**BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.**

**DEPARTMENT: FIRST YEAR**

**Academic Year: 2019-20**

| | Name of Subject | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | Program Outcomes | PSOs |
|---|---|---|---|---|---|---|---|---|---|
| **First Year SEM-I** | **Basic Civil Engineering** | Understand the role of various branches in civil engineering | Understand the various properties of construction materials. | Explain the types of foundations | Explain the components of building. | Understand the basics of surveying and leveling. | Know the principles of surveying and leveling | **1.Engineering knowledge:** engineering fundamentals, and complex engineering problems | 1.Apply basic knowledge related to the discipline to solve engineering/ societal problems. |
| | **Engineering Chemistry** | Students will able to know the application of chemistry in engineering fields. | Students will able to determine the quality parameters of the water sample | Students will able to determine the effect of various factors on one and two component systems. | Students will able to know the various steps involved during the extraction of metals from their ores. | Students will able to determine the quality of fuels and properties of lubricant materials | Students will able to know the basic concepts of electrochemistry | **2.Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. | |
| | **Communication skills** | Prepare good quality communication by avoiding barriers in various formal and informal situation. | Communicate skillfully using non-verbal methods of communication | Organize English speech sound system, stress and intonation | Formulate grammatically correct sentences. | Student can draft letters, emails &reports using corrects guidelines. | Demonstrate various soft skills like team skills, leadership, creativity, etc. in different situations. | **3.Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate consideration for the public health and safety, and the cultural, social, and environmental considerations. | |
| | **Engineering Graphics** | To understand read and draw the geometry of different engineering objects. | Visualize and Draw Orthographic Projection of different objects | Interpret and draw the projection of line. | Interpret and draw the projection of Plane. | Visualize and Draw the projection of Solid& Section of Solid. | Visualize and Draw Isometric Projection of different objects | **4.Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. | 2.Recognize and adapt to technical developments and to engage in lifelong learning and develop consciousness for professional, social, legal and ethical responsibilities. |
| | **Energy & Environmental engineering** | To recognize and understand the variable conventional energy sources and power production system. | To understand the reasons for unconventional energy requirement | To elect appropriate energy conservation method from future perspective. | To understand the air pollution term and their reduction method | To understand the Water pollution term and their reduction method. | To understand the Soil, Thermal, Noise pollution and their reduction method. | **5.Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. | |
| | **Engineering Mechanics** | Students should be able to identify all the forces associated with a static frame work | Ability of the students to construct free body diagrams and to calculate the reactions necessary to ensure static equilibrium. Solve the problems on Centroid, Friction | Describe the motion of a particle without analyze the forces causing the motion of a particle Compute the Kinematics problems | Describe the motion of a particle in terms of its position, velocity and acceleration in different frames of reference and to analyze the forces causing the motion of a particle . Compute the Kinetics problems | Students should be able to explain the concept of Work, Power | Students should be able to Describe the concept of Energy | **6.The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. | |
| | **Mathematics** | Student are able to implement complex number | Students are able to apply principle of ODE of first & second order | Student can demonstrate the LDE | Student can implement & solve problem of fourier series | Student can evaluate a particular kind of problems based on vector calculus in surface difference | Student can evaluate a particular kind of problems based on vector calculus in surface integral | 7.**Environment and sustainability:** Understand the impact of the professional Dr. Babasaheb Ambedkar Technological University, Lonere engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. | |
| | **ENGG. PHYSICS** | Students will able to know the application of Physics in engineering fields. | Solve the equations of free, forced, damped oscillations. | Determine the light phenomenon like: interference, refraction, polarization. | Understand the nuclear physics in engineering and science. | Determine the types of materials & crystal structure. | Understanding of applications of laser, optical fiber, x-rays. | **8.Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. | |

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| **First Year SEM-II** | **Basic Computer Programming** | Design flowchart / algorithms for given problem | Write, compile, debug & execute structured C programs by applying knowledge of various C Features like control and loop structures. | Write, compile, debug & execute structured C programs by applying knowledge of various C Features like array, pointer and function. | Apply features like structure and unions efficiently in small C applications | Develop the use of the C programming language to implement various algorithm, and develop the basic concept and terminology of programming in general | Introduce the more advanced features of the C language | **9.Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. | 3.Excellent adaptability to the changing industrial and real world requirements |
| | **Basic Electrical & Electronics Engineering** | Define the fundamental terms and elementary concept 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. | | | **10.Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. | |
| | **Basic Mechanical Engineering** | Understand basic principles of thermodynamics | To study IC engine & automotive parts | Built to built engineering knowledge about machine design | Apply theoretical knowledge to prepare micro projects | Develop creative thinking by team building and brainstorming | To study basic knowledge of mechanical engineering for life skills. | **11.Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one"s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. | |
| | | | | | | | | **12.. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. | |

**BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.**

**BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.**

**DEPARTMENT: Computer Science And Engineering**

**Academic Year: 2019-20**

| | Name of Subject | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | Program Outcomes | PSOs |
|---|---|---|---|---|---|---|---|---|---|
| **Second** | **Discrete Mathematics** | 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. | 1. Engineering knowledge: Apply engineering fundamentals, and complex engineering problems | Apply basic knowledge related to the discipline to solve engineering/ societal problems. |
| | **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. | | | 2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. | |
| | **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. | | 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate consideration for the public health and safety, and the cultural, social, and environmental considerations. | |

