JAGANNATH
UNIVERSITY, JAIPUR
(UGC Approved & NAAC Accredited)

BACHELOR OF TECHNOLOGY (ET0141)

Program Outcomes
Program Specific Outcomes
Course Outcomes

PROGRAM OUTCOMES OF BACHELOR OF ENGINEERING & TECHNOLOGY (POs)

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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.

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.

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.

7. 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.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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.

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. Lifelong 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.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1. Should be able to apply knowledge of mathematics, science, and engineering to engineering complex problems.

PSO2. Should be able design and conduct experiments, as well as to analyze and interpret data.

PSO3. Should have the capability to design systems, components, or processes to meet desired industry needs.

PSO4. Should posses the skills to communicate in both oral and written forms, the work already done and the future plans with necessary road maps, demonstrating the practice of professional ethics and the concerns for societal and environmental wellbeing.

COURSE OUTCOMES OF SEMESTER – I

BTBSC 101 ENGINEERING MATHEMATICS-I

CO1: Learn the calculation and Applications of definite integrals.

CO2: Able to solve problems related to Sequences and Series.

CO3: Interpret the concept of s series as the sum of a sequence and able to solve problems related to Fourier Series.

CO4: Interpret the concept of s series as the sum of a sequence and use the sequence of partial sums to determine divergence of a series.

CO5: Learn the calculation and Applications of Multivariable integrals.

BTBSC 102 ENGINEERING PHYSICS

CO1: To enhance the basic skills required to understand, develop, and design various engineering applications involving Wave Optics.

CO2: To understand Quantum Mechanics and apply them to diverse engineering problems.

CO3: Analyze the nature of light propagation in guided medium for engineering applications and study in Coherence and Optical Fibers.

CO4: To study different Laser problems.

CO5: To study Material Science & Semiconductor Physics.

BTHSMC 103 COMMUNICATION SKILLS

CO1: To understand Communication. Media and Types of Communication.

CO2: To know Grammar of Passive Voice, Reported Speech.

CO3: To Compose Job Application and Curriculum-Vitae.

CO4: To study different Short Stories.

CO5: To study different Poems.

BTESC 104 PROGRAMMING FOR PROBLEM SOLVING

CO1: To know and understand the conventions of Fundamentals of Computer.

CO2: To represent algorithms through flowchart and pseudo code.

CO3: To learn Number system and apply these skill in developing new products.

CO4: To understand and learn C Programming.

CO5: Comprehend the Development of C programs using- Arrays, functions.

BTESC 105B BASIC CIVIL ENGINEERING

CO1: To develop basic skills for designing various instruments for engineering applications.

CO2: To determine error in laboratory measurements and techniques used to minimize such error.

CO3: The students will be able to think innovatively and also improve the creative skills that are essential for civil engineering.

CO4: To know and understand the conventions of Selection of site for Buildings, Layout of Building Plan, Types of buildings.

CO5: To study the surveying and Transportation Engineering.

BTBSC 106 ENGINEERING PHYSICS LAB

CO1: Understand the usage of common Ammeter , voltmeter and Multimeter.

CO2: Formulate and solve complex AC, DC circuits.

CO3: Understand the usage of common electrical measuring instruments.

CO4: Identify the type of electrical machine used for that particular application.

CO5: Understand the usage of optical instruments.

BTHSMC 107 LANGUAGE LAB

CO1: To know and understand the Phonetic Symbols and Transcriptions.

CO2: To learn how to Extempore.

CO3: To improve their oral and visualization skills so that they can apply these skill in developing Group Discussion.

CO4: To improve their technical communication skill in the form of communicative drawings.

CO5: Make them learn and invest in Dialogue Writing and Listening comprehension.

BTESC 108 COMPUTER PROGRAMMING LAB

CO1: To learn about the C Library, Preprocessor directive, Input-output statement.

CO2: To learn data type, variables, If-else statement.

CO3: To learn about array and string operations.

CO4: To understand File handling operations.

CO5: Basically the students can learn programs related to C Programming.

BTESC109A BASIC CIVIL ENGINEERING LAB

CO1.Understand the usage of Compass Survey: Measurement of bearing of lines using Surveyor's and Prismatic compass.

CO2. To do Levelling using Tilting, Dumpy or Automatic Level.

CO3. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.

CO4. To study various water supply Fittings and Sanitary Fittings.

CO5: Basically the students can learn Practicals related to basic civil construction.

BTESC 110 COMPUTER AIDED ENGINEERING GRAPHICS

CO1: To know and understand the conventions and the method of engineering drawing.

CO2: Interpret engineering drawings using fundamentals of different views to Construct basic and intermediate geometry.

CO3: To know the Theory of sectioning and Section of Solids.

CO4: Comprehend the theory of projection.

CO5: To improve their drawing skill in the form of Computer Graphics.

COURSE OUTCOMES OF SEMESTER - II

BTBSC 201 ENGINEERING MATHEMATICS-II

CO1: Understand the matrices, Rank of a matrix, rank-nullity theorem; System of linear equations.

CO2: Identify, analyze and subsequently solve physical situations whose behavior can be described by First order and First degree ordinary differential.

CO3: Determine solutions to second order linear differential equations with variable coefficients. Solve some differential equation which is not solvable in ordinary case but series solution gives an idea of developing special function which has important role in some physical phenomena arising in engineering problem.

CO4: To solve Engineering problems using different methods and techniques.

CO5: To evaluate the first order and Second order partial differential equations.

BTBSC 202 ENGINEERING CHEMISTRY

CO1: To develop interest among students in various branches of inorganic chemistry. To impart essential theoretical knowledge on atomic structure, periodic properties, chemical bonding, and nuclear chemistry

CO2: To make students capable of understanding and studying organic fuels .To have exposure to various emerging new areas of organic chemistry.

CO3: To impart the students a thorough knowledge about the chemistry of some Engineering Materials like Portland Cement.

CO4: To enable the students to understand and study Organic reaction mechanisms.

CO5: To learn about Corrosion and its control.

BTHSMC 203 HUMAN VALUES

CO1: To understand and analyze Basic Guidelines, Content and Process for Value Education.

CO2: To study the principles of Understanding Harmony in the Human Being - Harmony in Myself.

CO3: To understand the Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship.

CO4: To understand the Understanding Harmony in the Nature and Existence – Whole existence as Coexistence.

CO5: To differentiate ac and Implicate the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values.

BTESC 204 BASIC MECHANICAL ENGINEERING

CO1: To know and understand the Fundamentals of thermal engineering, mechanical machine design, industrial engineering and manufacturing technology.

CO2: To understand the Refrigeration and Air Conditioning.

CO3: To understand the Applications and working of Reciprocating and Centrifugal pumps.

CO4: To know the Transmission of Power through Belt and Rope Drives, Gears.

CO5: To get a basic understanding of Primary Manufacturing Processes.

BTESC 205A BASIC ELECTRICAL ENGINEERING

CO1: To develop basic skills for designing various instruments for engineering applications.

CO2: To determine error in laboratory measurements and techniques used to minimize such error.

CO3: Students will gain knowledge regarding the various laws and principles associated with electrical systems.

CO4 : Students will gain knowledge regarding electrical machines and apply them for practical problems.

CO5:.Students will acquire knowledge in using the concepts in the field of electrical engineering, projects and research.

BTHSMC 206 ADVANCED ENGLISH

CO 1: Communicate in a variety of social, travel and work-related situations

CO 2: Improve conversation skills

CO 3: Develop confidence and proficiency in all major skills

CO 4: Practice English in 'real life' situations

CO 5: Get to know new people

CO 6: Learn how to apply grammar knowledge

CO 7: Widen vocabulary skills

BTHSMC 207 HUMAN VALUES ACTIVITIES

CO1: To Introduce yourself in detail and analyze Basic Guidelines, Content and Process for Value Education.

CO2: To study the principles of Understanding Harmony in the Human Being - Harmony in Myself.

CO3: To understand the Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship. Recollect and narrate an incident in your life.

CO4: To understand the Understanding Harmony in the Nature and Existence – Whole existence as Coexistence. Summarize the core massage of this course grasped by you.

CO5: To differentiate ac and Implicate the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values.

BTESC 208 MANUFACTURING PRACTICES WORKSHOP

CO1: Ability to cast different parts through Carpentry.

CO2: Ability to control manufacturing via computers.

CO3: Ability to use power tools and fitting tools.

CO4: Knowledge of various welding operations

CO5: Ability to mould different metallic and non metallic objects.

BTESC 209A BASIC ELECTRICAL ENGINEERING LAB

CO1. Students will gain knowledge regarding the various laws and principles associated with electrical systems.

CO2 : Students will gain knowledge regarding electrical machines and apply them for practical problems.

CO3 : Students will gain knowledge regarding various types' Electrical Equipments.

CO4 : Student will gain knowledge digital measuring equipments.

BTESC 210 COMPUTER AIDED MACHINE DRAWING

CO1: To know and understand the conventions and the method of engineering drawing.

CO2: Interpret engineering drawings using fundamentals of different views to Construct basic and intermediate geometry.

CO3: To know the Theory of sectioning and Section of Solids.

CO4: Comprehend the theory of projection.

CO5: To improve their drawing skill in the form of Computer Graphics.

Mechanical Engineering

Bachelor of Technology

SEMESTER: III

Subject Name: Advance Engineering Mathematics-I (BTMEBSC301)

Course Outcomes:

Upon completion of this course, students will :

CO1: Acquire knowledge about Fourier series

CO2: Gain the knowledge of Laplace's equation in two dimensions

CO3: Knowledge about using Functions of a complex variable

CO4: Knowledge about using Z Transforms.

CO5: Gain the knowledge about boundary value problems.

Subject Name: Managerial Economics & Financial Accounting (BTMEHSMC302)

Course Outcomes:

Upon completion of this course, students will:

CO1: Determine the objectives, nature, role & responsibilities of a business undertaking.

CO2: Predict the demand for a product or product mix of a company & to analyze various factor influencing demand elasticity.

CO3: Forecast & compute the future sales level of a product by using various qualitative techniques and with the help of past sales data.

CO4: Asses the cost behavior, costs, useful for managerial decision making and determine break even point of an enterprise.

Subject Name: Engineering Mechanics (BTMEESC303)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Use a standard process for analyzing static objects

CO2: Define a force and a moment.

CO3: Add forces and moments in two and three dimensions, and find a component of a force or moment in a given direction.

CO4: Construct free body diagrams of an object or a system of connected objects

CO5: Use conditions of equilibrium and known forces and moments to solve for unknown external and internal forces and moments present in an object of system of connected objects.

Subject Name: Engineering Thermodynamics (BTMEPCC304)

Course Outcomes:

Upon completion of this course, students will able :

CO1: To learn about work and heat interactions, and balance of energy between system and its surroundings.

CO2: To learn about application of I law to various energy conversion devices

CO3: To evaluate the changes in properties of substances in various processes

CO4: To understand the difference between high grade and low grade energies and II law limitations on energy conversion

CO5-Tto examine the condition of steam and performance of vapour power cycle and vapour compression cycle.

