
CO3	Draw conclusions from data and develop skills in experimental design.
CO4	Summarize technical report which communicates scientific information in a clear and concise manner.
CO5	Demonstrate to the methods used for estimating and dealing with experimental uncertainties and systematic "errors."
Course Name: Engineering Graphics & Design (BTME 101-21)	
CO1	Describe the principles of Engineering Graphics and its tools.
CO2	Draw orthographic projection and explain its concept.
CO3	To have the knowledge of generating the pictorial views.
CO4	Explain the solid projection techniques and surface development.
CO5	Use CAD Tools to draw 2d and 3D Models and generate printable drawing.

3rd Semester	
Course Name: Fluid Mechanics (BTME301-18)	
CO 1	Describe the concept of fluids and their properties.
CO 2	Explain the concepts of fluid Statics and Dynamics.
CO 3	Apply the concept to solve the problems of statics, dynamics and kinematics of fluids.
CO 4	Determine the measurement for losses, pressure variations and flow rates.
CO 5	Illustrate the dimensional formulas for dimensional analysis and similitude techniques.
Course Name: Theory of Machine (BTME302-18)	
CO 1	Understand constructional and working features of important machine elements
CO 2	Design belt, rope and chain drives for transmission of motion from one shaft to another.
CO 3	Identify different Cam and follower pairs for different applications and construct cam profile for required follower motion.
CO 4	Understand the function of brakes, dynamometers, flywheel and governors
Course Name: Machine Drawing (BTME303-18)	
CO 1	Read, draw and interpret the machine drawings and related parameters.
CO 2	Describe the concept of limits, fits and tolerances in various mating parts.
CO 3	Use standards used in machine drawings of machine components and assemblies.
CO 4	Use CAD tools for making drawings of machine components and assemblies
CO 5	Visualize and generate different views of a component in the assembly.
Course Name: Strength of Materials-I (BTME304-18)	
CO 1	Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads and temperature changes.
CO 2	Determine principal stresses, maximum shearing stress and their angles, and the stresses acting on any arbitrary plane within a structural element.
CO 3	Find bending moment and shear force over the span of various beams subjected to different kinds of loads.
CO 4	Calculate load carrying capacity of columns and struts and their buckling strength.
CO 5	Evaluate the slope and deflection of beams subjected to loads.
Course Name: Basic Thermodynamics (BTME305-18)	
CO 1	Apply energy balance to Systems and Control Volumes in situations involving heat and work interactions
CO 2	Evaluate changes in thermodynamic properties of substances
CO 3	Evaluate performance of various energy conversion devices
CO 4	Explain and apply various gas power and vapor power cycles.
Course Name: BEE (BTEC305-18)	
CO 1	To study and Understand construction of diodes and their rectifier applications
CO 2	Illustrate the construction and working bipolar junction transistors and MOSFETs.
CO 3	To study the working and design of Op-AMP IC-based fundamental applications.
CO 4	Illustrate the basics and the working of basic elements of digital electronics and circuits.

4th Semester	
Course Name: Applied Thermodynamics (BTME 401-18)	
CO 1	Explain single stage and multistage reciprocating air compressors
CO 2	Illustrate the thermodynamics features of IC engines and Boilers.
CO 3	Analyze the properties of various accessories of Steams like steam nozzles and steam condensers.
CO 4	Explain the case of steam turbine with their velocity diagrams
CO 5	Make use of applications for performance of thermodynamics cycles like vapour power cycles, Rankine cycles.
Course Name: Fluid Machines (BTME 402-18)	
CO 1	Explain the basic components of turbo machines and related laws.
CO 2	Outline the complete concepts of turbines and their considerations.
CO 3	Infer the performance of centrifugal and reciprocating pumps.
CO 4	Explain the similarity relations and performance characteristics of turbo machines.
CO 5	Illustrate the various hydraulic devices and its allied system.
Course Name: Strength of Materials-II (BTME 403-18)	
CO 1	Apply the basics to find stresses in various applications (shells, curved beams and rotating discs).
CO 2	Analyse the change in dimensions of shells, curved beams and rotating discs under operation.
CO 3	Determine stresses, deflection and energy stored in various kinds of springs subjected to load and twist.
CO 4	Understand the concept of failure theories and strain energy.
CO 5	Evaluate shearing stress variation in beams of different cross-section and materials.
Course Name: Theory of Machines-II (BTME 404-18)	
CO 1	Analysis the system of forces for static and dynamic state.
CO 2	Illustrate the theory of balancing for different conditions.
CO 3	Solve for the specifications of gears to given conditions
CO 4	Apply the principle of gyroscopic couple and its application.
CO 5	Analyze the Kinematic Mechanism for the given techniques.
Course Name: Environment Science (EVS 101-18)	
CO 1	Students will enable to understand environmental problems at local and national level through literature and general awareness.
CO 2	The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
CO 3	The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
CO 4	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

