JSPM GROUP OF INSTITUTE, PUNE
SHRI BHAGWANT EDUCATION & RESEARCH CHARITABLE TRUST'S
BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.
(Approved by AICTE New Delhi, Govt. of Maharashtra & Affiliated to DBATU Lonere, MSBTE)
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Prof. Dr. T. J. Sawant
President

Ref. No.: SBERCT/BIT/NAAC/2023-24/2/12/04

Date: 10/12/2024

To,
The Coordinator,
NAAC; Bengaluru.

Subject: Proof of list of courses outcomes offered by institution.
References: 2.6.1 Teachers and students are aware of the stated Programme and course outcomes Of the Programmes offered by the institution.

Dear Sir/Madam,

Sample of programme & outcomes of the courses offered by university and institute of 2023-24 is enclosed herewith.
The detailed documents are available at following link:
https://bitbarshi.edu.in/iqac/ay_23-24/criterion2/2.6.1.pdf

PRINCIPAL

Principal
Bhagwant Institute of Technology
Barshi.

Enclosures:
1. Proof of list of CO of all departments subjects.

Bhagwant Institute of Technology Barshi

BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.

DEPARTMENT: FIRST YEAR

Academic Year: 2023-24

	Name of Subject	CO1	CO2	CO3	CO4	CO5	CO6
First Year SEM-I	**Basic Civil and Mechanical Engineering(BTES106)**	Identify various Civil Engineering materials and choose suitable material among various options.	Apply principles of surveying to solve engineering problem	Identify various Civil Engineering structural components and select appropriate structural system among various options	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.	Know and discuss the working principle of various power consuming and power developing devices	
	Engineering Chemistry(BTBS202)	Demonstrate knowledge of chemistry in technical fields	Bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer	Develop the importance of water in industrial and domestic usage.	Identify the concepts of Chemistry to lay the ground work for subsequent studies in various engineering fields.	Examine a fuel and suggest alternative fuels.	
	Communication skills(BTHM104)	Apply speaking and writing skills in professional as well as social situations	Overcome Mother Tongue Influence and demonstrate neutral accent while exercising English	Apply communication skills for Presentations, Group Discussion and interpersonal interactions.	Apply grammar correctly during Speaking and Writing situations especially in context with Presentations, Public Speaking, Report writing and Business Correspondence		
	Engineering Graphics(BTES103)	To make use of drawing instruments effectively for drawing and dimensioning.	To understand the conventions and methods of engineering drawing	To know the concept of projections of points, lines, planes, solids and section of solids	To understand the Construction isometric and orthographic views of given objects		
	Engineering Mathematics (BTBS101)	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem	Demonstrate the concept partial derivatives and their applications to Maxima/ Minima , series expansion of multi valued functions.	Compute Jacobian of functions of several variables and their applications to engineering problems	Identify and sketch of curves in various coordinate system	Evaluate multiple integrals and their applications to area and volume.	
	Energy & Environmental engineering(BTES105)	Identify conventional ,non conventional energy sources.	Knowand discuss power consuming and power developing devices for effective utilization and power consumption	Identify various sources of air, water pollution and its effects.	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste		
	Engineering Mechanics(BTES203)	Apply fundamental Laws of Engineering Mechanics	Apply Conditions of static equilibrium to analyze given force system	Compute Centre of gravity and Moment of Inertia of plane surfaces	Compute the motion characteristics of a body/particle for a Rectilinear and Curvilinear Motion	Know and discuss relation between force and motion characteristics	