Subject Name: Materials Science and Engineering (BTMEPCC305)

Course Outcomes:

Upon completion of this course, students will be:

CO1. Able to identify crystal structures for various materials and understand the defects in such structures

CO2. Understand how to tailor material properties of ferrous and non-ferrous alloys

CO3. How to quantify mechanical integrity and failure in materials

CO4. Figure out the different mechanical properties of material by studying different destructive and non- destructive testing.

CO5. Articulate and utilize corrosion prevention strategies and estimate corrosion behavior of materials and components

Subject Name: Mechanics of Solids (BTMEPCC306)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to recognize various types loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components

CO2: Able to evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading

CO3: Proficient to construct Shear Force and Bending Moment diagrams for statically determinate beam due to concentrated load, uniformly distributed load, uniformly varying load and couple.

CO4: Able to determine bending and shear stresses in machine elements.

CO5: Able to Evaluate Slope and Deflection of Statically Determine beams subjected to concentrated load, uniformly distributed load, uniformly varying load and couple and also strain energy in members subjected to Gradual, sudden and impact loads

Subject Name: Machine drawing practice (BTMEPCC307)

Course Outcomes:

Upon completion of this course, students will be able:

CO1: To know and understand the conventions and the method of engineering drawing.

CO2: Interpret engineering drawings using fundamental technical mathematics. Construct basic and intermediate geometry.

CO3: To improve their visualization skills so that they can apply these skill in developing new products.

CO4: To improve their technical communication skill in the form of communicative drawings.

CO5: Comprehend the theory of projection.

Subject Name: Materials Testing Lab (BTMEPCC308)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Classify the materials

CO2: Understand the basic properties that characterize the behavior of materials

CO3: Understand the type of loadings/environment that materials should withstand

CO4: Select appropriate type of material for specific application

CO5: Offer different approaches to modify structure/microstructure in order to get desired properties

Subject Name: Basic Mechanical Engineering Lab (BTMEPCC309)

Course Outcomes:

Upon completion of this course, students will get:

CO1: Understanding of various pumps.

CO2: Understanding of various tools.

CO3: Understanding of different mechanical systems.

Subject Name: Programming using MATLAB (BTMEPCC310)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the main features of the MATLAB development environment

CO2: Use the MATLAB GUI effectively

CO3: Design simple algorithms to solve problems

CO4: Write simple programs in MATLAB to solve scientific and mathematical problems

SEMESTER IV

Subject Name: Data Analytics (BTMEBSC401)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.

CO2: Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.

CO3: Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.

CO4: Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

Subject Name: Technical Communications (BTMEHSMC402)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.

CO2:Understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks. Students will also focus on these following points-

- The Mechanics of Writing
- Usage of words and phrases
- Selecting the right words
- Grammar, spelling & punctuation
- Creating style in technical writing
- Technical Writing Reviewing and Revising
- Editing for quality
- Structuring Information for Understanding
- Problem words
- Technical Writing standards
- Technical Writing process
- Maintaining document structure

CO3: To learn about self awareness, different types of attitudes, Perceptions and beliefs.

CO4: Familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, reports, manuals, project , newsletters, articles, and presentation.

CO5: Students will marvelously able to understand about business ethics, role and responsibility of an engineer, complex problem solving and creativity etc.

Subject Name: Digital Electronics (BTMEESC403)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Convert different type of codes and number systems which are used in digital transmission and computer systems.

CO2: Apply the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.

CO3: Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the real time of economic, performance, efficiency, user friendly and environmental constraints.

CO5: Assess the nomenclature and technology in the area of various memory devices used and apply the memory devices in different types of digital circuits for real world application.

Subject Name: Fluid Mechanics & Fluid Machines (BTMEPCC404)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to mathematically analyze simple flow situations

CO2: Able to evaluate the performance of pumps and turbines.

CO3: Able to use conservation laws in integral form and apply them to determine forces and moments on surfaces of various shapes and simple machines

CO4: Able to use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and in viscid fluids

CO5: Able design simple pipe systems to deliver fluids under specified conditions and also the loosed during the flow of the fluid.

Subject Name: Manufacturing Processes (BTMEPCC405)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1-Select appropriate Manufacturing Processing to manufacture any component.

CO2-Interpret foundry practices like pattern making, mold making, Core making and Inspection of defects.

CO3-Differentiate various metal forming processes such as Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes.

CO4- Classify different cutting process.

CO5-Select appropriate machine processes

Subject Name: Theory of Machines (BTMEPCC406)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Design various types of linkage mechanisms for obtaining specific motion and analyze them for optimal functioning

CO2: Analyze the planar mechanisms for position, velocity and acceleration.

CO3. Synthesize planar four bar and slider crank mechanisms for specified kinematic conditions.

CO4. Evaluate gear tooth geometry and select appropriate gears for the required applications.

CO5. Cams and followers for specified motion profiles

Subject Name: Digital Electronics Lab (BTMEPCC407)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Convert different type of codes and number systems which are used in digital transmission and computer systems.

CO2: Apply the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.

CO3: Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the real time of economic, performance, efficiency, user friendly and environmental constraints.

CO5: Assess the nomenclature and technology in the area of various memory devices used and apply the memory devices in different types of digital circuits for real world application.

Subject Name: Fluid Mechanics Lab (BTMEPCC408)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Identify, name, and characterize flow patterns and regimes

CO2: Understand basic units of measurement, convert units, and appreciate their magnitudes

CO3: Utilize basic measurement techniques of fluid mechanics

CO4 Discuss the differences among measurement techniques, their relevance and applications

CO5: Measure fluid pressure and relate it to flow velocity

Subject Name: Production Practice Lab (BTMEPCC409)

Course Outcomes:

Upon completion of this course, students will be able to get:

CO1: Knowledge in various metal cutting operations in machine tools like lathe, drilling, milling, grinding, shaping, and planning, hobbing.

CO2: Know various machine tools and equipment for manufacturing

CO3: Make various threads

CO4: Understand the concept of patterns.

Subject Name: Theory of Machine Lab (BTMEPCC410)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to apply the principles of balancing of masses to various links, mechanisms and engines.

CO2. Able to apply the principles of gyroscopic effects and stabilization on various transport vehicles and applications of various governors.

CO3. Able to understand the working principles of brakes and dynamometer.

CO4. Able to determine moment of inertia of mechanical systems.

CO5. Able to determine the vibration parameters of different systems.

Semester V

Subject Name: Mechatronics Systems (BTME501)

Course Outcomes:

Upon completion of this course, students will be enabled to:

CO1: Identification of key elements of mechatronics system, representation into block diagram

CO2: Apply knowledge of the concept of signal processing and signal conditioning for its industrial applications

CO3: Analyze the requirements for a given industrial process and select the most appropriate Actuators, sensors, design circuit according to applications

CO4: Understand the different logic gates, architecture of microprocessor and microcontroller for industrial applications.

CO5: Develop Mechatronics system according to an Industrial Applications

Subject Name: Heat Transfer (BTME502)

Course Outcomes:

Upon completion of this course,:

CO1. After completing the course, the students will be able to formulate and analyze a heat transfer problem involving any of the three modes of heat transfer

CO2. The students will be able to obtain exact solutions for the temperature variation using analytical methods where possible or employ approximate methods or empirical correlations to evaluate the rate of heat transfer

CO3. The students will be able to design devices such as heat exchangers and also estimate the insulation needed to reduce heat losses where necessary.

CO4. Calculate and execute the impact of boundary conditions on the solutions of heat transfer in conduction and convection problems like extended surfaces (Fins)

CO5-Determine performance of thermal systems related to one dimension, steady state 0tural and Forced Convection heat transfer by theoretically and experimentally.

Subject Name: Manufacturing Technology (BTME503)

Course Outcomes:

Upon completion of this course, students will :

CO1: Be able to understand the tooling needed for manufacturing,

CO2: Be able to understand the dimensional accuracy.

CO3: Be able to understand tolerances of products.

CO4: Be able to understand assembly of different components.

CO5: Be able to understand application of optimization methods in manufacturing.

Subject Name: Design Of Machine Elements I (BTME504)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Get an overview of the design methodologies employed for the design of various machine components.

CO2: To apply knowledge of the stress and strain of mechanical components; and understand, identify and quantify factor of safety, failure modes for simple mechanical components subjected to direct and bending and combined loading. Acquire a skill and logic of finding resisting areas against failure and simple component design by using design data hand book.

CO3: Develop Logical and Analytical ability to apply Knowledge of various theories of failures for design of Mechanical components use in Industries like Joints, Bolts, Shafts etc. and Understand and develop analytical ability to design shaft subjected to combined loading

CO4: Understands the mechanism of fatigue failures of parts and its use in mechanical component design. Be able to estimate endurance strength of ductile and brittle materials and develop analytical ability to apply fatigue theories for ductile and brittle material in static and dynamic loading

CO5: Understand different welded and riveted joints structure and able to apply its knowledge to analyze its strength when subjected to simple, coplanar and eccentric loading.

Subject Name: Principles of Management (BTME505)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Understand the concepts related to Business.

CO2: Demonstrate the roles, skills and functions of management.

CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.

CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

Subject Name: Automobile Engineering (BTME506)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Identify the different parts of the automobile

CO2: Explain the working of various parts like engine, transmission, clutch, brakes

CO3: Describe how the steering and the suspension systems operate.

CO4: Understand the environmental implications of automobile emissions

CO5: Develop a strong base for understanding future developments in the automobile industry

Subject Name: Mechatronics Lab (BTME507)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Analyse the velocity and direction of fluid power circuit with the help of simulation software.

CO2: Demonstrate the fluid power circuits using PLC

CO3: Observe interface between stepper motor and 8051 micro controller

CO4: Simulate the basic electric, hydraulic and pneumatic system using simulation software.

Subject Name: Heat Transfer Lab (BTME508)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the basic laws of heat transfer.

CO2: Account for the consequence of heat transfer in thermal analyses of engineering systems.

CO3: Analyze problems involving steady state heat conduction in simple geometries.

CO4: Develop solutions for transient heat conduction in simple geometries.

CO5: Understand the fundamentals of convective heat transfer process. i.e. Natural, forced and mixed convection in various type of flow. i.e. internal and external flow.

Subject Name: Production Engineering Lab (BTME509)

Course Outcomes:

Upon completion of this course, students will get:

CO1: Knowledge in various metal cutting operations in machine tools like lathe, drilling, milling, grinding, shaping, and planning, hobbing.

CO2: Able to try various machine tools and equipment for manufacturing

CO3: Able to make various threads

CO4: Able to understand the concept of patterns.

Subject Name: Machine Design Practice Lab (BTME510)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Be able to apply design knowledge for Design of Cotter Joint and Knuckle Joint etc and formulate the design procedure and acquire skill of finding resisting areas against failure. Apply the knowledge of Design Data Hand Book and ISO standards for selection of materials, strengths, standard dimensions of design components.

CO2: Able to apply design and drafting knowledge of CAD software for drafting assembly and details of Bolted joint, Coupling, Cotter joint, Knuckle Joint etc.

CO3: Develop Logical and Analytical ability to apply Knowledge of CAD for design of Shaft subjected to direct and combined loading

CO4: Be able to apply skill of design and drafting CAD software for standard welded and riveted joint as per ISO standard. Apply the design knowledge and formulation for safe design

CO5:Able to apply design procedure for finding the maximum force the given power screw can lift and able to draft and design on CAD software and compare it with analytical results

Semester VI

Subject Name: Measurement & Metrology (BTME601)

Course Outcomes:

Upon completion of this course, students will be able:

CO1: To understand the basic measurement units and able to calibrate various measuring devices

CO2: To express error and correction factors of various measuring devices.