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| **Second Year SEM-I** | **Digital Electronics & Microprocessors (BTCOC305)** | Define the fundamental terms and elementary concepts of Logicss and IC's. | Describe combinational circuits. | )Define the term related to sequential circuit. | Describe the term related to Microprocessor 8086. | | | Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. | Recognize and adapt to technical developments and to engage in lifelong learning and develop consciousness for professional, social, legal and ethical responsibilities. |
| | **Basic Human Rights (BTHMC306)** | Understand the history of human rights. | 2) 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. | Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. | |
| | **Python Programming (BTCOL307)** | 1)Develop a basic understanding of the Python programming language. | To learn how to design and program Python applications. | Demonstrate significant experience with Python program development environment. | Solve problems requiring the writing of well- documented programs in the Python language, including use of the logical constructs of that language. | | | The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. | |
| | **HTML and Javascript** | Use a variety of strategies and tools to create websites. | Create a functioning web application suitable for portfolio presentation. | Learn the language of the web: HTML and CSS. | Understand and apply effective web design principles. | | | Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. | |
| **Second Year SEM-II** | **DAA** | 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. | | Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. | |
| | **P&S** | 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 | | | Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. | |
| | **OS** | 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. | Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write | |
| | **OOP in C++** | Acquirethe basics of object oriented concepts. | Illustrate theconcepts like operator overloading & inheritance. | Illustrate the concept of polymorphism and streams. | Practicing use of different features of Object Oriented Methodology like templates, exception handling etc. | Analyze object oriented concepts and their utility | Apply Object oriented approach to design complex C++ Program | 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one"s own work, as a member and leader in a | |
| | **NM** | Understanding of Basic of communication and types | Comprehend English speech sound system, stress and intonation | Understand the basic grammar principles | To study the four skills (LSRW) in English language | | | Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and | Excellent adaptability to the changing industrial and real world requirements |
| | **PDE** | Solve the equations of free, forced, damped oscillations. | Determine the light phenomenon like: interference, refraction, polarisation. | Understand the nuclear physics in engineering and science. | Determine the types of materials & crystal structure. | Understanding of applications of laser, optical fibre, x-rays. | | | |
| | **Database System** | 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. | | | |

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| **Third Year SEM-I** | **Theory of Computation** | 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 |
| | **Machine Learning** | 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. | |
| | **Business Communication** | To participate in an online learning environment successfully by developing the implication-based understanding of Paraphrasing, deciphering instructions, interpreting guidelines, discussion boards & Referencing Styles. | To demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary & Grammar. | To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization. | To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization. | 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. |
| **Third Year SEM-II** | **Compiler Design** | Demonstrate various phases involved in compilation process | Differentiate between methodologies required for language translation. | Design various phases of compiler | Implement various phases of compiler through use of programming languages and tools. | | |
| | **Computetr Network** | To demonstrate the purpose of different layers. | To write application layer protocols using services offered by the transport layer protocols such as UDP, TCP & SCTP. | To show the functioning of DHCP, DNS and e-mail system | | | |
| | **OOAD** | | | | | | |
| | **IoT** | 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 |
| | **Development Engineering** | Explain different definitions of Development Engineering | Identify & compare engineer's role in different societal issues. | Explain the importance of basic human rights. | Elaborate the performance of technology in different international and global issues. | Identify the role of engineer for sustainable development of society & Environment. | Explain the use of ICT, AI, Blockchain in Social Development. |
| | **Competetive Programming-II** | 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 |
| **Final Year SEM-I** | **Distributed System** | Understand the basics of distributed systems and middleware. | Design and simulate distributed system software modules using various methods, strategies, and techniques presented in the course that fulfills requirements for desired properties. | Apply principles of distributed systems in a real world setting across multidisciplinary areas. | Apply knowledge of Hadoop Distributed File system, its architecture and working for active research at the forefront of these areas | | |
| | **Machine Learning** | | | | | | |
| | **Modern Database System** | Differentiate between Distributed & Parallel databases. | Implement object oriented databases, mining concepts | Implement different query processing algorithms. | Tabulate SQL, NoSQL & New SQL with its applications. | Articulate technologies like Hadoop, MongoDB, Cassandra, Pig , Hive. | Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. |
| | **STQA** | Understand what a software bug is, how serious they can be, and why they occur. | Test software to meet quality objectives & requirements | Apply testing skills to common testing tasks | Perform the planning and documentation of test efforts | Understand software quality concepts, assurance & standards | Use testing tools to test software in order to improve test efficiency with automation |

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| | **Data Mining** | Examine the types of the data to be mined for a particular application. | Apply preprocessing statistical methods for any given raw data. | Select and apply proper data mining algorithms to build analytical applications | Understand and differentiate between different types of clusters | Comprehend the roles that data mining plays in various fields and manipulate different data mining techniques | Demonstrate and apply a wide range of Clustering, Classification and association rule mining algorithms |
| | **Information Retrival** | Acquire concepts of Information retrieval & Web retrieval System. | Demonstrate the performance of information retrieval systems.(Application) | Explain different querying patterns in retrieval models. (Understand) | Explain different indexing structure like inverted index, hash files, suffix arrays for given collection of documents. (Understand) | Demonstrate multimedia IR system and indexing on multimedia data. (Application) | Discuss architectural issues of Digital Libraries.(Understand) |
| **Final Year SEM-II** | **MIS** | Understand information systems and their uses | Use computerized management information systems | Understand analysis and decision making. | Apply modern project management techniques. | Aware of security issues related to information Systems | Analyse Different E-commerce systems. |
| | ICS | Recognize common attack patterns, evaluate vulnerability of an information system and establish a plan for risk management. | Demonstrate how to detect and reduce threats in Web security, how to secure a wireless network. | Evaluate the authentication and encryption needs of an information system. | Explain the Public Key Infrastructure process. | Evaluate a company's security policies and procedures. | Implement Firewall design principles and identify various intrusion detection systems and be able to achieve system security. |
| | Data Mining | Understand Data Mining fundamentals, Data Mining Principles | Identify appropriate data mining algorithms to solve real world problems | Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining | Describe complex data types with respect to spatial and web mining | Benefit the user experiences towards research and innovation. integration. | |
| | Cloud Computing | Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. | Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost. | Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing. | Analyze various cloud programming models and apply them to solve problems on the cloud | | |

**BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.**

**DEPARTMENT: CIVIL ENGG**

**Academic Year: 2019-20**

| | **Name of Subject** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** | **CO6** | **Program Outcomes** | **PSOs** |
|---|---|---|---|---|---|---|---|---|---|
| | **Building construction** | Understand types of masonry structures | Understand composition of concrete and effect of various parameters affecting strength | Comprehend components of building and there purposes | Comprehend the precast and pre-engineered building construction techniques | Draw plan, elevation and section of various structures. | Prepare detailed working drawing for doors and windows. | Apply the knowledge of mathematics, basic sciences, and mechanical engineeringto the solution of complex | Make the students employable in engineering industries. |
| | **Hydraulics-I** | Calibrate the various flow measuring devices | **Determine the properties of fluid.** | Understand fundamentals of pipe flow, losses in pipe and pipe network. | **Visualize fluid flow phenomena observed in Civil Engineering systems.** | Explain Similarities between model and prototype. | **Understand theories of laminar and turbulent flow.** | Identify, formulate, research literature, and analyze complex mechanical engineering problems reaching substantiated | Motivate the students for higher studies and research |
| | **Mechanics of solids** | Perform the stress-strain analysis. | **Draw force distribution diagrams for members and determinate beams.** | Find deflections in determinant beams. | **Visualize force deformation behavior of bodies.** | The students will be able to analyze determinate structural members subjected to different types of loadings. | **The students will be able to analyze special structures such as composite beams and thin walled cylinders.** | Design solutions for complex engineering problems and design mechanical systemcomponents that meet the specified needs. | |
| **Second** | **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. | **Solve numerical problems on bearing, leveling, traversing.** | Use and adjust the levels, theodolites, plane table and total station. | **Prepare plans, maps and reports for surveying projects** | Use mechanical engineering research-based knowledge related to interpretation of data and provide valid conclusions. | |

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| **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. | **Student can apply Laplace and inverse Laplace transforms for solving linear differential equations.** | Student can express a function in terms of sine and cosine components so as to model simple periodic functions. | **Student can evaluate counter integrations of complex functions.** | Student can solve higher order linear differential equation with constant coefficient | **Student can evaluate counter integrations of complex function** | Create, select, and apply modern mechanical engineering and IT tools to complex engineering activities with an understanding of the limitations. |
| | **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.** | Students will be able to draw geological maps. | **This course will be able to carry out preliminary geological investigation of site related to civil engineering projects.** | Apply reasoning acquired by the mechanical engineering knowledge to assess societal and safety issues. |
| | Soft Skills Development | | | | | | | Understand the impact of engineering solutions on the environment, and demonstrate the knowledge for sustainable development |
| | | | | | | | | **Apply ethical principles** |
| **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 | **Exhibit the analytical capabilities of pressure and velocity distribution in an open channel in order to solve practical problems.** | The students will be able to apply their knowledge of fluid mechanics in addressing problems in open channels | **Develop basic knowledge of open channel flow.** | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings |
| | **Structural Mechanics** | 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** | | | **Communicate effectively on complex engineering activities with the engineeringcommunity and with society at large.** |
| | **Surveying-II** | Understand basics different types of curves on roads and their preliminary survey. | **Perform setting of curves, buildings, culverts and tunnels** | Comprehend different geodetic methods of survey such as triangulation, trigonometric levelling | **Comprehend modern advanced surveying techniques.** | Understand the advantages of electronic surveying over conventional surveying methods | | Understand the engineering and management principles and apply these to themultidisciplinary environments. |
| | **Product Design Engineering** | Create simple design of components or a system whole | Create design documents for knowledge shearing. | Manage own work to meet design requirements. | **Work effectively in team.** | | | Recognize the need for life-long learning in the broadest context of technological change. |
| | **Engineering Management** | Demonstrate the nuances of management functions. | **Analyze the framework of a business organization.** | Adopt an empirical approach toward business situations. | **Apply various Management techniques.** | Recognize the fundamentals of Management thoughts that are vital for the development of conceptual frame work of Management as a | **Apply the principles of decision making through planning, organizing, staffing, directing and controlling** | |
| | **Numerical Methods in Engineering** | Able to learn Sources of error in computation and its propagation. | **Able to learn Simple polynomial interpolation on equally & unequally spaced data.** | Able to learn Trapezoidal & Simpson's 1/3rd Rules. | **Able to learn Iterative and Matrix-Factorization methods for system of linear equations.** | Able to learn Finding root by Regula Falsi and Newton-Raphson methods | **Able to find root by Regula Falsi and Newton-Raphson methods.** | |
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| **Third Year SEM-I** | **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** | | | |
| | **Soil Mechanics** | 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. | **Explain Rankin' s and Coulomb's earth pressure** | Explain Terzaghi's theories. | **Know the theory of shear strength and its determination.** | |
| | **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.** | Public awareness of environmental is at infant stage. | **Development and improvement in std. of living has lead to serious environmental** | |
| | **Transportation Engineering** | The students will be able to carry out geometric design and pavement design of roads for particular nature and intensity of traffic as per IRC standards. | **The student will be able carry out testing various road construction materials in Laboratory using modern equipments & instruments and draw appropriate conclusions regarding their usability.** | The student will be able to undertake traffic studies and adopt appropriate traffic signals | **Comprehend to various types of pavements** | Design the pavements by considering various aspects associated with traffic safety measures. | **Comprehend various types of transportation systems and their history of the development** | |