	Mathematics(BTBS201)	. Discuss the need and use of complex variables to find roots ,to separate complex quantities and to establish relation between circular and hyperbolic functions.	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems.	. Determine Fourier series representation of periodic functions over different intervals.	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence &curl in various engineering streams.	Apply the principles of vector integration to transform line integral to surface integral , surface to volume integral &vice versa using Green"s , Stoke"s and Gauss divergence theorems.	
	ENGG. PHYSICS(BTBS102)	Explain & apply the concept of types of Oscillation,Dielectric properties & ultrsonics	Explain & compare between Interference & Polarisation of light ,working Principle of Lasers & Fiber optics	Interprete, apply &demonstrate principle of motion of charged particles in EF&MF, BAinbridge Mass spectrograph &G M counter	Identify Types of crystals & crystal planes using Miller indices, Experemental apprroach.		
	Computer Programming in (BTES204)	Gain a broad perspective about the uses of computers in engineering industry and C Programming	Develop the basic concept of algorithm, algorithmic thinking and flowchart.	Apply the use of C programming language to implement various algorithms and develops the basic concepts and terminology of programming in general	Use the more advanced features of the C language.	Identify tasks in which the numerical techniques learned are applicable and apply them to write programs and hence use computers effectively to solve the task	
	Basic Electrical & Electronics Engineering(BTES206)	Apply basic ideas and principles of electrical engineering.	Identify protection equipment and energy storage devices.	Differentiate electrical and electronics domains and explain the operation of diodes and transistors	Acquire knowledge of digital electronics	Design simple combinational and sequential logic circuits.	
First Year SEM-II	**Engineering Mechanics(BTES203)**	Apply fundamental Laws of Engineering Mechanics	Apply Conditions of static equilibrium to analyze given force system	Compute Centre of gravity and Moment of Inertia of plane surfaces	Compute the motion characteristics of a body/particle for a Rectilinear and Curvilinear Motion	Know and discuss relation between force and motion characteristics	

BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.

DEPARTMENT: CIVIL ENGG

Academic Year: 2023-24

Name of Subject	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Building construction	Understand types of masonry structures.	Comprehend components of building and there purposes	Draw plan, elevation and section of various	Apply the principles of planning and by laws used	Prepare detailed working drawing for	
Hydraulics-I	Calibrate the various flow measuring devices.	Determine the properties of fluid and pressure and their measurement	Understand fundamentals of pipe flow, losses in pipe and analysis of pipe network	Visualize fluid flow phenomena observed in Civil Engineering systems		
Mechanics of solids	Perform the stress-strain analysis.	Draw force distribution diagrams for members and determinate beams.	Visualize force deformation behavior of bodies.	Perform failure analysis		

	Surveying-I	Perform measurements in linear/angular methods.	Perform plane table surveying in general terrain	Know the basics of leveling and Theodolite survey in elevation and angular measurements							
Second Year SEM-I	**Engineering Mathematics-III**	On completion of the course, student will be able to formulate and solve mathematical model of civil engineering phenomena in field of structures, survey, fluid mechanics and soil mechanics.									
	Building Planning and Drawing	To plan buildings considering various principles of planning and byelaw of governing body.	Comprehend various utility requirements in buildings	Understand various techniques for good acoustics							
	Environmental Engineering	Apply the water treatment concept and methods.	Prepare basic process designs of water and wastewater treatment plants	Apply the wastewater treatment concept and methods	Apply the solid waste management concepts						
	Structural Mechanics - I	Describe the concept of structural analysis, degree of indeterminacy.	Calculate slopes and deflection at various locations for different types of beams.	Identify determinate and indeterminate trusses and calculate forces in the members of trusses Perform the distribution of the moments the in continuous beam and frame							
	Water Resources Engineering	Understand need of Irrigation in India and water requirement as per farming practice in India	Understand various irrigation structures and schemes.	Develop basis for design of irrigation schemes							
	Engineering Geology	Recognize the different land forms which are formed by various geological agents.	Identify the origin, texture and structure of various rocks and physical properties of mineral.	Emphasize distinct geological structures which have influence on the civil engineering structure	Understand how the various geological conditions affect the design parameters of structures.						
Second Year SEM-II	**Hydraulics - II**	Design open channel sections in a most economical way.	Know about the non-uniform flows in open channel and the characteristics of hydraulic jump.	Understand application of momentum principle of impact of jets on plane							
	Design of Steel Structures	Identify and compute the design loads and the stresses developed in the steel member	Analyze and design the various connections and identify the potential failure modes	Analyze and design various tension, compression and flexural members.	Understand provisions in relevant BIS Codes						
	Geotechnical Engineering	Understand different soil properties and behavior	Understand stresses in soil and permeability and seepage aspects	Develop ability to take up soil design of various foundations							