5th Semester	
Course Name: Heat Transfer (BTME 501-18)	
CO 1	To teach students conduction, radiation, and convection heat transfer. Students will understand conduction, radiation, and convection heat transfer. to apply energy conservation to conduction, radiation, and heat transfer. Students will apply energy conservation to conduction, radiation, and convection heat transfer problems. This principle will establish mathematical models and thermal boundary conditions.
CO 2	To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will demonstrate the ability to formulate practical conduction heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique, and evaluating the significance of results.
CO 3	To train students to identify, formulate, and solve engineering problems involving forced convection heat transfer, natural convection heat transfer, and heat exchangers. Students will demonstrate the ability to formulate practical forced and natural conduction heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique, and evaluating the significance of results. Students will also demonstrate an ability to analyze the performance of heat exchangers
CO 4	To train students to identify, formulate, and solve engineering problems involving radiation heat transfer among black surfaces and among diffuse gray surfaces. Students will demonstrate the ability to formulate practical radiation heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique, and evaluating the significance of results.
Course Name: DME (BTME 502-18)	
CO 1	Demonstrate recalling and applying knowledge of Basic Sciences, Graphics & Drawing, Basic Manufacturing Processes and Material Science, for design procedures of various Mechanical components.
CO 2	Comprehend the effect of different stresses and strains under various loading conditions on the mechanical components and identify the mechanism/mode of failure.
CO 3	Examine and solve design problems involving machine elements on the basis of various theories of failure.
CO 4	Synergize forces, moments and strength information to develop ability to analyze, design and/or select machine elements aiming for safety, reliability, and sustainability.
Course Name: Manufacturing Processes (BTME 503-18)	
CO 1	Students will be able to select appropriate manufacturing techniques to produce engineering components.(Apply)
CO 2	Students will be able to understand the principles and procedures behind different manufacturing methods and will be able to choose an appropriate method.(Understand)
CO 3	Students will be able to analyse various process parameters involved in a manufacturing processes.(Analyze)
CO 4	Student will be able to predict and identify possible defects and can device methods to produce defect free products.(Apply)

Course Name: MEE (BTME 504-18)	
CO 1	Explain the development of management and the role it plays at different levels in an organization.
CO 2	Comprehend the process and role of effective planning, organizing and staffing for the development of an organization.
CO 3	Understand the necessity of good leadership, communication and coordination for establishing effective control in an organization.
CO 4	Understand engineering economics demand supply and its importance in economics decision making and problem solving.
CO 5	Calculate present worth, annual worth and IRR for different alternatives in economic decision making.
CO 6	Understand the procedure involved in estimation of cost for a simple component, product costing and depreciation, its methods.

6th Semester	
Course Name: RAC (BTME 601-18)	
CO 1	illustrate the fundamental principles and applications of refrigeration and air conditioning system
CO 2	Calculate air conditioning requirements by testing refrigeration systems for cooling capacity and coefficient of performance.
CO 3	explain the properties, applications and environmental issues of different refrigerants.
CO 4	demonstrate psychometric processes and cycles of air conditioning systems.
Course Name: MMM (BTME 602-18)	
CO 1	Interpret characteristics of measuring instruments.
CO 2	Describe various industrial metrological instruments for measuring linear, angular, screw thread and gear profiles.
CO 3	Apply the fundamental principles for measurement of various mechanical quantities like Force/torque etc.
CO 4	Develop an ability of problem solving and decision making by identifying and analysing the cause for variation and recommend suitable corrective actions for quality measurements.
Course Name: Automobile Engineering (BTME 603-18)	
CO 1	Explain the layout of the different automotive systems. (Remembering)
CO 2	Illustrate the fuel, cooling and lubrication system. (Understand & Analyze).
CO 3	Explain the working of various parts like engine, transmission, clutch and suspension system of an automobile (Understand)
CO 4	Describe the steering, braking and ignition mechanism. (Apply)
CO 5	Identify Modern technology and safety measures used in Automotive Vehicles (Apply)
Course Name: IEM (BTME 604-18)	
CO 1	Illustrate the scope and principals of management in Industrial Engineering.
CO 2	Understand the complexities associated with management in the organizations and integrate the learning in handling these complexities.
CO 3	Understand the concepts related to industrial management.
CO 4	Demonstrate the roles, skills and functions of management.
CO 5	Make use of value engineering to reduce the cost of product.
Course Name: NCER (BTME 615-18)	
CO 1	Understand the history, global, environmental and economic impacts of green technology
CO 2	Build models that simulate sustainable and renewable green technology systems
CO 3	Address non-renewable energy challenges
CO 4	Address smart energy and green infrastructure

7th Semester	
Course Name: Mechanical Vibration (BTME 701-18)	
CO 1	Definition of vibration and natural frequency due to elastic Energy stored in system.
CO 2	Compose linear vibratory models of dynamic systems with changing complexities (SDOF, TDOF), and of real-life engineering systems.
CO 3	Differentiate free and forced (harmonic, periodic, non-periodic) vibration response Multi-degree of freedom systems.
CO 4	Identify the situations to control the vibrations to acceptable level using various vibration absorption and Damping Devices for various applications.
Course Name: Automation in Manufacturing (BTME 702-18)	
CO 1	Students should be able to design and implement automated systems using pneumatics.
CO 2	Students should be able to provide hydraulic solutions for designing automated systems.
CO 3	Students should be able to design and implement electro-pneumatic/hydraulic solutions for automated systems.
CO 4	Students should be able to apply PLC programming and implement it on PLC kits.
CO 5	Students should be able to devise Assembly automated systems using feeders, orienteers and escapement devices
Course Name: FOM (BTME 703-18)	
CO 1	The students understand the significance of Management in their Profession.
CO 2	Understand the complexities associated with management in the organizations and integrate the learning in handling these complexities.
CO 3	The student will learn how to use effective tools and techniques for quality design and control.
CO 4	The various Management Functions like Planning, Organizing, Staffing, Leading, aspects are learnt in this course.
CO 5	Demonstrate the roles, skills and functions of management.
Course Name: Metro Systems and Engineering (OECE-701-18)	
CO 1	To acquire & comprehend Principals of Guided form of Transport
CO 2	To acquire knowledge regarding planning and development of Metro Construction system.
CO 3	To understand basic of multimodal transfer and management module
CO 4	To understand different methods of traffic signalling system.
CO 5	To be able to understand control and operation of electric traction & mechanical system.