CO3: To use measuring Load Measurement System.

CO4: To understand the thermocouple wire etc

CO5: To understand the Capacitance, resistance and inductance etc.

Subject Name: Computer Integrated Manufacturing Systems (BTME602)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1. Identify key decision areas for operations managers and researchers for design of production planning and control systems

CO2. Formulate competitive priorities and manufacturing strategy for a given pro duction system to derive strategic advantage.

CO3. Apply ROP, MRP and JIT systems for inventory control in production systems.

CO4. Design push and pull systems using the principles of factory dynamics.

CO5. Design factory systems for shop floor control, production scheduling, aggregate planning and capacity planning.

Subject Name: Mechanical Vibrations (BTME603)

Course Outcomes:

Upon completion of this course,:

CO1:. Students will be able to construct the equations of motion for free-body diagrams.
CO2: Students will be able to construct the governing differential equation and its solution for a vibrating mass subjected to an arbitrary force

CO3: Students will be able to decompose any periodic function into a series of simple harmonic motions using Fourier series analysis.

CO4:. Students will be able to solve for the motion and the natural frequency for forced vibration of a single degree of freedom damped or undamped system.

CO5: Students will be able to solve vibration problems that contain multiple degrees of freedom.

Subject Name: Design of Machine Elements II (BTME604)

Course Outcomes:

Upon completion of this course, students will:

CO1: Acquire knowledge about Fatigue Considerations in Design

CO2: Acquire knowledge about Pre loading of bolts.

CO3: Gain the knowledge about Design of helical compression, tension, torsional springs

CO4: Gain the knowledge about Springs under variable stresses.

CO5: Gain the knowledge about Design of gear teeth, Design of sliding & journal bearing.

Subject Name: Quality Management (BTME605)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: To use the tools and techniques of TQM in manufacturing and service sectors.

CO2: Select appropriate quality tools to be applied for specific situations to meet industrial requirements.

CO3: Prepare industries according to the various National and International quality standards.

CO4: To use the Quality Function Development

Subject Name: Non Conventional Machining Methods (BTME606A)

Course Outcomes:

Upon completion of this course,:

CO1: Create awareness among students about Non-Conventional sources of energy technologies

CO2: Enable students to understand various renewable energy technologies and systems.

CO3: To impart the knowledge of Storage technologies form the autonomous renewable energy sources

CO4: Equip the students with knowledge and understanding of various possible mechanisms about renewable energy projects

Subject Name: Power Plant Engineering (BTME606B)

Course Outcomes:

Upon completion of this course,:

CO1- Students will be able to understand basic knowledge of Different types of Power Plants, site selection criteria of each one of them and understanding of Power Plant Economics, Energy Storage including compressed air energy and pumped hydro etc.

CO2- Students will be able to select the suitability of site for a power plant and will be able to calculate load factor, capacity factor, average load and peak load on a power plant. Students will also be able to propose ash handling, coal handling method in a the thermal power plant.

CO3-Student Should be able to calculate performance of thermal power plant.

CO4-Students will be able to understand the working of Hydroelectric and Nuclear power plant

CO5-Students will be able to understand the working of Diesel & Gas Turbine Power plant

Subject Name: MEMS and Microsystems (BTME606C)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Illustration the design and modeling of MEMS components.

CO2: Explain the various MEMS fabrication technologies.

CO3: Describe the mechanical, thermal, electrical, magnetic and chemical properties of material.

CO4: Discuss the lumped modeling of systems and transducers.

CO5: Interpret the micro system dynamics.

Subject Name: CIMS Lab (BTME607)

Course Outcomes:

Upon completion of this course, students will be :

CO1: Able to apply knowledge about Computer Aided Quality control and Process Planning Control.

CO2: Able to Design Flexible manufacturing cell after carrying out Group technology study and finally creating FMS.

CO3: Able to apply knowledge about various methods of communication in CIMS.

CO4: Able to apply data management and its importance for decision making in CIMS environment.

Subject Name: Vibration Lab (BTME608)

Course Outcomes:

Upon completion of this course,

CO1: Students will be able use frequency and time domain measurement systems and analysis techniques for vibrational systems.

CO2: Students will be able to construct the equations of motion for free-body diagrams.

CO3: Students will be able to solve for the motion and the natural frequency of a freely vibrating single degree of freedom undamped motion

CO4: Students will be able to construct the governing differential equation and its solution for a vibrating mass subjected to an arbitrary force.

CO5: Students will be able to solve for the motion and the natural frequency for forced vibration of a single degree of freedom damped or undamped system

Subject Name: Machine Design Practice II Lab (BTME609)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to understand Fatigue loading and tension in different springs.

CO2: To understand bolts subjected to variable stresses.

CO3: To understand Sliding contact bearing design and Anti-friction bearing selection its applications.

Subject Name: Thermal Engineering Lab (BTME610)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Compute the property of fuels and lubricating oils using suitable tests.

CO2: Demonstrate the performance of internal combustion engines and air compressors

CO3: Interpret the emission characteristics of internal combustion engines

Semester: VII

Subject Name: Finite Element Methods (BTME701)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the general steps of finite element methods.

CO2: Identify mathematical model for solution of common engineering problems.

CO3: Understand the basic finite element formulation techniques.

CO4: Formulate simple problems into finite elements.

CO5: Derive equations in finite element methods for 1D, 2D and 3D problems

Subject Name: Refrigeration & Air Conditioning (BTME702)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the principles and applications of refrigeration systems.

CO2: Understand vapour compression refrigeration system and identify methods for performance improvement.

CO3: Study the working principles of air, vapour absorption, thermoelectric and steam-jet refrigeration systems.

CO4: Analyze air-conditioning processes using the principles of psychometric.

CO5: Evaluate cooling and heating loads in an air-conditioning system.

Subject Name: Operations Research (BTME703)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Solve Linear Programming Problems

CO2: Solve Transportation and Assignment Problems

CO3: Understand the usage of game theory and Simulation for Solving Business Problems

CO4: Be able to choose rational options in practical decision-making problems using standard mathematical models of operations research;

CO5: Have skills in analysis of operations research objectives, mathematical methods and computer systems

Subject Name: Turbomachines (BTME704)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the main applications of turbo machines and Recognize typical designs of turbo machines.

CO2: Understand the working principles of turbo machines and apply it to various types of machines.

CO3: Calculate the velocity triangles in turbo machinery stages operating at design and off-design conditions

Subject Name: Operations Management (BTME705)

Course Outcomes:

Upon completion of this course, students will be able to understand:

CO1: Scope of Operations Management, components of forecasting, Selection of forecasting technique

CO2: Types of Production planning and Process analysis Systems,, Evaluation of alternatives-Cost-Volume analysis

CO3: Production Planning, Planning levels, MRP and MRPII Systems

CO4: Production control function, batch production and mass production systems

CO5: Functions of material management, inventory control systems, lead time and reorder point

Subject Name: Micro and Nano Manufacturing (BTME706A)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Illustration the design and modeling of MEMS components.

CO2: Explain the various Nano fabrication technologies.

CO3: Describe the mechanical, thermal, electrical, magnetic and chemical properties of nano material.

CO4: Discuss the lumped modeling of systems and transducers.

CO5: Interpret the nano system dynamics.

Subject Name: Robotics (BTME706B)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Classify and characterize the robots based on the configuration and work volume.

CO2: Explain and solve the problems related to robot design and control

CO3: Illustrate the working of the transmission system in a robot.

CO4: Discuss the concept of vision system and image processing

CO5: Write programs for automatic functioning of a robot.

Subject Name: CNC Machines and Programming (BTME706C)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1.Classify and distinguish NC, CNC and DNC systems.

CO2.Develop manual and APT part programs for 2D complex profiles and test the programs through simulation.

CO3.Understand CNC machine structures and system drives.

CO4. Develop interpolation algorithms for control loops.

CO5. Understand latest developments in CNC system.

Subject Name: Thermal Engineering Lab-II (BTME707)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Demonstrate conduction, convection and radiation heat transfer through experiments.

CO2: Interpret heat transfer enhancement mechanisms.

CO3: Estimate the size and type of heat exchangers.

CO4: Calculate the cooling load of air conditioning systems and cooling towers.

Subject Name: FEM Lab (BTME708)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: To demonstrate the ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software

CO2: To model multi-dimensional heat transfer problems using ANSYS;

CO3: To demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes.

CO4: To develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use.

Semester: VIII

Subject Name: Computer Integrated Manufacturing Systems (BTME801)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1Identify key decision areas for operations managers and researchers for design of production planning and control systems

CO2Formulate competitive priorities and manufacturing strategy for a given production system to derive strategic advantage.

CO3Apply ROP, MRP and JIT systems for inventory control in production systems.

CO4Design push and pull systems using the principles of factory dynamics.

CO5Design factory systems for shop floor control, production scheduling, aggregate planning and capacity planning.

Subject Name: Laws for Engineers (BTME802)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to understand the basic laws assessment.

CO2: Able to control their work environment.

CO3: Able to identify the flaws in the working systems.

CO4: Able to regulate the proper work ethics.

Subject Name: Power Generation (BTME803)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Describe and analyze different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.

CO2: Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts

CO3: Combine concepts of previously learnt courses to define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types

CO4: Describe the working principle and basic components of the nuclear power plant and the economic and safety principles involved with it.

CO5: Discuss the working principle and basic components of the hydroelectric plants and the economic principles and safety precautions involved with it.

Subject Name: Product Development and Launching (BTME804A)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1 To understand the technical and business aspects of the product development process

CO2.Skilled in implementation of gathering data from customers and establish technical specification

CO3.To understand product functional decomposition

CO4. To participate in engineering problem solving

CO5.To understand the principles behind product modularization, to be able to understand intellectual property issues in product development

Subject Name: Computational Fluid Dynamics (BTME804B)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Express numerical modeling and its role in the field of fluid flow and heat transfer.

CO2: Apply the various discretization methods, solution procedures and turbulence modeling to solve flow and heat transfer problems.

CO3: Interpret the knowledge, capability of analyzing and solving any concept or problem associated with heat energy dynamics and utilization.

CO4: Illustrate the working concepts of thermal engineering.

Subject Name: Total Quality Management (BTME804C)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: To use the tools and techniques of TQM in manufacturing and service sectors.

CO2: Select appropriate quality tools to be applied for specific situations to meet industrial requirements.

CO3: Prepare industries according to the various National and International quality standards.

CO4: To use the Quality Function Development

Subject Name: CAM Lab (BTME805)

Course Outcomes:

Upon completion of this course, students will be:

CO1: Able to learn the part programming

CO2: Able to learn the importance of group technology.

CO3: Able to learn computer aided process planning,

CO4: Able to learn computer aided quality control

Subject Name: CAD Lab (BTME806)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Demonstrate basic concepts of the AutoCAD software

CO2: Apply basic concepts to develop construction (drawing) techniques

CO3: Ability to manipulate drawings through editing and plotting techniques

CO4: Understand geometric construction

CO5: Produce 2D Orthographic Projections

Subject Name: Industrial Engineering Lab - II (BTME807)

Course Outcomes:

Upon completion of this course, students will be :

CO1: Able to design a system, component, or process to meet desired needs within realistic constraints

CO2: Able to identify the control charts.