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| | **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** | | | | |
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| **Third Year SEM-II** | **Building Planning & Design** | To plan buildings considering various principles of planning and bye laws of governing body. | **Comprehend various utility requirements in buildings** | Understand various techniques for good acoustics. | | | |
| | **Design of concrete structure-I** | Comprehend to the various design philosophies used for design of reinforced concrete. | **Analyze and design the reinforced concrete slab using limit state and working state method.** | Analyze and design the reinforced concrete beam using limit state and working state method. | Use IS code of practice for the design of concrete elements | **Design the beams, slab and columns** | Design and prepare detailed drawings of various RCC structural elements |
| | **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.** | Know the concept of deep and shallow foundation. | **Explain types of slope failure** |
| | **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 | |
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| **Final Year SEM-I** | **Quality Surveying and Valuation** | Prepare estimate for Building, road, canal works. | **Calculate Quantity of material required for civil engineering works as pe specification** | Evaluate contracts and tenders n construction practices. | **Prepare rate analysis for different works.** | Carry out valuation of land and buildings. | **Demonstrate professional ethics in Civil Engineering sector.** |
| | **Engineering Management-II** | Plan the project and prepare Bar chart and Network to optimize the project duration and cost | **Update the network and reevaluate the resources.** | Demonstrate the decision making abilities based on economics in projects and to appraise alternative projects | **Analyze life cycle cost and value of the project.** | Use appropriate project management application software for planning, tracking and reporting progress of civil engineering | |
| | **Design of concrete structure-I** | Use IS code of practice for the design of concrete elements | **Analyze and design the reinforced concrete slab using limit state method.** | Design and prepare detailed drawings of various RCC structural elements | Comprehend to the various design philosophies used for design of reinforced concrete. | Analyze and design the reinforced concrete beam using limit state method. | |
| | **Earthquake Engineering** | Apply the Principles of Earthquake Engineering in planning, design and | **Demonstrate the dynamic analysis of structures under** | Incorporate Earthquake resistant features for various types of construction. | | | |
| | **Air pollution and control** | Identify the sources of air pollutants and their effect on human, plants and materials. | **Apply knowledge of meteorology for controlling air pollution** | Design of air pollution controlling equipments. | **Use knowledge of legislation for prevention and control of air pollution** | | |
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| | **Design of concrete structure-II** | Design of staircases and footing by Limit State Method | **Design of counter fort retaining walls and RCC water tanks by approximate and Indian Standard method** | Design a prestressed concrete beams accounting for losses | | | |
| | **Construction Practices and town planning** | Prepare layout of small towns | **Identify and select various inputs for town planning** | Calculate output of construction machines | **Execute various items of construction work using construction machinery and adopt** | | |

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| **Final Year SEM-II** | **Transportation Engineering-II** | Perform geometric design for the Railway tracks. | **Learn different types of structural components, engineering properties of the materials, to calculate the material quantities required for construction** | Design simple turnout at points and crossings and explain the working principles of railway interlocking system. | **Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids.** | Identify components of Docks and Harbour and their working principles | |
| | **Solid and hazardous waste management** | Suggest waste reduction and resource recovery methods | **Explain various waste disposal methods** | Examine legal, political and administrative considerations in design and operation of solid and hazardous waste management | | | |
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**BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.**
**DEPARTMENT: E&TC ENGG.**
**Academic Year: 2019-20**

| | Name of Subject | CO1 | CO2 | CO3 | CO4 | CO5 | CO6 | CO7 | CO8 | CO9 | CO10 | ram Outc | PSOs |
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| | Engineering Mathematics-III | students will be able to solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits. | students will be able to Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing | students will be able to 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. | students will be able to Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields. | students will be able to Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing | | | | | | Apply the knowledge of mathematics, basic sciences, and electronics and communication engineering to the solution of complex engineering problems. | Make the students employable in engineering industries. |
| | Analog Circuits | students will be able to Understand the characteristics of IC and Op-Amp and identify the internal structure. | students will be able to Understand and identify various manufacturing techniques | students will be able to Derive and determine various performances based parameters and their significance for Op-Amp. | students will be able to Comply and verify parameters after exciting IC by any stated method | students will be able to Analyze and identify the closed loop stability considerations and I/O limitations. | students will be able to Analyze and identify linear and nonlinear applications of Op-Amp. | students will be able to Understand and verify results (levels of V & I) with hardware implementation. | students will be able to Implement hardwired circuit to test performance and application for what it is being designed. | students will be able to Underst and and apply the function alities of PLL. | | Identify, formulate, researchliterature, and analyze complex electronics and communication engineering problems reaching substantiated | Motivate the students for higher studies and research. |
| **Second** | Electronic Devices & Circuits | students will be able to Comply and verify parameters after exciting devices by any stated method | students will be able to Implement circuit and test the performance. | students will be able to Analyze small signal model of FET and MOSFET. | students will be able to Explain behavior of FET at low frequency. | students will be able to Design an adjustable voltage regulator circuits. | | | | | | Design solutions for complex engineering problems and design electronics system components that meet the specified needs. | |

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| **Second Year SEM-I** | Network Analysis | students will be able to Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same. | students will be able to 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. | students will be able to Identify issues related to transmission of signals, analyze different RLC networks. | students will be able to Find technology recognition for the benefit of the society. | | | | | | | Use electronics and communication engineering research-based knowledge related to interpretation of data and provide valid conclusions |
| | Digital Logic Design | students will be able to Use the basic logic gates and various reduction techniques of digital logic circuit in detail. | students will be able to Design combinational and sequential circuits. | students will be able to Design and implement hardware circuit to test performance and application | students will be able to Understand the architecture and use of VHDL for basic operations and Simulate using simulation software. | | | | | | | Create, select, and apply modern electronics and communication engineering and IT tools to complex engineering activities with an understanding of the limitations. |
| | Basic Human Rights | students will be able to Simply put, human rights education is all learning that develops the knowledge, skills, and values of human rights. | students will be able to Strengthen the respect for human rights and fundamental freedoms | students will be able to Enable all persons to participate effectively in a free society. | students will be able to Learn about human rights principles, such as the universality, indivisibility, and interdependence of human rights. | students will be able to Learn about regional, national, state, and local law that reinforces international human rights law. | students will be able to Learn and know about and being able to use global, regional, national, and local human rights instruments and mechanisms for the protection of human rights. | | | | | Apply reasoning acquired by the electronics and communication engineering knowledge to assess societal and safety issues. |
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| | Electrical Machines and Instruments | students will be able to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions. | students will be able to analyze the response of any electrical machine | students will be able to troubleshoot the operation of an electrical machine. | students will be able to select a suitable measuring instrument for a given applica | students will be able to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument. | | | | | | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings |

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| **Second Year SEM-II** | Analog Communication Engineering | students will be able to Understand and identify the fundamental concepts and various components of analog communication systems. | students will be able to Understand the concepts of modulation and demodulation techniques. | students will be able to Design circuits to generate modulated and demodulated wave. | students will be able to Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance. | students will be able to Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase). | students will be able to Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system. | students will be able to Develop the ability to compare and contrast the strengths and weaknesses of various communication systems. | | | | Communicate effectively on complex engineering activities with the engineering community and with society at large. |
| | Microprocessor | Learner gains ability to apply knowledge of engineering in designing different case studies. | Students get ability to conduct experiments based on interfacing of devices to or 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. | Students will design cost effective real time system to serve engineering solution for Global, social and economic context. | This course understanding will enforce students to acquire knowledge of recent trends like superscalar and pipelining and thus finds recognition of continuous updation. | Learn use of hardware and software tools. | Develop interfacing to real world devices. | | | Understand the engineering and management principles and apply these to the multidisciplinary environments. |
| | Signals and Systems | Students will be able to Understand mathematical description and representation of continuous and discrete time signals and systems. | Students will be able to Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system. | Students will be able to Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. | Students will be able to Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain. | Students will be able to Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event. | | | | | | Recognize the need for life-long learning in the broadest context of technological change |
| | Product Design Engineering | students will be able to Create simple mechanical or other designs | students will be able to Create design documents for knowledge sharing | students will be able to Manage own work to meet design requirements | students will be able to Work effectively with colleagues. | | | | | | | |
| | Numerical Methods and Computer Programming | students will be able to solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and also will be able to choose a proper one as per the requirement of the problem. | students will be able to solve a system of linear equations with any number of variables using different direct and iterative numerical techniques. | students will be able to Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values. | students will be able to Prepare them to write computer programs for the numerical computational techniques | students will be able to Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagnetics etc. | students will be able to Understand procedure-oriented and object oriented programming concepts. | students will be able to Capable of writing C and C++ programs efficiently. | | | | |

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| | Electromagnetic Field Theory | students will demonstrate the ability to Understand characteristics and wave propagation on high frequency transmission lines | students will demonstrate the ability to Carryout impedance transformation on TL | students will demonstrate the ability to Use sections of transmission line sections for realizing circuit elements | students will demonstrate the ability to Characterize uniform plane wave | students will demonstrate the ability to Calculate reflection and transmission of waves at media interface | students will demonstrate the ability to Analyze wave propagation on metallic waveguides in modal form | students will demonstrate the ability to Understand principle of radiation and radiation characteristics of an antenna | | | | |
| | Control System Engineering | students will demonstrate the ability to Understand the modeling of linear-time-invariant systems using transfer function and state-space representations. | students will demonstrate the ability to Understand the concept of stability and its assessment for linear-time invariant systems. | students will demonstrate the ability to Design simple feedback controllers. | | | | | | | | |

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| **Third Year SEM-I** | Computer Architecture | students will demonstrate the ability to learn how computers work | students will demonstrate the ability to know basic principles of computer"s working | students will demonstrate the ability to analyze the performance of computers | students will demonstrate the ability to know how computers are designed and built | students will demonstrate the ability to Understand issues affecting modern processors (caches, pipelines etc.). | | | | | |
| | Digital Signal Processing | students will be able to Understand use of different transforms and analyze the discrete time signals and systems. | students will be able to Realize the use of LTI filters for filtering different real world signals. | students will be able to Capable of calibrating and resolving different frequencies existing in any signal. | students will be able to Design and implement multistage sampling rate converter. | students will be able to Design of different types of digital filters for various applications. | | | | | |
| | Microcontroller and its Applications | Learner gains ability to apply knowledge of engineering in designing different case studies. | Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications. | Graduates will be able to design real time controllers using microcontroller based system. | 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 microcontrollers. | Students will design cost effective real time system to serve engineering solution for Global, social and economic context. | Learners get acquainted with modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development environment tools. | Students get ability to Learn importance of microcontroller in designing embedded application. | Students get ability to Learn use of hardware and software tools. | Students get ability to Develop interfacing to real world devices. |
| | Probability Theory and Random Processes | students will demonstrate the ability to Understand representation of random signals | students will demonstrate the ability to Investigate characteristics of random processes | students will demonstrate the ability to Make use of theorems related to random signals | students will demonstrate the ability to To understand propagation of random signals in LTI systems | | | | | | |
| | Data Structure & Algorithms Using Java Programming | student will be able to impart the basic concepts of data structures and algorithms. | student will be able to understand concepts about searching and sorting techniques | student will be able to Describe how arrays, records, linked structures are represented in memory and use them in algorithms. | student will be able to understand basic concepts about stacks, queues, lists trees and graphs | student will be able to enable them to write algorithms for solving problems with the help of fundamental data structures. | | | | | |
| | Introduction to MEMS | students will be able to Appreciate the underlying working principles of MEMS and NEMS devices. | students will be able to Design and model MEM devices | | | | | | | | |