	Structural Mechanics –II	Have a basic understanding of matrix method of analysis and will be able to analyze the determinant structure.	Have a basic understanding of the principles and concepts related to finite difference and finite element methods	Have a basic understanding of concept of influence line							
	Concrete Technology	Understand the various types and properties of ingredients of concrete.	Understand effect of admixtures on the behavior of the fresh and hardened concrete	Formulate concrete design mix for various grades of concrete							
	Project Management	Understand various steps in project Management, different types of charts. Construct network by using CPM and PERT method	Determine the optimum duration of project with the help of various time estimates	Know the concept of engineering economics, economic comparisons, and linear break even analysis problems	Understand the concept of total quality Management including Juran and Deming's philosophy						
Third Year SEM-I	**Material, Testing and Evaluation**	To develop skill to construct strong and durable structures by applying knowledge of material science	To make the students aware of quality assurance and control in their real life as a professional.	To propose suitable material in adverse conditions							
	Design of RC Structures	On completion of the course, the students will be able to comprehend the various design philosophies used in design of reinforced concrete	Analyze and design the reinforced concrete sections using working stress and limit state method.								
	Foundation Engineering	To predict soil behavior under the application of loads and come up with appropriate solutions to foundation design queries.	Analyze the stability of slope by theoretical and graphical methods	Analyze the results of in-situ tests and transform measurements and associated uncertainties into relevant design parameters	Synthesize the concepts of allowable stress design, appropriate factors of safety, margin of safety, and reliability.						
	Transportation Engineering	Comprehend various types of transportation systems and their history of the development Comprehend to various types of pavements	Design the pavements by considering various aspects associated with traffic safety measures.								
	Open Channel Flow	Understand phenomena of hydraulic jump.	Compute Discharge through various open channel sections	Discuss different applications of gradually varied flow profiles							
Third Year SEM-II	**Basic Human Rights**	ELECTIVE COURSE									
	Design of Reinforced & Prestressed Concrete Structures	Able to identify the behavior, analyze and design of the beam sections subjected to torsion.	Able to analyze and design of axially and eccentrically loaded column and construct the interaction diagram for them.	Understand various concepts, systems and losses in pre-stressing	Able to analyze and design the rectangular and symmetrical I-section pre-stressed beam/girders						

	Infrastructure Engineering	Know about the basics and design of various components of railway engineering	Understand the types and functions of tracks, junctions and railway stations	Able to understand Airport engineering.	Able to understand Docks and Harbours	Know about the aircraft characteristics, planning and components of airport	Understand the types and components of docks and harbors
	Construction Techniques	Understand the planning of new project with site accessibility and services required.	Comprehend the various civil construction equipment's	Familiar with layout of RMC plant, production, capacity and operation process	Recognize various aspect of road construction, construction of diaphragm walls, railway track construction etc.		
	Professional Practices	Understand the importance of preparing the types of estimates under different conditions for various structures	Know about the rate analysis and bill preparations and to study about the specification writing.	Know the various types of contract, accounts in PWD, methods for initiating the works in PWD and tendering	Understand the valuation of land and buildings, various methods and factors affecting valuation		
Final Year SEM-I	**Legal Aspects in Civil Engineering Contracts**	Students will learn Indian contract act, Arbitration act and contract administration	Student will gain knowledge about bailment and FIDIC	Students will understand the labour laws	Students will be exposed to safety engineering and relevant act		
	Maintenance and Repair Of Concrete Structures	SELF STUDY COURSE					
Final Year SEM-II	**Environmental Remediation of Contaminated Sites**	SELF STUDY COURSE					

BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.

DEPARTMENT: Computer Science And Engineering

Academic Year: 2023-24

Name of Subject	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Engineering Mathematics – III(BTBS301)	Understand sets, relations, functions and discret structures. Apply Propositional logic and First orderlogic to solve problems	Express and solve number theoretic problems using algebraic properties of groups, rings and fields.	To design and develop real time application using graph theory	Students would be able to model and analyze computational processes using analytic and combinatorial methods.	Students will be able to use the methods learnt as partof this subject in subsequent courses in the design and analysis of algorithms, theory of computation, andcompilers.	Develop a discrete model for a given computational problem and solve.
Discrete Mathematics(BTCOC302)	Understand sets, relations, functions and discret structures. Apply Propositional logic and First orderlogic to solve problems	Express and solve number theoretic problems using algebraic properties of groups, rings and fields.	To design and develop real time application using graph theory	Students would be able to model and analyze computational processes using analytic and combinatorial methods.	Students will be able to use the methods learnt as partof this subject in subsequent courses in the design and analysis of algorithms, theory of computation, andcompilers.	Develop a discrete model for a given computational problem and solve.