CO3: Able to draw and calculate the different charts and diagrams.

CO4: Knowledgeable of defining standard deviations.

Computer Science & Engineering

Bachelor of Technology

SEMESTER – III

Subject Name: Advanced Engineering Mathematics (BTCSBSC301)

CO1: Acquire knowledge about Fourier series.

CO2: Gain the knowledge of Laplace's equation in two dimensions.

CO3: Knowledge about using functions of a complex variable.

CO4: Knowledge about using Z transforms.

CO5: Gain the knowledge about boundary value problems.

Subject Name: Managerial Economics and Financial Accounting (BTCSHSMC 302)

Upon completion of this course, students will :

CO1: Determine the objectives, nature, role & responsibilities of a business undertaking.

CO2: Predict the demand for a product or product mix of a company & to analyze various factor influencing demand elasticity.

CO3: Forecast & compute the future sales level of a product by using various qualitative techniques and with the help of past sales data.

CO4: Asses the cost behavior, costs, useful for managerial decision making and determine break even point of an enterprise.

Subject Name: Digital Electronics (BTCSESC 303)

CO1: Convert different type of codes and number systems which are used in digital transmission and computer systems.

CO2: Apply the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy,performance and efficiency.

CO3: Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping andmathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the real time of economic, performance, efficiency, user friendly andenvironmental constraints.

CO5: Assess the nomenclature and technology in the area of various memory devices used and apply the memory devices in different types of digital circuits for real world application.

Subject Name: Data Structures and Algorithms (BTCSPCC304)

CO1: For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.

CO2: For a given Search problem (Linear Search and Binary Search) student will able to implement it.

CO3: For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.

CO4: Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

CO5: Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Subject Name: Object Oriented Programming (BTCSPCC305)

CO1: Knowledge of the structure and model of the Java programming language.

CO2: Use the Java programming language for various programming technologies(understanding)

CO3: Develop software in the Java programming language, (application)

CO4: Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)

CO5: Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)

Subject Name: Software Engineering (BTCSPCC306)

CO1: To look at the large scale software development from a broader perspective, and function in multidisciplinary teams.

CO2: To apply knowledge gained in the course to practical software development situations in methodical way.

CO3: To design software systems to meet desired needs with realistic constraints.

CO4: To communicate effectively in software development activities.

CO5: To get an idea about contemporary issues in Software development and engage in life-long learning, understand professional and ethical responsibility

Subject Name: Data Structures and Algorithms Lab (BTCSPCC307)

CO1: Be able to design and analyze the time and space efficiency of the data structure.

CO2: Be capable to identity the appropriate data structure for given problem.

CO3: Have practical knowledge on the applications of data structures.

Subject Name: Object Oriented Programming Lab (BTCSPCC308)

CO1: Understand the features of C++ supporting object oriented programming.

CO2: Understand the relative merits of C++ as an object oriented programming language.

CO3: Understand how to produce object-oriented software using C++.

CO4: Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.

CO5: Understand advanced features of C++ specifically stream I/O, templates and operator Overloading.

Subject Name: Software Engineering Lab (BTCSPCC309)

CO1. Create models for software applications.

CO2. Create DFD's for software applications.

CO3. Use the different UML notations for designing software.

Subject Name: Digital Electronics Lab (BTCSPCC310)

CO1: Convert different type of codes and number systems which are used in digital transmission and computer systems.

CO2: Apply the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy,performance and efficiency.

CO3: Analyze different types of digital electronic circuit using various mapping and logical

tools and know the techniques to prepare the most simplified circuit using various mapping andmathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits for particular operation, within the real time of economic, performance, efficiency, user friendly andenvironmental constraints.

CO5: Assess the nomenclature and technology in the area of various memory devices used and apply the memory devices in different types of digital circuits for real world application.

SEMESTER – IV

Subject Name: Discrete Mathematics Structure (BTCSBSC401)

CO1: Will be able to recognize the random variables, pmf, pdf, cdf, expectations of functions of random variables, mean, variance and learned some discrete and continuous probability distributions with practical exposure.

CO2: Understand the all distributions .Acquainted with the principle of least squares method for fitting the curve to the given data points. The concept of correlation and regression is next explained with its wide range of applications

CO3: The student will learn to handle, solve and analyzing problems using linear programming and other mathematical programming algorithms.

CO4: Understand classical optimization using differential calculus .

CO5: Understand the application of Linear programming like Transportation and Assignment problem.

Subject Name: Technical Communication (BTCSHSMC402)

CO1: Students will be able to produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.

CO2: Students will understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks.Students will also focus on these following points-

- The Mechanics of Writing
- Usage of words and phrases
- Selecting the right words
- Grammar, spelling & punctuation
- Creating style in technical writing
- Technical Writing Reviewing and Revising
- Editing for quality
- Structuring Information for Understanding
- Problem words
- Technical Writing standards
- Technical Writing process
- Maintaining document structure

CO3: Students will learn about self awareness, different types of attitudes, Perceptions and beliefs.

CO4: Students will be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, reports, manuals, project ,newsletters, articles, and presentation.

CO5: Students will marvelously able to understand about business ethics, role and responsibility of an engineer, complex problem solving and creativity etc.

Subject Name: Microprocessor & Interfaces (BTCSESC403)

CO-1: To understand the architecture of microprocessor and concept of microcontroller.

CO-2: Concept of assembly language programming.

CO-3: Concept of interfacing design of peripherals like I/O, A/D, D/A, timer, counter and memory devices etc.

CO-4: Develop systems using different microcontrollers

CO-5: Synchronous and Asynchronous Communication. RS232, SPI, I2C, Stepper motor interfacing and its applications.

Subject Name: Database Management System (BTCSPCC404)

CO1: For a given query write relational algebra expressions for that query and optimize the developed expressions

CO2: For a given specification of the requirement design the databases using E-R method and normalization.

CO3: For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.

CO4: For a given query optimize its execution using Query optimization algorithms

CO5: For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.

Subject Name: Theory of Computation (BTCSPCC405)

CO1: Write a formal notation for strings, languages and machines.

CO2: Design finite automata to accept a set of strings of a language.

CO3: For a given language determine whether the given language is regular or not.

CO4: Design context free grammars to generate strings of context free language.

CO5: Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars

CO6: Write the hierarchy of formal languages, grammars and machines.

Subject Name: Data Communication and Computer Networks (BTCSPCC406)

CO1: Explain the functions of the different layer of the OSI Protocol.

CO2: Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.

CO3: 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

CO4: For a given problem related TCP/IP protocol developed the network programming.

CO5: Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Subject Name: Microprocessor & Interfaces Lab (BTCSPCC407)

CO-1: Identify relevant information to supplement to the Microprocessor and Microcontroller course**.**

CO-2: Set up programming strategies and select proper mnemonics and run their program on the training boards.

CO-3: Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.

CO-4: Develop testing and experimental procedures on Microprocessor and Microcontroller analyze their operation under different cases.

CO-5: Prepare professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.

Subject Name: Database Management System Lab (BTCSPCC408)

CO1: Design a Database without anomalies as per requirements

CO2: Construct complex queries to retrieve required information from database

CO3: Use SQL for generating necessary reports.

CO4: Design procedures and functions for required database tasks.

CO5: Write assertions to implement integrity constraints on multiple tables

Subject Name: Network Programming Lab (BTCSPCC409)

CO1: To apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.

CO2: Understand and building the skills of routing mechanisms.

CO3: To explain how a collision occurs and how to solve it.

CO4: To be familiar with network tools and network programming.

CO5: Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Subject Name: Linux Shell Programming Lab (BTCSPCC410)

CO1: To make students able to implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.

CO2: Students will also be able to implement page replacement and memory management algorithms.

CO3: Apply UNIX/LINUX operating system commands.

CO4: Understand different UNIX/LINUX shell scripts and execute various shell programs.

CO5: Implement virtualization by installing Virtual Machine software.

Subject Name: Java Lab (BTCSPCC 411)

CO1: Understand the features of C++ supporting object oriented programming

CO2: Understand the relative merits of C++ as an object oriented programming language

CO3: Understand how to produce object-oriented software using C++

CO4: Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism

CO5: Understand advanced features of C++ specifically stream I/O, templates and operator overloading

SEMESTER – V

Subject Name : Information Theory & Coding (BTCS501)

CO1: Design the channel performance using Information theory.

CO2: Comprehend various error control code properties

CO3: Apply linear block codes for error detection and correction

CO4: Apply convolution codes for performance analysis & cyclic codes for error detection and correction.

CO5: Design BCH & RS codes for Channel performance improvement against burst errors.

Subject Name : Compiler Design(BTCS502)

CO1: For a given grammar specification develop the lexical analyzer

CO2: For a given parser specification design top-down and bottom-up Parsers

CO3: Develop syntax directed translation schemes

CO4: Develop algorithms to generate code for a target machine

Subject Name : Operating System (BTCS503)

CO1: Analyze the structure of OS and basic architectural components involved in OS design

CO2: Analyze and design the applications to run in parallel either using process or thread models of different OS

CO3: Analyze the various device and resource management techniques for timesharing and distributed systems

CO4: Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system

Subject Name : Computer Graphics & Multimedia(BTCS504)

CO1: To list the basic concepts used in computer graphics.

CO2: To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

CO3:To describe the importance of viewing and projections.

CO4: To define the fundamentals of animation, virtualreality and its related technologies.

Subject Name : Analysis of Algorithms(BTCS505)

CO1: For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.

CO2: Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.

CO3: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.

CO4: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.

Subject Name : Wireless Communication(BTCS506A)

CO1: Explain the Classification of mobile communication systems

CO2: Analyze the radio channel characteristics and the cellular principle

CO3: Analyze the measures to increase the capacity in GSM systems- sectorization and Spatial Filtering for Interference Reduction

CO4: Ability to analyze improved data services in cellular communication.

Subject Name : Human-Computer Interaction(BTCS506B)

CO1: Understand fundamental design and evaluation methodologies of **human computer interaction**.

CO2: Demonstrate knowledge of **human computer interaction** design concepts and related methodologies.

CO3: Apply theories and concepts associated with effective work design to real-world application.

Subject Name : Bioinformatics (BTCS 506C)

CO1: To get introduced to the basic concepts of Bioinformatics and its significance in Biological data analysis.

CO2: Describe the history, scope and importance of Bioinformatics and role of internet in Bioinformatics.

CO3: Explain about the methods to characterise and manage the different types of Biological data.

CO4 : Classify different types of Biological Databases.

CO5 : Introduction to the basics of sequence alignment and analysis.

CO6 : Overview about biological macromolecular structures and structure prediction methods.

Subject Name : Computer Graphics & Multimedia Lab(BTCS507)

CO1: To list the basic concepts used in computer graphics.

CO2: To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

CO3:To describe the importance of viewing and projections.

CO4: To define the fundamentals of animation, virtualreality and its related technologies.