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| | Antennas and Wave Propagation | students will be able to Formulate the wave equation and solve it for uniform plane wave. | students will be able to Analyze the given wire antenna and its radiation characteristics. | students will be able to Identify the suitable antenna for a given communication system. | | | | | | | |
| | Computer Network & Cloud Computing | students will be able to master the terminology and concepts of the OSI reference model and the TCP‑IP reference model. | students will be able to master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks. | students will be able to be familiar with wireless networking concepts. | students will be able to be familiar with contemporary issues in networking technologies. | students will be able to be familiar with network tools and network programming | students will be able to 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. | students will be able to For a | students will be able to Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools. | | |
| | Digital Image Processing | students will be able to Review the fundamental concepts of digital image processing system. | students will be able to Analyze images in the frequency domain using various transforms. | students will be able to Categories various compression techniques. | students will be able to Interpret image segmentation and representation techniques. | | | | | | |
| | CMOS Design | students will be able to Design different CMOS circuits using various logic families along with their circuit layout. | students will be able to Use tools for VLSI IC design. | | | | | | | | |
| | Information Theory and Coding | students will demonstrate the ability to Understand the concept of information and entropy | students will demonstrate the ability to Understand Shannon "s theorem for coding | students will demonstrate the ability to Calculation of channel capacity | students will demonstrate the ability to Apply coding techniques | | | | | | |
| | Power Electronics | students will demonstrate the ability to Build and test circuits using power devices such as SCR | students will demonstrate the ability to Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters | students will demonstrate the ability to Learn how to analyze these inverters and some basic applications | students will demonstrate the ability to Design SMPS. | | | | | | |

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| **Third Year SEM-II** | Nano Electronics | students will demonstrate the ability to Understand various aspects of nano-technology and the processes involved in making nano components and material | students will demonstrate the ability to Leverage advantages of the nano-materials and appropriate use in solving practical problems. | students will demonstrate the ability to Understand various aspects of nano-technology and the processes involved in making nano components and material | students will demonstrate the ability to Leverage advantages of the nano-materials and appropriate use in solving practical problems. | | | | | | |
| | Android Programming | Students will demonstrate the ability to write simple GUI applications, | Students will demonstrate the ability to use built-in widgets and components | Students will demonstrate the ability to work with the database to store data locally, and much more. | | | | | | | |
| | Digital System Design | students will demonstrate the ability to Design and analyze combinational logic cir | students will demonstrate the ability to Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder | students will demonstrate the ability to Design & analyze synchronous sequential logic circuits | students will demonstrate the ability to Use HDL & appropriate EDA tools for digital logic design and simul | | | | | | |
| | Optimization Techniques | students will be able to Cast engineering minima/maxima problems into optimization framework | students will be able to Learn efficient computational procedures to solve optimization problems | | | | | | | | |
| | Project Management and Operation Research | Student will be able to Apply operations research techniques like L.P.P, scheduling and sequencing in industrial optimization problems | Student will be able to Solve transportation problems using various OR methods. | Student will be able to Illustrate the use of OR tools in a wide range of applications in industries. | Student will be able to Analyze various OR models like Inventory, Queing, Replacement, Simulation, Decision etc and apply them for optimization | Student will be able to Gain knowledge on current topics and advanced techniques of Operations Research for industrial solutions | | | | | |
| | Augmented, Virtual and Mixed Reality | students will be able to develop 3D virtual environments. | students will be able to develop 3D interaction techniques and immersive virtual reality applications. | | | | | | | | |
| | Python Programming | students will be able to Experience with an interpreted Language. | students will be able to build software for real needs | students will be able to Prior Introduction to testing software | | | | | | | |
| | Web Development and Design | student will be able to Develop the skill & knowledge of Web page design | student will be able to Understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors. | | | | | | | | |
| | Employability & Skill Development | student will be able to Have skills and preparedness for aptitude tests | student will be able to Be equipped with essential communication skills (writing, verbal and non-verbal) | student will be able to Master the presentation skill and be ready for facing interviews. | student will be able to Build team and lead it for problem solving. | | | | | | |

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| | Computer Communication Network | student will be able to Explain Data Communications System and its components. | student will be able to Develop building skills of subnetting and understand routing mechanisms. | student will be able to Enumerate the layers of the OSI model and TCP/IP and explain the function(s) of each layer. | student will be able to Identify the different types of network topologies and protocols. | student will be able to Acquaintance with the basic protocols of computer networks, and how they can be used to assist in network design and implementation | | | | | |
| | Embedded System Design | student will be able to design, execution and evaluation of experiments on embedded platforms | student will be able to analysis, design and testing of systems that include both hardware and software. | | | | | | | | |
| | Satellite Communication | students will be able to Explain basics of satellite communication | students will be able to Solve problems related to orbital mechanism, satellite link design. | students will be able to Explain the different types of earth stations. | students will be able to Understand working principle of GPS and navigation system. | | | | | | |

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| **Final Year SEM-I** | Database Management System | student will be able to Define and apply the basic concepts of database system, design, relational model and schemas. | student will be able to Design principles for logical design of databases, including the E- R method and normalization approach for any real time application. | student will be able to Evaluate, using relational algebra and SQL, solutions to a broad range of query problems in a relational DBMS. | student will be able to Demonstrate an understanding of normalization theory and apply such knowledge to normalize a database. | student will be able to Familiar with the basic issues of transaction processing (ACID properties), different methods of concurrency control and recovery techniques. | | | | | |
| | Image & Video Processing | students will be able to Develop and implement algorithms for digital image and video processing. | students will be able to Apply image and video processing algorithms for practical computer vision applications. | | | | | | | | |
| | Optimization Techniques | students will be able to Solve problems based on classical optimization techniques | students will be able to Discuss linear and non linear programming methods. | students will be able to Solve problems based on unconstrained optimization techniques. | students will be able to Use modern techniques for optimization | | | | | | |
| | Electronic Product Design | students will be able to Obtain reliability of electronic product | students will be able to Design ergonomics of electronic product | students will be able to Design control panel | students will be able to Analyze thermal design | students will be able to Use CAD for electronic product design | | | | | |
| | Advanced Digital Signal Proces | student will be able to understand theory of different filters and algorithms | student will be able to understand theory of multirate DSP, solve numerical problems and write algorithms | student will be able to understand theory of prediction and solution of normal equations | student will be able to know applications of DSP at block level. | | | | | | |