	Data Structures (BTCOC303)	Student should able to know fundamentals of data structures like array, list, linked list, stack, queue, tree, graph, hashing	Student should able to identify suitable data structure for application	Student should able to use data structure to solve problems.	Student should able to implement various data structures and algorithm essential for implementing computer based solutions.						
	Computer Architecture & Organization (BTCOC304)	To understand the basic hardware and software	Identify functional units, bus structure and addressing modes.	Students will be able to identify where, when and how enhancements of computerperformance can be accomplished.	Students will also be introduced to more recent applications of computer organization in advanced digital systems.	Identify memory hierarchy and performance.					
Second Year SEM-I	**Object Oriented Programming in Java(BTCOC305)**	Understand the basic knowledge of OOP in Java, use of JDK, JVM, and JRE , set of libraries and class, method.	Use of Control Statement like if-else, switch, for, while, do-while.	Define Array, UseofArrayand type of Array.	Introduction of Inheritance and Polymorphism, Type and program.	Use of Exception Handling, type of Exception, Use java Script.					
	Design & Analysis of Algorithms(BTCOC401)	To recognize and understand the variable conventional energy sources and power production systems	To understand the reasons for unconventional energy requirement.	To elect the appropriate energy conservation method form future perspective.	To understand the air pollution term and reduction methods.	To acknowledge the resources of water pollution and reduction methods.					
	Operating Systems(BTCOC402)	Identify the importance of operating system in computing devices.	Explain the communication between application programs and hardware devices through System calls.	Compare and exemplify various scheduling algorithms.	Use appropriate memory and file management techniques	Gain practical experience with software tools available in operating system for system calls, Threads, etc.	Appraise the need of access control and protection in an operating system.				
	Basic Human Rights (BTHM403)	Understand the history of human rights.	Learn to respect others caste, religion, region and culture.	Be aware of their rights as Indian citizen.	Understand the importance of groups and communities in the society.	Realize the philosophical and cultural basis and historical perspectives of human rights.	Make them aware of their responsibilities towards the nation.				
	Probability and Statistics(BTBSC404)	Define the fundamental terms and elementary concepts of electrical engineering	Describe the network of transmission and batteries	Define the term related to semiconductor devices	Describe the terms related to digital system with application						
Second Year SEM-II	**Digital Logic Design & Microprocessors(BTES405)**	To use the basic logic gates and various reduction techniques for ex K map of digital logic circuit in detail	To design analyze combinational circuits adders, multiplexers and encoders ete	To design and analyze sequential circuits like counter and shift register	To identify and formulate control and monitoring systems using microprocessors.	Student ability to develop interfacing to real world devices.					

	Database System (BTCOC501)	Define and apply the basic concepts of database system, design, relational model and schemas.	Design principles for logical design of databases, including the E-R method and normalization approach for any real time application	Evaluate, using relational algebra and SQL, solutions to a broad range of query problems in a relational DBMS.	Demonstrate an understanding of normalization theory and apply such knowledge to normalize a database.	Be familiar with the basic issues of transaction processing (ACID properties), different methods of concurrency control and recovery techniques.					
	Theory of Computation(BTCOC502)	Students would be able to explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory	Understand formal machines, languages and computations	The student will be able to demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA)	Develop analytical thinking and intuition for problem solving situations in related areas of theory of computation	The student will be able to demonstrate abstract models of computing including Push Down Automata (PDA) and Turing (TM) machine models and their power to recognize the languages.	Students will be able to apply mathematical and formal techniques for solving problems in computer science				
	Software Engineering(BTCOC503)										
	Human computer Interaction(BTCOE504)	Explain the capabilities of both humans and computers from the viewpoint of	To develop understanding of human factors in HCI design	Apply an interactive design process and universal design principles to designing	Analyze and identify user models, user support, socio-organizational issues, and	To learn modem systems.					
Third Year SEM-I	**Business Communication (BTHM505)**		To demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary & Grammar.			To stimulate their Critical thinking by designing and developing clean and lucid writing skills	To demonstrate his verbal and non-verbal communication ability through presentations.				
	Compiler Design (BTCOC601)	Human information processing.	Differentiate between methodologies required for language translation.	HCI systems	Stakeholder requirements of HCI systems.						
	Computetr Network (BTCOC602)	Describe the concepts of Data Communication, Reference models and network technologies	Explain how communication works in data networks and the Internet.	Identify different network interfaces and routing protocols.	Discuss the various services offered by transport layer such as TCP and UDP.	Describe the application layer protocol and network security issues.	Apply the basics of networking protocols for solving real life networking problems				
	Machine Learning(BTCOC603)	Gain knowledge about basic concepts of Machine Learning	Identify machine learning techniques suitable for a given problem	Solve the problems using various machine learning techniques	Apply Dimensionality reduction techniques.	Design application using machine learning techniques.					