Subject Name : Compiler Design Lab(BTCS508)

CO1: For a given grammar specification develop the lexical analyzer

CO2: For a given parser specification design top-down and bottom-up Parsers

CO3: Develop syntax directed translation schemes

CO4: Develop algorithms to generate code for a target machine

Subject Name : Analysis of Algorithms Lab(BTCS509)

CO1: For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.

CO2: Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.

CO3: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.

CO4: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.

Subject Name : Advance Java Lab(BTCS510)

CO1: learn to access database through Java programs, using Java Data Base Connectivity (JDBC)

CO2: create dynamic web pages, using Servlets and JSP.

CO3: make a resusable software component, using Java Bean.

CO4: invoke the remote methods in an application using Remote Method Invocation (RMI)

CO5: understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).

CO6: develop Stateful, Stateless

Subject Name : Industrial Training(BTCS 511)

SEMESTER – VI

Subject Name : Digital Image Processing(BTCS 601)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems.

Subject Name : Machine Learning (BTCS602)

CO1: The students will be able to: Build intelligent agents for search and games

CO2: Solve AI problems through programming with Python

CO3: Learning optimization and inference algorithms for model learning

CO4: Design and develop programs for an agent to learn and act in a structured environment.

Subject Name : Information Security System(BTCS603)

CO1: Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.

CO2: Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition. Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.

CO3: Incorporate approaches for incident analysis and response.

Subject Name : Computer Architecture and Organization(BTCS604)

CO1: Able to evaluate performance of the computer system and decode machine language

CO2: Able to design arithmetic and logic unit

CO3: Able to design and analyze pipelined control units

CO4: Able to design parallel processing architectures.

Subject Name : Artificial Intelligence(BTCS 605)

CO1: The students will be able to: Build intelligent agents for search and games

CO2: Solve AI problems through programming with Python

CO3: Learning optimization and inference algorithms for model learning

CO4: Design and develop programs for an agent to learn and act in a structured environment.

Subject Name : Cloud Computing(BTCS606)

CO1: Analyze the Cloud computing setup with it's vulnerabilities and applications using different architectures.

CO2: Design different workflows according to requirements and apply map reduce programming model.

CO3:Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.

CO4: Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds

CO5:.Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application

CO6: Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Subject Name : Distributed System(BTCS607A)

CO1: Distinguish distributed computing paradigm from other computing paradigms

CO2: Identify the core concepts of distributed systems

CO3: Illustrate the mechanisms of inter process communication in distributed system

CO4: Apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system

CO5: Compare the concurrency control mechanisms in distributed transactional environment

CO6: Outline the need for mutual exclusion and election algorithms in distributed systems

Subject Name : Software Defined Network (BTCS607B)

CO1: Examine the challenges and opportunities associated with adopting SDN compared to traditional approaches to networking.

CO2: Analyse the functions and components of the SDN architecture.

CO3: Discuss the major requirements of the design of an SDN protocol.

CO4: Design and create an SDN network consisting of SDN switches and a centralised controller.

CO5: Analyse the performance of the SDN network by using verification and troubleshooting techniques.

Subject Name : Ecommerce & ERP(BTCS607C)

CO1: Understand the basic concepts and technologies used in the field of management information systems;

CO2: Have the knowledge of the different types of management information systems;

CO3: Understand the processes of developing and implementing information systems;

CO4: Be aware of the ethical, social, and security issues of information systems;

Subject Name : Digital Image Processing Lab(BTCS608)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems.

Subject Name : Machine Learning Lab(BTCS609)

CO1: The students will be able to: Build intelligent agents for search and games

CO2: Solve AI problems through programming with Python

CO3: Learning optimization and inference algorithms for model learning

CO4: Design and develop programs for an agent to learn and act in a structured environment.

Subject Name : Python Lab(BTCS610)

CO1:Write, Test and Debug Python Programs

CO2:Implement Conditionals and Loops for Python Programs

CO3:Use functions and represent Compound data using Lists, Tuples and Dictionaries

CO4:Read and write data from & to files in Python and develop Application using Pygame

Subject Name : Mobile Application Development Lab(BTCS611)

CO1: Demonstrate the android features and create ,develop using android

CO2: Demonstrate and Understanding anatomy of an Android application

CO3: Apply the android geo location based services

CO4: Illustrate the android wifi features and advance android development

CO5: Demonstrate the linux security and implement ADL interface

SEMESTER – VII

Subject Name : Cloud Computing(BTCS701)

CO1: Analyze the Cloud computing setup with it's vulnerabilities and applications using different architectures.

CO2: Design different workflows according to requirements and apply map reduce programming model.

CO3:Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.

CO4: Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds

CO5:.Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application

CO6: Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Subject Name : Information System Security(BTCS702)

CO1: Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.

CO2: Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition. Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.

CO3: Incorporate approaches for incident analysis and response.

Subject Name : Data Mining & Ware Housing(BTCS703)

CO 1: Store voluminous data for online processing
CO 2: Preprocess the data for mining applications
CO 3: Apply the association rules for mining the data
CO 4: Design and deploy appropriate classification techniques
CO 5: Cluster the high dimensional data for better organization of the data
CO 6: Discover the knowledge imbibed in the high dimensional system
CO 7: Evolve Multidimensional Intelligent model from typical system
CO 8: Evaluate various mining techniques on complex data objects

Subject Name : Computer Aided Design for VLSI(BTCS704)

CO 1: To review the basics of different processors including architecture and organization
CO 2: To foster ability of handling and designing different types of pipelining techniques; exception handling corresponding instruction scheduling.
CO 3: To understand various memory organization and management techniques

CO 4: To Understand the various advanced architectures.

CO 5: To achieve the understanding of parallel, shared architectures and important organizational details of superscalar architecture

Subject Name : Compiler Construction(BTCS705)

CO1: For a given grammar specification develop the lexical analyzer

CO2: For a given parser specification design top-down and bottom-up Parsers

CO3: Develop syntax directed translation schemes

CO4: Develop algorithms to generate code for a target machine

Subject Name :Advance DataBase Management Systems (BTCS706A)

CO 1: Explain in detail DBMS architecture.

CO 2: Explain in detail query processing and techniques involved in query optimization.

CO 3: Explain the principles of concurrency control.

CO 4: Explain the principles of recovery management.

CO 5: Know recent developments and active research topics in database.

Subject Name : Robotics (BTCS706B)

CO 1: knowledge of programming and algorithms, as well as systems development techniques

CO 2: knowledge of digital technology that forms the basis for designing computers and embedded systems

CO 3: knowledge about electronics and sensors that form the basis for machine launching

CO 4: knowledge of mathematics required for electronics, programming and robotics

Subject Name : Data Compression Techniques (BTCS706C)

CO 1: program, analyze Hoffman coding: Loss less image compression, Text compression, Audio Compression

CO 2: program and analyze various Image compression and dictionary based techniques like static Dictionary, Diagram Coding, Adaptive Dictionary

CO 3: understand the statistical basis and performance metrics for lossless compression

CO 4: understand the conceptual basis for commonly used lossless compression techniques, and understand how to use and evaluate several readily available implementations of those techniques

CO 5: understand the structural basis for and performance metrics for commonly used lossy compression techniques and conceptual basis for commonly used lossy compression techniques.

Subject Name : Web Development Lab (BTCS707)

CO 1: Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

CO 2: Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.

CO 3: Get introduced in the area of Online Game programming.

Subject Name : VLSI Physical Design Lab (BTCS708)

CO 1: 1. An ability to design CMOS logic circuits.

CO 2: simulate circuits within a CAD tool and compare to design specifications.

CO 3: design, implement, and simulate circuits using VHDL.

CO 4: write machine language programs and assembly language programs for the simple computer.

CO 5: To learn by using Xilinx Foundation tools and Hardware Description Language (VHDL)

CO 6: To analyze the results of logic and timing simulations and to use these simulation results to debug digital systems.

Subject Name : Compiler Design Lab (BTCS709)

CO1: For a given grammar specification develop the lexical analyzer

CO2: For a given parser specification design top-down and bottom-up Parsers

CO3: Develop syntax directed translation schemes

CO4: Develop algorithms to generate code for a target machine

SEMESTER - VIII

Subject Name : Mobile Computing (BTCS801)

CO 1: explain the principles and theories of mobile computing technologies.
CO 2: describe infrastructures and technologies of mobile computing technologies.
CO 3: list applications in different domains that mobile computing offers to the public, employees, and businesses.
CO 4: describe the possible future of mobile computing technologies and applications.
CO 5: effectively communicate course work through written and oral presentations.

Subject Name : BTCS 802 Digital Image Processing (BTCS802)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems.

Subject Name : BTCS 803 Distributed Systems (BTCS803)

CO1: Distinguish distributed computing paradigm from other computing paradigms

CO2: Identify the core concepts of distributed systems

CO3: Illustrate the mechanisms of inter process communication in distributed system

CO4: Apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system

CO5: Compare the concurrency control mechanisms in distributed transactional environment

CO6: Outline the need for mutual exclusion and election algorithms in distributed systems

Subject Name : Hardware Testing & Fault Tolerance (BTCS804A)

CO 1: enumerate the need and necessity to consider fault-tolerant design in digital systems.
CO 2: explain vividly, the various techniques for fault modelling and tests generation.
CO 3: determine the various forms of redundancy for enhancing reliability of digital systems

Subject Name : Real Time Systems(BTCS804B)

CO1: Understand concepts of Real-Time systems and modeling

CO2: Recognize the characteristics of a real-time system

CO3: Understand and develop document on an architectural design of a real-time system

CO4: Develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.

Subject Name : Information Retrieval (BTCS804C)

CO 1: Ability to identify Data Base Management systems and data ware houses
CO 2: Ability to use knowledge of data structures and indexing methods in information retrieval Systems
CO 3: Ability to choose clustering and searching techniques for different data base systems
CO 4: Ability to Explain different types of search algorithms like Hardware text search systems and software text search systems

Subject Name : Unix Network Programming & Simulation Lab (BTCS805)

CO1: To make students able to implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance and prevention.

CO2: Students will also be able to implement page replacement and memory management algorithms.

CO3: Apply UNIX/LINUX operating system commands.

CO4: Understand different UNIX/LINUX shell scripts and execute various shell programs.

CO5: Implement virtualization by installing Virtual Machine software.

Subject Name : FPGA Lab. (BTCS806)

CO1: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

CO2: Comprehend important embedded system terminology

CO3: Experience of embedded system product conceptualization methods

CO4: Understanding of what an embedded system R&D project is, and the activities it involves

Subject Name : Digital Image Processing lab (BTCS807)

CO1: Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

CO2: Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic

CO3: To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations

CO4: Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

CO5: Reveal different applications of these models to solve engineering and other problems.

Department of Electrical Engineering

SEMESTER - III

BTEEBSC301: Advance Mathematics

Course outcomes:-

Upon completion of this course, students will be :

CO1. Acquire knowledge about Fourier series.

CO2. Gain the knowledge of Laplace's equation in two dimensions.

CO3. Knowledge about using Functions of a complex variable.

CO4. Knowledge about using Z transform's.

CO5 Gain the Knowledge about boundary value problems.

BTEEHSM302: Managerial Economics and Financial Accounting

Course outcomes:-

Upon completion of this course, students will:

CO1: Determine the objectives, nature, role & responsibilities of a business undertaking.

CO2: Predict the demand for a product or product mix of a company & to analyze various factor influencing demand elasticity.