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| **Final Year SEM-II** | Internet of Things | Student can elaborate different components of an IoT System. | Student can describe the architecture Cortex M3 series ARM microcontroller | Student can write interfacing program for different applications with ARMmicrocontroller. | Student can describe different communication technologies and application protocolsused in IoT. | Student can elaborate different cloud platforms of IoT. | | | | | |
| | Multimedia Communication Techniques | students will be able to Understand the concept of basic television signal processing and different types of multimedia data | students will be able to Identify globally accepted colour TV standards | students will be able to Demonstrate the need of audio and video compression techniques in real life | students will be able to Analyze different compression algorithms. | students will be able to Acquire knowledge of latest digital TV systems and applications | | | | | |
| | VLSI DESIGN | student will be able to Explain different syntax of VHDL language. | student will be able to Design, simulate and analyze combinational and sequential logic circuits using VHDL. | student will be able to Explicate the terms associated to MOS transistor and CMOS logic. | student will be able to Implement logic gates and simple Boolean expression using CMOS logic. | student will be able to Describe CPLD and FPGA architecture and its internal components and explain concept of ASIC and SOC. | student will be able to Explain different testing methods for combinational and sequential logic, IC testing and write test bench for simple combinational circuit. | | | | |
| | Network Security | students will be able to Recognize common attack patterns, evaluate vulnerability of an information system & establish a plan for risk management. | students will be able to Demonstrate how to detect and reduce threats in Web security, how to secure a wireless network | students will be able to Evaluate the authentication and encryption needs of an information system. | students will be able to Explain the Public Key Infrastructure process | students will be able to Evaluate a company's security policies and procedures | | | | | |
| | Soft Computing | students will be able to analyze and appreciate the applications which can use fuzzy logic. | students will be able to design inference systems | students will be able to understand the difference between learning and programming and explore practical applications of Neural Networks (NN). | students will be able to appreciate the importance of optimizations and its use in engineering fields and other domains. | students will be able to understand the efficiency of a hybrid system and how Neural Network and fuzzy logic can be hybridized to form a Neuro-fuzzy network and its various applications. | | | | | |
| | DSP Processors & Application | students will be able to Apply mathematical fundamentals to DSP Processors | students will be able to Use fundamentals of Programmable DSP Processors for different applications | students will be able to Write Assembly language programs for DSP Processors | students will be able to Knowledgeable in the architecture and programming of TMS320C5X, TMS320C3X Processors for real time applications | | | | | | |
| | Data Analytics | student will be able to Deploying the Data Analytics Lifecycle to address data analytics projects. | student will be able to Use the right method to solve real problem. | student will be able to Selecting appropriate data visualizations to clearly communicate analytic insights. | student will be able to Use the tools and techniques to apply different algorithms and methodologies. | | | | | | |

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| **BHAGWANT INSTITUTE OF TECHNOLOGY, BARSHI.** |
| **DEPARTMENT: MECHANICAL ENGG.** |

| Academic Year: 2019-20 | | | | | | | | | |
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| | **Name of Subject** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** | **CO6** | **Program Outcomes** | **PSOs** |
| **Second Year SEM-I** | **Engineering Mathematics-III** | apply Laplace and inverse Laplace transforms for solving linear differential equations. | Student can express a function in terms of sine and cosine components so as to model simple periodic functions. | Student can find the relation between two variables for the given data using regression | | | | Apply the knowledge of mathematics, basic sciences, and mechanical engineering to the solution of complex engineering problems. | Make the students employable in engineering industries. |
| | **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 | Identify, formulate, research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions | Motivate the students for higher studies and research. |
| | **Fluid Mechanics** | Define fluid, define and calculate various properties of fluid | Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies | Explain various types of flow. Calculate acceleration of fluid particles | Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics | Explain laminar and turbulent flows on flat plates and through pipes | Explain and use dimensional analysis to simple problems in fluid mechanics | Design solutions for complex engineering problems and design mechanical system components that meet the specified needs | |
| | **Machine Drawing and CAD** | Interpret the object with the help of given sectional and orthographic views. | Construct the curve of intersection of two solids | Draw machine element using keys, cotter, knuckle, bolted and welded joint | Assemble details of any given part. i. e. valve, pump , machine tool part etc. | Represent tolerances and level of surface finish on production drawings | Understand various creating and editing commands in Auto Cad | Use mechanical engineering research-based knowledge related to interpretation of data and provide valid conclusions | |
| | **Thermodynamics** | Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics. | Study different laws of thermodynamics and apply these to simple thermal systems like balloon, piston-cylinder arrangement, compressor, pump, refrigerator, heat exchanger, etc. to study energy balance. | Study various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes. | Apply availability concept to non-flow and steady flow type systems. | 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. | | Create, select, and apply modern mechanical engineering and IT tools to complex engineering activities with an understanding of the limitations. | |
| | **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. | Apply reasoning acquired by the mechanical engineering knowledge to assess societal and safety issues | |
| **Second Year SEM-II** | **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, planing and drilling, their types and related tooling's | Understand the impact of engineering solutions on the environment, and demonstrate the knowledge for sustainable development. | |
| | **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 | Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method | Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach | | Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice | |
| | **STRENGTH OF MATERIAL** | State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, etc. | Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases. | Distinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. shear stress, their planes and max. normal and shear stresses on a given plane. | 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 | Differentiate between beam and column and calculate critical load for a column using Euler's and Rankine's formulae | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. | |
| | **NUMERICAL METHODS IN MECHANICAL ENGG.** | Describe the concept of error | Illustrate the concept of various Numerical Techniques | Evaluate the given Engineering problem using the suitable Numerical Technique | Develop the computer programming based on the Numerical Techniques | | | Communicate effectively on complex engineering activities with the engineering community and with society at large. | |
| | **PRODUCT DESIGN ENGINEERING-I** | Create simple mechanical designs | Create design documents for | Manage own work to meet design | Work effectively with colleagues | | | Understand the engineering and management principles | |
| | **Interpersonal Communication Skill& Self Development** | Acquire interpersonal communication skills | Develop the ability to work independently. | Develop the qualities like self-discipline, self-criticism and self-management. | Have the qualities of time management and discipline. | Present themselves as an inspiration for others | Develop themselves as good team leaders | Recognize the need for life-long learning in the broadest context of technological change | |
| | **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, mass transfer and 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 | | |