	IoT(BTCOE604)	To understand the fundamentals of Internet of Things	To learn about the basics of IOT protocols	To Learn about Building state of the art architecture in IoT.	To learn use of Devices, Gateways and Data Management in IoT.	To build a small low cost embedded system using Raspberry Pi.	To apply the concept of Internet of Things in the real world scenario	
Third Year SEM-II	**Competetive Programming-II(BTCOL606)**	Apply algorithm techniques and methods.	Calculate processing time and memory space of algorithm.	Create good and correct algorithm for problem solving	To develop logics which help them to create programs, application in C.	Identify and abstract the programming task involved	Choose the right data representation formats based on the requirements of the problem	
	Artificial Intelligence(BTCOC701)	To Identify and apply suitable Intelligent agents for various AI applications	To Design smart system using different informed search / uninformed search or	To Identify knowledge associated and represent it by ontological engineering to plan	To Apply the suitable algorithms to solve AI problems.	To Implement natural language processing .		
	Cloud Computing(BTCOC702)	Introduction to the basic concept and terminology of cloud computing.	Familiarization with areas of cloud technologies.	Introduction to cloud computing infrastructures.	Learning techniques of cloud programming.	Feasibility study to migrate existing applications to a cloud environment from		
	Distributed System(BTCOE703)	Understand the design principles in distributed systems and the architectures for distributed systems.	Heuristic approaches.	A strategy to solve given problem.	Analyze the role of middleware technologies in designing Distributed systems	Both a technical and an economic point of view;		
	Business Intelligence(BTCOE704)	Know the complete life cycle of BI/Analytical development	Become familiar with the role of mathematical models, Business intelligence architectures, representation of the decision-making process, evolution of information systems	Define development of a model, representation of input data ,data mining process, analysis methodologies, data validation, data transformation, data reduction	Understand the technology and processes associated with Business Intelligence framework	Given a business scenario, identify the metrics, indicators and make recommendations to achieve the business goal		
Final Year SEM-I	**Design Thinking(BTCOE705)**	Demonstrate the critical theories of design, systems thinking, and design methodologies	Produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact	Understand the diverse methods employed in design thinking and establish a workable design thinking framework to use in their practices	Conceive, organize, lead and implement projects in interdisciplinary domain and address social concerns with innovative approaches			

BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.							
DEPARTMENT: MECHANICAL ENGG.							
Academic Year: 2023-24							
	Name of Subject	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**

Second Year SEM-I	**Engineering Mathematics-III**	"Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing"	"Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing."	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing	Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing					
	Materials Science and Metallurgy	Study various crystal structures of materials	Understand mechanical properties of materials and calculations of same using appropriate equations	Evaluate phase diagrams of various materials	Suggest appropriate heat treatment process for a given application	Prepare samples of different materials for metallography	Recommend appropriate NDT technique for a given application				
	Fluid Mechanics	Explain basic properties of fluid, fluid statics, kinematics and dynamics.	Identify various types of flow, flow patterns and their significance.	Explain concepts of flow through pipes, boundary layer theory, forces on immersed bodies and dimensionless parameters.	Derive various equations in fluid mechanics such as Euler's, Bernoulli's, Momentum, Continuity etc	Solve the problems related to properties of fluid, fluid kinematics, fluid dynamics, laminar flow, pipe flow, dimensional analysis, boundary layer theory, and forces on immersed bodies					
	Thermodynamics	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics	Studied different laws of thermodynamics and apply these to simple thermal systems to study energy balance .	Studied Entropy, application and disorder.	Studied various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes	Represent phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. Show various constant property lines on them.					
	MANUFACTURING PROCESSES -I	Identify castings processes, working principles and applications and list various defects in metal casting	Understand the various metal forming processes, working principles and applications	Classify the basic joining processes and demonstrate principles of welding, brazing and soldering.	Study center lathe and its operations including plain, taper turning, work holding devices and cutting tool	Understand milling machines and operations, cutters and indexing for gear cutting.	Study shaping, planning and drilling, their types and related tooling's				