CO3: Forecast & compute the future sales level of a product by using various qualitative techniques and with the help of past sales data.

CO4: Asses the cost behavior, costs, useful for managerial decision making and determine break even point of an enterprise.

BTEEESC303: Power Generation Processes

At the end of the course, the student will be able to:

CO1. Be conversant with the operation and working of various power plants

CO2. Detailed understanding of the economic aspects of power generation

CO3. Awareness of different configurations of generating systems

CO4. Understand the effect of Power factor of the system

BTEEPCC304: Electrical Circuit Analysis

At the end of the course, the student will be able to:

CO1. Apply the knowledge of source transformation and Kirchhoff's voltage law for the analysis of electrical networks.

CO2. Apply various networks theorem for analysis of electrical circuits.

CO3. Understand transient behavior and network functions with computation of network functions for various configurations.

CO4. Do the time- domain and S- domain analysis of circuits .

CO5. Understand the features of two port networks and to obtain their equivalent circuits

BTEEPCC305: Analog Electronics

At the end of the course, the student will be able to:

CO1. Understand the characteristics of transistors.

CO2. Design and analyses various rectifier and amplifier circuits.

CO3. Design sinusoidal and non-sinusoidal oscillators.

CO4: Understand the functioning of OP-AMP and design OP-AMP based circuits.

CO5. Develop competence in linear and non- linear OP-AMP Circuit analysis.

BTEEPCC306: Electrical Machine-I

At the end of the course, the student will be able to:

Course outcomes:-

CO1. Help the learner to understand basic principle and operation of energy conversion principle.

CO2. Understand the DC machines: Construction, armature windings; EMF and torque equations, starting, speed control and braking of DC motor.

CO3. Understand the generator and motor mode of operations; armature reaction, commutation; characteristics of DC motors

CO4. Understand the principle of operation of transformer.

CO5. Learn about different type of connection in poly-phase transformer.

BTEEPCC307: Electromagnetic Fields

At the end of the course, the student will be able to:

Course outcomes:-

CO1. To differentiate different types of coordinate systems used in system and use them for solving the problems of EM field theory.

CO2. To describe static electric and magnetic fields, their behavior in different media, associated laws, boundary conditions and electromagnetic potentials.

CO3**.** To use integral and point form of Maxwell`s equations for solving the problems of electromagnetic field theory.

CO4. To describe time varying fields, propagation of electromagnetic waves in different media, poynting theorem, their sources & effects and to apply the theory of electromagnetic waves in practical problems.

CO5. To apply concepts of Wave reflection and refraction, Smith Chart in practical Field, and skin effect.

BTEEPCC308: Analog Electronics Lab

At the end of the course, the student will be able to:

Course outcomes:-

CO1. Set up testing strategies and select proper instruments to evaluate performance characteristics of electronic circuit.

CO2. Choose testing and experimental procedures on different types of electronic circuit and analyze their operation different operating conditions.

CO3. Evaluate possible causes of discrepancy in practical experimental observation in comparison to theory.

CO4. Practice different types of wiring and instruments connections keeping in mind technical, Economical, safety issues.

BTEEPCC309: Electrical Machines-I Lab

At the end of the course, the student will be able to:

Course outcomes:-

CO 1. Determine the performance of a single phase transformer by conducting Open Circuit (O.C) and Short Circuit (SC) tests and Sumpner's test.

CO 2. Understand 3-phase to 2-phase transformation using the Scott connection and determine the different losses of the transformers.

CO 3. Determine the performance characteristics of DC shunt and DC compound generators by conducting load tests.

CO 4. Implement the speed control techniques for a separately excited DC motor

CO 5. study and perform of 3 phase transformer for its various connection

BTEEPCC310: Electrical Circuit Design Lab

At the end of the course, the student will be able to:

Course outcomes:-

CO 1. Analyse the characteristics of BJT & UJT

CO 2. Simulate Bridge Rectifier Circuit and validate on Bread Board or PCB.

CO 3. Analyse the characteristics of Half Bridge rectifier.

CO 4. Introduction to Sensors to measure real time quantities and their implementation in different processes

SEMESTER - IV

BTEEBSC401: Biology

Course Outcomes

After studying the course, the student will be able to:

CO1. Describe how biological observations of 18th Century that lead to major discoveries.

CO2. Convey that classification per se is not what biology is all about but highlight the underlying

criteria, such as morphological, biochemical and ecological

CO3. Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring

CO4. Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine

CO5. Classify enzymes and distinguish between different mechanisms of enzyme action.

BTEEHSMC402 : Technical Communication

CO1: Students will be able to produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.

CO2: Students will understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks.Students will also focus on these following points-

- The Mechanics of Writing
- Usage of words and phrases
- Selecting the right words
- Grammar, spelling & punctuation
- Creating style in technical writing
- Technical Writing Reviewing and Revising
- Editing for quality
- Structuring Information for Understanding
- Problem words
- Technical Writing standards
- Technical Writing process
- Maintaining document structure

CO3: Students will learn about self awareness, different types of attitudes, Perceptions and beliefs.

CO4: Students will be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, reports, manuals, project ,newsletters, articles, and presentation.

CO5: Students will marvelously able to understand about business ethics, role and responsibility of an engineer, complex problem solving and creativity etc.

BTEEESC403: Electronic Measurement and Instrumentation

Course Outcomes

After studying the course, the student will be able to:

CO1. Recognize the evolution and history of units and standards in Measurements.

CO2. Identify the various parameters that are measurable in electronic instrumentation.

CO3. Employ appropriate instruments to measure given sets of parameters.

CO4. Practice the construction of testing and measuring set up for electronic systems

BTEEPCC404: Electrical Machines – II

Course Outcomes

After studying the course, the student will be able to:

CO1. Acquire knowledge to carry out a detailed design of a dc machine and provide the information required for the fabrication of the same along with an estimate of various performance indices.

CO2. Acquire knowledge to carry out a detailed design of a transformer and provide the information required for the fabrication of the same along with an estimate of various performance indices.

CO3. Acquire knowledge to carry out a detailed design of an alternator and provide the information required for the fabrication of the same along with an estimate of various performance indices.

CO4. Acquire knowledge to carry out a detailed design of an induction machine and provide the information required for the fabrication of the same along with an estimate of various performance indices.

BTEEPCC405: Power Electronics

Course Outcomes

After studying the course, the student will be able to:

CO1. Understand the differences between signal level and power level devices.

CO2. Analyse controlled rectifier circuits.

CO3. Analyse the operation of DC-DC choppers.

CO4. Analyse the operation of voltage source inverters

BTEEPCC406: Signals and Systems

Course Outcomes:

At the end of this course, students will be able to understand-

CO1. Understand the concept of continuous and discrete time signal and its applications.

CO2. Behavior of continuous and discrete-time LTI systems, state space analysis and concept of state transition matrix.

CO3. Concept of Fourier transforms to convert a time domain signal into frequency domain.

CO4. Concept of Z transform and Laplace transform and its various applications in signal analysis.

CO5. To understand the concept of sampling theorem, reconstruction filter, aliasing and its effects and introduction to feedback control systems

BTEEPCC407: Digital Electronics

Course Outcomes:

At the end of the course, a student will be able to:

CO1. Understand working of logic families and logic gates.

CO2. Design and implement Combinational and Sequential logic circuits.

CO3. Classification and characteristics of memories

CO4. Understand the process of Analog to Digital conversion and Digital to Analog

Conversion

CO5. Be able to use PLDs to implement the given logical problem

BTEEPCC408: Electrical Machines - II Lab

Course Outcomes:

At the end of the course, a student will be able to:

CO1. Experiment with the basic operation of synchronous machines.

CO2. Analyze various parameters, characteristics and assess the performance of synchronous machines.

CO3. Defend the utility/application of alternator

CO4. Analyze various parameters, characteristics and assess the performance of Induction Motor

BTEEPCC409: Power Electronics Lab

Course Outcomes:

At the end of the course, a student will be able to:

CO1. Set up testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and **analyze** their operation under different loading conditions.

CO2. Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues.

CO3. Realize the limitations of computer simulations for verification of circuit behavior, apply these techniques to different power electronic circuits and **evaluate** possible causes of discrepancy in practical experimental observations in comparison to theory.

CO4. Study of bridge rectifier and effect of freewheeling diode.

CO5. To analyze the characteristics of MOSFET, IGBT, SCR and SCR firing circuits

BTEEPCC410: Digital Electronics Lab

Course Outcomes:

At the end of this course, students will be able to understand–

CO1. To learn the basics of gates

CO2. Construct basic combinational circuits and verify their functionalities

CO3. Apply the design procedures to design basic sequential circuits

CO4. Learn about counters and Shift registers

CO5. To understand the basic digital circuits and to verify their operation

BTEEPCC411: Measurement Lab

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO 1. Measure the electrical parameters using measuring instruments

CO 2. Calibration and testing of measuring instruments

CO 3. Study the working of Calibrate an ammeter using DC slide wire potentiometer

CO 4. Study of Kelvin's double bridge

SEMESTER - V

Subject Name: Electrical Materials (BTEE501)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the electrical properties and characteristics of various materials.

CO2: Understand the different materials for static and alternating fields

CO3: Have a moderate level understanding of the physics behind the materials

CO4: Select proper material for design of a circuit, device or machine.

Subject Name: Power System - I (BTEE502)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the concepts of power systems.

CO2: Understand the various power system components.

CO3: Evaluate fault currents for different types of faults.

CO4: Understand the generation of over-voltages and insulation coordination.

CO5: Understand basic protection schemes.

CO6: Understand concepts of HV dc power transmission and renewable energy generation.

Subject Name: Control System (BTEE503)

Course Outcomes:

Upon completion of this course, students will be able to learn:

CO1: Understand the modelling of linear-time-invariant systems using transfer function and state-space representations.

CO2: Understand the concept of stability and its assessment for linear-time invariant systems.

CO3: Design simple feedback controllers.

Subject Name: Microprocessor (BTEE504)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Do assembly language programming.

CO2: Do interfacing design of peripherals like I/O, A/D, D/A, timer etc.

CO3: Develop systems using different microcontrollers.

Subject Name: Electrical Machine Design (BTEE505)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand the construction and performance characteristics of electrical machines.

CO2: Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines

CO3: Understand the principles of electrical machine design and carry out a basic design of an ac machine.

CO4: Use software tools to do design calculations.

Subject Name: Restructured Power System. (BTEE506A)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: understand the importance of restructuring of Power Systems, market models and the role of ISO in power market.

CO2: Understand the Concepts of Transmission Congestion and how to manage it.

CO3: Define Ancillary services management and analyze transmission pricing issues.

CO4: To understand the reforms like Government initiatives in this regard.

Subject Name: Electromagnetic Wave (BTEE506B)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Analyse transmission lines and estimate voltage and current at any point on transmission line for different load conditions.

CO2: Provide solution to real life plane wave problems for various boundary conditions.

CO3: Analyse the field equations for the wave propagation in special cases such as lossy and low loss dielectric media.

CO4: Visualize TE and TM mode patterns of field distributions in a rectangular wave-guide.

CO5: Understand and analyse radiation by antennas.

Subject Name: Digital Control System (BTEE506C)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Obtain discrete representation of LTI systems.