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| **Third Year SEM-I** | **Applied Thermodynamics – I** | 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. | Study and Analyze gas power cycles and vapour power cycles like Otto, Diesel, dual, Joule and Rankine cycles and derive expressions for the performance parameters like thermal efficiency, Pm | Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant. | Classify various types of IC engines. Sketch the cut section of typical diesel engine and label its components. Define the terms like TDC, BDC, rc, etc. | Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary 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 and rope drive for a particular application | Evaluate gear tooth geometry and select appropriate gears, gear trains | Define governor and select/suggest an appropriate governor | Characterize flywheels as per engine requirement | Understand gyroscopic effects in ships, aeroplanes, and road vehicles. | Understand free and forced vibrations of single degree freedom systems |
| | **Metrology and Quality Control** | Identify techniques to minimize the errors in measurement | Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts. | Choose limits for plug and ring gauges | Explain methods of measurement in modern machineries | Select quality control techniques and its applications | Plot quality control charts and suggest measures to improve the quality of product and reduce cost using Statistical tools. |
| | **Product Design Engineering - II** | Create prototypes | Test the prototypes | Understand the product life cycle management | | | |
| | **Automobile Engineering** | 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. | Apply vehicle troubleshooting and maintenance procedures. | Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications. | Evaluate future developments in the automobile technology. |
| **Third Year SEM-II** | **Manufacturing Processes- II** | 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 | Design jigs and fixtures for given application |
| | **Machine Design-II** | Define function of bearing and classify bearings. | Understanding 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, belts and chain | Design of elements like gears, belts and chain for given power rating | Design thickness of pressure vessel using thick and thin criteria |
| | **Applied Thermodynamics- II** | Study engine classification, nomenclature, valve timing, power cycles, and combustion in SI & CI. | Study starting systems, ignition systems, lubrication system. Engine testing and performance, parameters. Apply for solve problems. | Study various types of air refrigeration systems, VCC, VAB and represent them on p-h and T-s planes. | Study various properties of moist air, psychometric chart. Controls in air conditioning. | Study various sources of energy for power plant, cycles for steam and gas turbine power plant. | Study various power plants. |
| | **Quantitative Techniques in Project Management** | Define and formulate research models to solve real life problems for allocating limited resources by linear programming. | Apply transportation 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. |
| | **Solar Energy** | Describe measurement of direct, diffuse and global solar radiations falling on horizontal and inclined surfaces. | Analyze the performance of flat plate collector, air heater and concentrating type collector. | Understand test procedures and apply these while testing different types of collectors. | Study and compare various types of thermal energy storage systems. | Analyze payback period and annual solar savings due to replacement of conventional systems. | Design solar water heating system for a few domestic and commercial applications |
| **Final Year SEM-I** | **Automatic Control Engineering** | 1) To make the students aware of basic mathematical analysis techniques used for Automatic control systems. | 2) To make use of the software MATLAB to solve simple problems in control Engg. as a part of Term-Work | | | | |
| | **Operations Research** | 1. Apply various optimization techniques to industrial applications. | 2. Develop a project plan for the industry or organization. | | | | |
| | **Refrigeration and Air Conditioning** | 1. Analyze basic refrigeration cycles and air refrigeration systems | 2. Select proper refrigerant and appropriate refrigeration system based on application | 3. Define and estimate psychometric properties | 4. Estimate cooling and heating load calculations and design air conditioning system for different applications | | |

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| | **Automobile Engineering** | 1. Demonstrate & explain various systems in an automobile | 2. Describe importance and features of different elements like axle, differential, brakes, steering, suspension, wheel balancing etc. | 3. Explain principle of operation, construction and applications of various sensors used in modern automobile | | | |
| | **Entrepreneurship Development** | 1. Avail various government facilities required to set-up small unit. | 2. Prepare a project report for setting a small manufacturing or service unit. | 3. Find the solutions for problems face by SMEs. | | | |
| **Final Year SEM-II** | **Industrial & Quality Management** | 1. Demonstrate various management functions. | 2. Apply statistical tools to industrial / organizational problems. | | | | |
| | **Industrial Engineering** | 1. Analyze & measure productivity. | 2. Perform method study and work measurement etc. | 3. Develop improved method of working/process for manufacturing /service sector. | | | |
| | **Production and Operation Management** | 1. Apply the principles and techniques used in production management. | 2. Solve the problems related to production. | | | | |
| | **Plastic Engineering** | 1. Select the plastic materials for particular end user application | 2. Predict the structure and properties of different kind of plastic material | 3. Know the processing of different plastic material based on the end user requirement. | | | |