Second Year SEM-II	**Basic Human Rights**	Understand the history of human rights	Learn to respect others caste, religion, region and culture	Be aware of their rights as Indian citizen	Understand the importance of groups and communities in the society.	Realize the philosophical and cultural basis and historical perspectives of human rights.	Make them aware of their responsibilities towards the nation				
	THEORY OF MACHINES-I	Define basic terminology of kinematics of mechanisms	Classify planar mechanisms and calculate its degree of freedom	Perform kinematic analysis of a given mechanism using ICR and RV methods	Introduction of different types of lubrication system.	Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach	Perform balancing of unbalance forces in rotating masses, different types of single/multi cylinder reciprocating engines in different positions				
	STRENGTH OF MATERIAL	State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, principle stresses, etc	Analyze the stresses and strain energy in different load cases	Design the columns based on deflection	Design a beam based on bending and shafts based on torsion	Analyze given beam for calculations of SF and BM	Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods				
	Fluid Machinery	Understand and apply momentum equation	Understand and explain Hydrodynamic Machines	Explain difference between impulse and reaction turbines	Find efficiencies, draw velocity triangles	Explain governing mechanisms for hydraulic turbines	Explain working of various types of pumps, draw velocity diagrams, do simple Calculations	Design simple pumping systems			
	Heat Transfer	Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies	Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer	Interpret the extended surfaces	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions	Describe the Boiling heat transfer, Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields				
	Automobile Engineering BTAPE504D	Identify the different parts of the automobile.	Explain the working of various parts like engine, transmission, clutch, brakes etc	Demonstrate various types of drive systems; front and rear wheels, two and four wheel drive	Apply vehicle troubleshooting and maintenance procedures	Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications					

Third Year SEM-I	**Applied Thermodynamics – I BTMC506**	Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air, equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.	Studied and Analyze gas power cycles and vapour power cycles and derive expressions for the performance parameters like thermal efficiency.	Classify various types of boilers, nozzle, steam turbine and condenser used in steam power plant	Classify various types condenser, nozzle and derived equations for its efficiency.	Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating androtary air compressors.					
	Machine Design – I	Formulate the problem by identifying customer need and convert into design Specification	Understand component behavior subjected to loads and identify failure criteria	Analyze the stresses and strain induced in the component	Design of machine component using theories of failures	Design of component for finite life and infinite life when subjected to fluctuating load	Design of components like shaft, key, coupling, screw and spring				
	Theory of Machines- II	Identify and select type of belt drive for a particular application	Evaluate gear tooth geometry and select appropriate gears, gear trains	Characterize flywheels as per application requirement	Understand gyroscopic effects in ships, aeroplanes, and road vehicles.	Understand free and forced vibrations of single degree freedom systems					
	Renewable Energy BTMOE505B	Explain the difference between renewable and non-renewable energy	Describe working of solar collectors	Explain various applications of solar energy	Describe working of other renewable energies such as wind, biomass , nuclear						
	Manufacturing Processes- II BTMC 601	Understand the process of powder metallurgy and its applications	Calculate the cutting forces in orthogonal and oblique cutting	Evaluate the machinability of materials	Understand the abrasive processes	Explain the different precision machining processes	Understandi ng plastic				
	Machine Design-II BTMC 602	Define function of bearing and classify bearings.	Understandi ng failure of bearing and their influence on its selection	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter.	Select materials and configuration for machine element like gears	Design of elements like gears, belts for given power rating					
	Quantitative Techniques in Project Management BTMOE605A	Define and formulate research models to solve real life problems for allocating limited resources by linear programming.	Apply transportatio n and assignment models to real life situations.	Apply queuing theory for performance evaluation of engineering and management systems	Apply the mathematical tool for decision making regarding replacement of items in real life.	Determine the EOQ, ROP and safety stock for different inventory models.	Construct a project network and apply CPM and PERT method				