CO2: Analyse stability of open loop and closed loop discrete-time systems.

CO3: Design and analyse digital controllers.

CO4: Design state feedback and output feedback controllers.

Subject Name: Power System - I Lab (BTEE507)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand power system installations

CO2: Exposed to fault analysis

CO3: Understand Electromagnetic transient program (EMTP)

CO4: Understand about numerical relays.

Subject Name: Control System Lab (BTEE508)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Design simple feedback controllers.

CO2: Model the linear-time-invariant systems using transfer function and state-space representations.

CO3: Analyse the stability for linear-time invariant systems.

Subject Name: Microprocessor Lab (BTEE509)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Do assembly language programming.

CO2: Do interfacing design of peripherals like I/O, A/D, D/A, timer etc.

CO3: Develop systems using different microcontrollers.

Subject Name: System Programming Lab (BTEE510)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the use of MATLAB in electrical circuits.

CO2: Implement the simulation model of various electrical circuits.

SEMESTER – VI

Subject Name: Computer Architecture (BTEE601)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the concepts of microprocessors, their principles and practices.

CO2: Write efficient programs in assembly language of the 8086 family of microprocessors.

CO3: Organize a modern computer system and be able to relate it to real examples.

CO4: Develop the programs in assembly language for 80286, 80386 and MIPS processors in real and protected modes.

CO5: Implement embedded applications using ATOM processor.

Subject Name: Power System - II (BTEE602)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Use numerical methods to analyse a power system in steady state.

CO2: Understand stability constraints in a synchronous grid.

CO3: Understand methods to control the voltage, frequency and power flow.

CO4: Understand the monitoring and control of a power system.

CO5: Understand the basics of power system economics.

Subject Name: Power System Protection (BTEE603)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the different components of a protection system.

CO2: Evaluate fault current due to different types of fault in a network.

CO3: Understand the protection schemes for different power system components.

CO4: Understand the basic principles of digital protection.

CO5: Understand system protection schemes, and the use of wide-area measurements.

Subject Name: Electrical Energy Conservation and Auditing (BTEE604)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the current energy scenario and importance of energy conservation.

CO2: Understand the concepts of energy management.

CO3: Understand the methods of improving energy efficiency in different electrical systems.

CO4: Understand the concepts of different energy efficient devices.

Subject Name: Electric Drives (BTEE605)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the characteristics of dc motors and induction motors.

CO2: Understand the principles of speed-control of dc motors and induction motors.

CO3: Understand the power electronic converters used for dc motor and induction motor speed control.

Subject Name: Power System Planning (BTEE606A)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Understand and distinguish characteristics of distribution systems from transmission systems

CO2: To design, analyze and evaluate distribution system design based on forecasted data

CO3: Identify and select appropriate sub–station location

CO4: Design and evaluate a distribution system for a given geographical service area from alternate design alternatives

Subject Name: Digital Signal Processing (BTEE606B)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Represent signals mathematically in continuous and discrete-time, and in the frequency domain.

CO2: Analyse discrete-time systems using z-transform.

CO3: Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms.

CO4: Design digital filters for various applications.

CO5: Apply digital signal processing for the analysis of real-life signals.

Subject Name: Electrical and Hybrid Vehicles. (BTEE606C)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Understand the models to describe hybrid vehicles and their performance.

CO2: Understand the different possible ways of energy storage.

CO3: Understand the different strategies related to energy storage systems.

Subject Name: Power System - II Lab (BTEE607)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Do hands on practice and computational analysis on power systems

CO2: Do programming of numerical methods for solution of the power flow problem

CO3: Do programming of numerical methods for solution of stability analysis

Subject Name: Electric Drives Lab (BTEE608)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** understand the Performance of the fundamental control practices associated with AC and DC machines like starting, reversing, braking, plugging, etc.

CO2: To understand the operation of inverters and cyclo converters

CO3: To evaluate the use of computer-based analysis tools to review the major classes of machines and their physical basis for operation

Subject Name: Power System Protection Lab (BTEE609)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Evaluate fault current due to different types of fault in a network.

CO2: Understand the use of microcontrollers for protection

CO3: Understand the basic principles of digital protection.

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Subject Name: Modeling and simulation lab (BTEE610)

Course Outcomes:

Upon completion of this course, students will be able to:

CO1**:** Implement the simulation model using MATLAB.

CO2: Understand the working principles of FACTS devices and their operating characteristics.

CO3: Understand the modelling and simulation of various machines.

SEMESTER - VII

BTEE701 POWER SYSTEM PLANNING

CO1.Introduces a student to power planning, National and Regional Planning, structure of P.S., planning tools

CO2. To impart the knowledge of modelling of power system components - generators, transmission lines, excitation and prime mover controllers - is covered in detail.

CO3. Awareness of Consumer services, Tariffs costing and pricing, Overhead and underground lines-optimum design considerations,.

CO4. Create awareness of impact of stability problems on power system planning, and operation is also brought out.

CO5: An understanding of Operating and maintenance cost of candidate plants of different types

BTEE702 POWER SYSTEM ANALYSIS

CO1: Create computational models for analysis power systems and able to understand per unit system CO2: Perform load flow computations and analyze the load flow results.

CO3: Analyse a power system network under Symmetrical Conditions.

CO4: Understand Positive Sequence, Negative & zero sequence system and fault analysis.

CO5: Analyze power system operation and stability control.

BTEE703 ARTIFICIAL INTELLIGENCE TECHNIQUES

CO1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CO4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.

CO5. Demonstrate proficiency in applying scientific method to models of machine learning.

BTEE704 NON CONVENTIONAL ENERGY SOURCES

CO1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.

CO2. Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.

CO 3. Explore the concepts involved in wind energy conversion system by studying its components, types and performance.

CO4. Illustrate ocean energy and explain the operational methods of their utilization.

CO5. Acquire the knowledge on Geothermal energy.

BTEE705 POWER SYSTEM ENGINEERING

CO1: To impart the knowledge of Power system-general concepts, Load and Energy forecasting

CO2: To enable the students to analyze economic loading of distribution transformers, Distribution system reliability

CO3: To enable the students to Advantages and problems of interconnected power systems

CO4: To impart the knowledge of Series compensation of transmission lines

BTEE706 ELECTROMAGNETIC FIELD THEORY

After completing the course, the students should be able:

CO-1: To differentiate different types of coordinate systems used in system and use them for solving the problems of EM field theory.

CO-2: To describe static electric and magnetic fields, their behaviour in different media, associated laws, boundary conditions and electromagnetic potentials.

CO-3: To use integral and point form of Maxwell`s equations for solving the problems of electromagnetic field theory.

CO-4: To describe time varying fields, propagation of electromagnetic waves in different media, poynting theorem, their sources & effects and to apply the theory of electromagnetic waves in practical problems.

CO-5: To apply concepts of Wave reflection and refraction, Smith Chart in practical Field, and skin effect.

BTEE707 COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES

CO1. Select proper materials based on their properties and selection criterion, IS standards Used in electrical machine design.

CO2. Design commercial Electrical Machine.

CO3. Apply computer aided optimization techniques for design of electrical machines

CO4: Understand and implement CAD of Three phase Induction Motor

BTEE708 ECONOMIC OPERATION OF POWER SYSTEMS

CO1.Designing an optimal operation setup of power system which minimizes operation costs and meet desired needs

CO2. Identifying optimal operation setup design problem and constraints that include most of the following: economic, environmental, operability and security.

CO3. Ability to Design Electrical Layout of Various Generating Stations

CO 4. Ability to understand the features and need of various Compensation Systems

CO5. Ability to Design Parallel operation of generator

BTEE709 POWER SYSTEM PLANNNG LAB

CO1.Introduces a student to power planning, National and Regional Planning, structure of P.S., planning tools

CO2. Modeling of Electrical Forecasting techniques.

CO3. Awareness of Consumer services, Tariffs costing and pricing, Overhead and underground lines-optimum design considerations,.

CO4. Create awareness of impact of stability problems on power system planning, and operation is also brought out.

CO5: An understanding of Transmission and distribution planning

BTEE710 POWER SYSTEM MODELLING AND SIMULATION LAB

CO1. The student will be able to appreciate the utility of the MATLAB Circuit maker in solving real time problems and day to day problems.

CO2. Use of these tools for any engineering and real time applications.

CO3. Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their employment

CO4.The student will be able to FACTS Controller designs with FACT devices for SMIB system

BTEE711 INDUSTRIAL ECONOMICS &MANAGEMENT

CO1. Develop ideas of the basic characteristics of Indian economy, its potential on natural resources.

CO2. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.

CO3. Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.

CO4. Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole.

SEMESTER - VIII

BTEE801 EHV AC/DC TRANSMISSION

CO1. EHV AC/DC transmission works on high power transmission.

CO2. It uses very good equipments and instruments for transmission bulk power .

CO3. FACTs devices uses very useful for high power transmission and reducing losses.

CO4. Understand the need of EHV AC transmission and various issues related with it

CO5. Reactive power management, Stability of AC and DC systems

BTEE802 ELECTRIC DRIVES AND THEIR CONTROL

CO1.Able to understand basic requirements placed by mechanical systems on electric drives.

C02. Able to review phasors and three phase electric circuits.

CO3. Able to understand the basic principles of power electronics in drives using switch mode converters and pulse width modulation to synthesize the voltages in dc and ac motor drives.

CO4. Able to understand the basic concepts of magnetic circuits as applied to electric machines.

CO5. Able to understand the two basic principles (generation of force and EMF) that govern electromechanical energy conversion.

BTEE803 PROTECTION OF POWER SYSTEM

CO1. Able to understand the principle of protective schemes and various faults in the Power System Scenario.

CO2. Able to examine protection of power system with various protection relays.

CO3. Able to study the various types of the circuit breakers, the arc quenching phenomena and the protection against over voltages

CO4. Design of over current protection and its coordination

CO5. Design of directional over current protection

BTEE804 UTILIZATION OF ELECTRICAL POWER

CO1. Basic Power, Energy and Efficiency Relationships for conventional and renewable energy sources.

CO2. Basic elements of Analysis, Modeling and Design of Photovoltaic Power Systems.

CO3. Basic elements of Analysis, Modeling and Design of Wind Power Systems.

CO4. Basic elements of Analysis and Modeling of Fuel Economy and Operation of Vehicles, including conventional and electrified (hybrid and electric) vehicles.

BTEE805 FACTS DEVICES & THEIR APPLICATIONS

CO1.Explain the basic fundamental of FACTS controllers

CO2 Summarize about Static VAR Compensators

CO3 Explain about Modeling, Operation and control strategies of Static series compensation-SVC

CO4 Explain the voltage source based FACTS controllers

CO5 Explain the modeling and design of Coordinating multiple FACTS controllers using control techniques

BTEE806 POWER SYSTEM TRANSIENTS

CO1. Perform a wide variety of per unit conversions

CO2. Calculate symmetrical and unsymmetrical fault current

CO3. Formulate the YBUS matrix for a small power grid by hand

CO4. Differentiate among PV, PQ, reference/swing/slack buses in power flow analysis

CO5. Describe Automatic Generation Control and its use in power systems

BTEE807 COMPUTER BASED POWER SYSTEM LAB

CO1.Student will be able to understand various type fault analysis

CO2. Understand to Load flow analysis for a power system

CO3. Study of voltage security analysis .