Third Year SEM-II	**IC Engine BTMPE603A**	Understand various types of I.C. Engines and Cycles of operation.	Analyze the effect of various operating variables on engine performance	Identify fuel metering and fuel supply systems for different types of engines	Understand normal and abnormal combustion phenomena in SI and CI engines	Evaluate performance Analysis of IC Engine and Justify the suitability of IC Engine for different application	Understand the conventional and non-conventional fuels for IC engines and effects of emission formation of IC engines, its effects and the legislation standards				
	Product Life Cycle Management BTMPE604B	Outline the concept of PLM	Illustrate the PDM system and its importance	Illustrate the product design process	Build the procedure for new product development	Classify and compare various technology forecasting methods	Outline the stages involved in PLM for a given product.				
Final Year SEM-I	**Industrial Engineering and BTHM702**	Impart fundamental knowledge and skill sets required in the Industrial Management and Engineering profession, which include the ability to apply basic knowledge ofmathematics, probability and statistics, and the domain knowledge of IndustrialManagement and Engineering	Produce ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy.	Understand the interactions between engineering, businesses, technological and environmental spheres in the modern society.	Understand their role as engineers and their impact to society at the national and global context.						
	Mechatronics BTMC701	Define sensor, transducer and understand the applications of different sensors and transducers	Explain the signal conditioning and data representation techniques	Design pneumatic and hydraulic circuits for a given application	Write a PLC program using Ladder logic for a given application	Understand applications of microprocessor and micro controller	Analyse PI, PD and PID controllers for a given application				
	Entrepreneurship Development	enlarge the supply of entrepreneurs for rapid industrial development	Develop small and medium enterprises sector which is necessary for generation of employment	Industrialize rural and backward regions	Provide gainful self-employment to educated young men and women	Diversify the sources of entrepreneurship.					
	Intellectual Property Rights	State the basic fundamental terms such as copyrights, Patents, Trademarks etc.,	Interpret Laws of copy-rights, Patents, Trademarks and various IP registration Processes.	Exhibit the enhance capability to do economic analysis of IP rights, technology and innovation related policy issues and firms commercial strategies	Create awareness at all levels (research and innovation) to develop patentable technologies	Apply trade mark law, copy right law, patent law and also carry out intellectual property audits	Manage and safeguard the intellectual property and protect it against unauthorized use.				

	Advanced IC Engines BTMPE703D	Define and Distinguish between Spark ignition and Compression ignition system. Describe Air- fuel supply systems in ic engines.	Identify and Demonstrate normal and abnormal combustion in combustion chambers of IC engines. According to which able to analyse and Design combustion chambers	Recognize and discuss engine emissions formation, effects and various methods to reduce emissions and their measuring equipment's.	Understand combustion and emission characteristics of an alternative energy sources and suggest appropriate applications of alternative fuels such as bio diesels, natural gas, LPG, hydrogen, etc. and their Engine modifications for using these fuels	Apply and interpret with the recent trends IC engine techniques such as HCCI, CRDI, GDI, etc. with latest measuring equipments		

BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.

DEPARTMENT:E&TC

Academic Year: 2023-24

	Name of Subject	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**CO7**
Second Year SEM-I	**Engineering Mathematics – III(BTBS301)**	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits	Solve problems related to	Obtain Interpolating polynomials	Perform vector differentiation and	Analyze conformal mappings		
	Electronic Devices and Circuits (BTETC302)	Comply and verify parameters after exciting devices by any stated method.	Implement circuit and test the	Analyze BJT, JFET and MOSFET for	Analyze Feedback amplifiers and			
	Digital Electronics(BTETC303)	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.	Design combinational and sequential	Design and implement hardware	Understand the architecture and use of			
	Electrical Machines and Instruments(BTES304)	The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded	The skill to analyze the response of	The ability to troubleshoot the operation	The ability to select a suitable	The ability to estimate and correct		
	Network Theory(BTETC401)	Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze thesame.	Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.	Identify issues related to transmission of signals, analyze different RLC networks.	Find technology recognition for the benefit of the society.			
	Signals and Systems(BTETC402)	Understand mathematical description and representation of continuous and discrete time signals and systems.	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.			
	Basic Human Rights(BTHM403)	Students will be able to understand the history of human rights.	Students will learn to respect others caste, religion, region and culture.	Students will be aware of their rights as Indian citizen.	Students will be able to understand the importance of groups and communities in the society.	Students will be able to realize the philosophical and cultural basis and historical perspectives of human rights.		

	Probability Theory and Random Processes(BTBS404)	Understand representation of random signals	Investigate characteristics of random processes	Make use of theorems related to random signals	To understand propagation of random signals in LTI systems.						
Second Year SEM-II	**Python Programming (BTETPE405E)**	Experience with an interpreted Language.	To build software for real needs	Prior Introduction to testing software							
	Electromagnetic Field Theory (BTETC501)	Understand characteristics and wave propagation on high frequency transmission lines	Carryout impedance transformation on TL	Use sections of transmission line sections for realizing circuit elements	Characterize uniform plane wave	Calculate reflection and transmission of waves at media interface	Analyze wave propagation on metallic waveguides in modal form Understand principle of radiation and radiation characteristics of an antenn				
	Digital Signal Processing (BTETC502)	Understand use of different transforms and analyze the discrete time signals and systems.	Realize the use of LTI filters for filtering different real-world signals.	Capable of calibrating and resolving different frequencies existing in any signal	Design and implement multistage sampling rate converter.	Design of different types of digital filters for various applications.					
	Analog Communication(BTETC503)	Understand and identify the fundamental concepts and various components of analog communication systems.	Understand the concepts of modulation and demodulationt echniques.	Design circuits to generate modulated and demodulated wave.	Equip students with various issues related to analog communicatio n such as modulation, demodulation, transmitters and receivers and noiseperforma nce.	Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communicatio n system.	Develop the ability to compare and contrast the strengths and weaknesses of various communication systems			
	Digital System Design(BTETPE504C)	Design and analyze combinational logic circuits	Design & analyze modular combinational circuits with MUX/DEMU X, Decoder, Encoder	Design & analyze synchronous sequential logic circuits	Use HDL & appropriate EDA tools for digital logic design and simulation.						
Third Year SEM-I	**Control System Engineering(BTETOE505A)**	Understand the modeling of linear-time-invariant systems using transfer function and state-space representations.	Understand the concept of stability and its assessment for linear-time invariant systems.	Design simple feedback controllers							
	Antennas and Wave Propagation(BTETC601)	Formulate the wave equation and solve it for uniform plane wave.	Analyze the given wire antenna and its radiation characteristics.	Identify the suitable antenna for a given communicatio n system.							
	Digital Communication(BTETC602)	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.	Perform the time and frequency domain analysis of the signals in a digital communicatio n system.	Select the blocks in a design of digital communicatio n system.	Analyze Performance of spread spectrum communicatio n system.						

	Microprocessors and Microcontrollers(BTETPE603A)	Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications. interfacing to real world applications.	Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles	Students can identify and formulate control and monitoring systems using microprocessors	Learn use of hardware and software tools.	Develop interfacing to real world devices	Graduates will be able to design real time controllers using microcontroller-based system.	Learn importance of microcontroller in designing embedded application.			
Third Year SEM-II	**Computer Network(BTETOE604C)**	To master the terminology and concepts of the OSI reference model and the TCP‑IP reference model.	To master the concepts of protocols, network interfaces, and design/performance issue s in local area networks and wide area networks.	To be familiar with wireless networking concepts.	To be familiar with contemporary issues in networking technologies	To be familiar with network tools and network programming.	For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.	For a given problem related TCP/IP protocol developed the network programming			
	Microwave Engineering(BTETC701)	Formulate the wave equation in wave guide for analysis.	Identify the use of microwave components and devices in microwave applications.	Understand the working principles of all the microwave tubes.	Understand the working principles of all the solid-state devices.	Choose a suitable microwave tube and solid-state device for a particular application.	Carry out the microwave network analysis.	Choose a suitable microwave measurement instruments and carry out the required measurements.			
	Fiber Optic Communication(BTETPE702D)	Understand the principles fiber-optic communication, the components and the bandwidth advantages.	Understand the properties of the optical fibers and optical components	Understand operation of lasers, LEDs, and detectors.	Analyze system performance of optical communication systems.	Design optical networks and understand non-linear effects in optical fibers.					
	Mobile Computing(BTETOE703D)	At the end of the course, the student will be able to demonstrate:	A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities	The ability to develop applications that are mobile-device specific and demonstratecurrent practice in mobile computing contexts	A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.	An awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behavior					
Final Year SEM-I	**Data Structure & Algorithms Using Java Programming (BTETOE704C)**	To impart the basic concepts of data structures and algorithms.	To understand concepts about searching and sorting techniques	Describe how arrays, records, linked structures are represented in memory and use them in algorithms.	To understand basic concepts about stacks, queues, lists trees and graphs.	To enable them to write algorithms for solving problems with the help of fundamental data structures.					