CO 4. Study of economic load dispatch problem with different methods.

BTEE808 ELECTRICAL DRIVES AND CONTROL LAB

CO1.Set up control strategies to synthesize the voltages in dc and ac motor drives.

CO2. Control of 3-Phase Induction Motor in variable frequency V/f constant mode using 3-phase inverter.

CO3. An ability to use standard methods to determine accurate modeling/simulation parameters for various general-purpose electrical machines and power electronics devices required for designing a system and solve drives related problems

CO4. Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.)

BTEE809 HIGH VOLTAGE ENGINEERING LAB

CO1. To understand the principles of theory of high voltage generation and measurements.

CO2. To understand the operation of high voltage power supplies for ac, dc, and impulse voltages CO3.To get familiar with various applications where high voltage field is used.

CO4. To understand breakdown 0f HV insulation (solid, Liquid and Gas).

CO5.To understand lightning phenomena and HV Insulation Environmental pollution.

CIVIL ENGINEERING

BTCEBSC 301: ADVANCE ENGINEERING MATHEMATICS-I

COURSE OUTCOMES OF ADVANCE ENGINEERING MATHEMATICS-I

Upon completion of this course, students will :

CO1: Acquire knowledge about Fourier series

CO2: Gain the knowledge of Laplace's equation in two dimensions

CO3: Knowledge about using Functions of a complex variable

CO4: Knowledge about using Z Transforms.

CO5: Gain the knowledge about boundary value problems.

BTCEHSMC 302: **MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING**

COURSE OUTCOMES OF MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Upon completion of this course, students will :

CO1: Determine the objectives, nature, role & responsibilities of a business undertaking.

CO2: Predict the demand for a product or product mix of a company & to analyze various factor influencing demand elasticity.

CO3: Forecast & compute the future sales level of a product by using various qualitative techniques and with the help of past sales data.

CO4: Asses the cost behavior, costs, useful for managerial decision making and determine break even point of an enterprise.

BTCEESC 303: ENGINEERING MECHANICS

COURSE OUTCOMES OF ENGINEERING MECHANICS

At the end of the course, the student will be able to:

CO1: Understand types of forces and their applications.

CO2: Understand concept of centre of gravity.

CO3: Knowledge of types of friction.

CO4: Understand fundamental principles & concept of Newton's law of motion.

CO5: Knowledge of work, power and energy.

BTCEPCC 304: SURVEYING

COURSE OUTCOMES OF SURVEYING

At the end of the course, the student will be able to:

CO1: Student applies knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;

CO2: Student design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;

CO3: Student applies written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;

CO4: Student conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and

CO5: Student functions effectively as a member as well as a leader on technical teams.

BTCEPCC 305: FLUID MECHANICS

COURSE OUTCOMES OF

At the end of the course, the student will be able to:

CO1: The student will understand stress-strain relationship in fluids, classify their behavior and also establish force balance in static systems. Further they would develop dimensionless groups that help in scale-up and scale-down of fluid flow systems. (Unit I)

CO2: Students will be able to apply Bernoulli principle and compute pressure drop in flow systems of different configurations (Unit II)

CO3: Students will compute power requirement in fixed bed system and determine minimum fluidization velocity in fluidized bed (Unit III) .

CO4: Students will be able to describe function of flow metering devices and apply Bernoulli equation to determine the performance of flow-metering devices.

CO5: Students will be able to determine and analyze the performance aspects of fluid machinery specifically for centrifugal pump and reciprocating pump.

BTCEPCC 306: **BUILDING MATERIALS AND CONSTRUCTION**

COURSE OUTCOMES OF BUILDING MATERIALS AND CONSTRUCTION

At the end of the course, the student will be able to:

CO1: Students should be able to learn the significance of earth and its minerals.

CO2. Students should be able to understand about the different type's stone and their use and properties.

CO3: Students will be able to learn the various types of building materials and its Engineering application.

CO4: Gain knowledge in modern equipments and the recent techniques to be used.

CO5: get to knowledge about various types of materials like glass, plastic and water proofing etc.

BTCEPCC 307: ENGINEERING GEOLOGY

COURSE OUTCOMES OF

At the end of the course, the student will be able to:

CO1: To understand issues concerning the geological basement and structure of a region

CO2: To distinguish the characteristics of the most important geological formations and problems that may arise in the various public works.

CO3: To describe and interpret the geological structures in the geological maps and cross sections.

CO4: To assess and appropriately adjust the results of geological study in order to secure construction and operation of a technical project.

CO5: To receive, analyze and evaluate data and appropriately solve problems both technical and environmental.

BTCEPCC 308: **SURVEYING LAB**

COURSE OUTCOMES OF

At the end of the course, the student will be able to:

CO1 Students will be able to Conduct survey and collect field data

CO2 Prepare field notes from survey data

CO3 Interpret survey data and compute areas and volumes.

C04 study of Total station and measurement

BTCEPCC 309: FLUID MECHANICS LAB

COURSE OUTCOMES OF FLUID MECHANICS LAB

At the end of the course, the student will be able to:

CO1 Apply dimensional analysis for design of experimental procedures.

CO2 Calibrate flow measuring devices used in pipes, channels and tanks.

CO3 Determine fluid and flow properties.

CO4 Characterize laminar and turbulent flows.

BTCEPCC 310: **COMPUTER AIDED CIVIL ENGINEERING DRAWING**

COURSE OUTCOMES OF COMPUTER AIDED CIVIL ENGINEERING DRAWING

At the end of the course, the student will be able to:

CO1 Draw the plan, section and elevation of a building

CO2 Create, analyze and produce 2D drawings of buildings in AUTO CAD environment

CO3 Detailing building plans in CAD environment

BTCEPCC 311: **CIVIL ENGINEERING MATERIALS LAB**

COURSE OUTCOMES OF

At the end of the course, the student will be able to:

CO1: STUDENTS will be able to find out the various strength of materials.

CO2: they will be able to analyze and knowledge about the specification of various materials.

CO3: students will understand the various materials properties.

BTCEPCC 312: **GEOLOGY LAB**

COURSE OUTCOMES OF GEOLOGY LAB

At the end of the course, the student will be able to:

CO1 Identify minerals and rocks

CO2 Measure strike and dip of the bedding planes

CO3 Interpret geological maps

SEMESTER IV

BTCEBSC 401 ADVANCE ENGINEERING MATHEMATICS-II

COURSE OUTCOMES OF ADVANCE ENGINEERING MATHEMATICS-II

At the end of the course, the student will be able to:

CO1: Apply the fundamental concepts of Ordinary Differential Equations and Partial Differential Equations and the basic numerical methods for their resolution.

CO2: Solve the problems choosing the most suitable method.

CO3: Understand the difficulty of solving problems analytically and the need to use numerical approximations for their resolution.

CO4: Use computational tools to solve problems and applications of Ordinary Differential Equations and Partial Differential Equations.

CO5: Formulate and solve differential equation problems in the field of Industrial Organization Engineering.

BTCEHSMC402: TECHNICAL COMMUNICATION

COURSE OUTCOMES OF TECHNICAL COMMUNICATION

CO1: Students will be able to produce a set of documents related to technology and writing in the workplace and will have improved their ability to write clearly and accurately.

CO2: Students will understand and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks.Students will also focus on these following points-

- The Mechanics of Writing
- Usage of words and phrases
- Selecting the right words
- Grammar, spelling & punctuation
- Creating style in technical writing
- Technical Writing Reviewing and Revising
- Editing for quality

- Structuring Information for Understanding
- Problem words
- Technical Writing standards
- Technical Writing process
- Maintaining document structure

CO3: Students will learn about self awareness, different types of attitudes, Perceptions and beliefs.

CO4: Students will be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, reports, manuals, project ,newsletters, articles, and presentation.

CO5: Students will marvelously able to understand about business ethics, role and responsibility of an engineer, complex problem solving and creativity etc.

BTCEESC403: BASIC ELECTRONICS FOR CIVIL ENGINEERING APPLICATIONS

COURSE OUTCOMES OF BASIC ELECTRONICS FOR CIVIL ENGINEERING APPLICATIONS

At the end of the course, the student will be able to:

CO1: Extend the knowledge about the characteristics, sources and defects in various materials.

CO2: Design and test the materials either in the laboratory or in the field before their actual use at the site.

CO3: Attain the knowledge of different components of building, their classification, materials and methods of construction and causes of their failures

CO4: Identify various water demands and select suitable source of water and Demonstrate a firm understanding of various water quality parameters.

CO5: Understand the importance & characteristics of road transport for geometric design of various roads with proper alignment based on planning principles, survey data, economics & finance data

BTCEPCC404: STRENGTH OF MATERIALS

COURSE OUTCOMES OF STRENGTH OF MATERIALS

At the end of the course, the student will be able to:

CO1: Understand the fundamental concepts of stress and strain and the relationship between both through the strain-stress equations in order to solve problems for simple tridimensional elastic solids

CO2: Calculate and represent the stress diagrams in bars and simple structures

CO3: Solve problems relating to pure and non-uniform bending of beams and other simple structures .

CO4: Solve problems relating to torsional deformation of bars and other simple tri-dimensional structures

CO5: Understand the concept of buckling and be able to solve the problems related to isolated bars .

Distinguish between isostatic and hiperstatic problems and be able to use various methods for the resolution of both

BTCEPCC405: HYDRAULICS ENGINEERING

COURSE OUTCOMES OF HYDRAULICS ENGINEERING

At the end of the course, the student will be able to:

CO1: Students will be able to understand different pipe frication of fluid and there discharge.

CO2: Students will be able to explain different types of method of flow and their numerical problems.

CO3: Students will be able to separate flow in closed pipes, and design and recommend of pipes including sizes.

CO4: Students will be able to categorize turbine and pumps (single or multiple) for Different hydraulic applications.

CO5: Students will be able to identify with open channel cross sections, hydrostatic Pressure distribution. And be able to use the energy and momentum Equations

BTCEPCC406: BUILDING PLANNING

COURSE OUTCOMES OF BUILDING PLANNING

CO1: Students will be understood about the types of of buildings and its criteria for location and site selection of buildings.

CO2: Students will understand affecting orientation and orientation criteria for tropical climate.

CO3: Students get knowledge about the **Building Bye Laws and NBC Regulations.**

CO4: Students will be get knowledge and applying the **Vastu Shastra in Modern Building planning and** Factors considered in Vastu.

BTCEPCC 407: CONCRETE TECHNOLOGY

COURSE OUTCOMES OF CONCRETE TECHNOLOGY

At the end of the course, the student will be able to:

CO1: Identify the materials used to make concrete; including their sources, production and properties

CO2: Student should be able to gather knowledge to mix design philosophy, Describe and carry out tests relevant to the use of fresh and hardened concrete.

CO3: Student will be able to differentiate various types of cement used for various specific purposes to design concrete mixtures with and without admixtures

CO4: Student will be able to apply fundamental knowledge in the fresh and hardened properties of concrete Classify the different types of concrete based on their applications

CO5: Student will be able to design ordinary and control concretes, replacement of cement and their specific applications.

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BTCEPCC 408: MATERIAL TESTING LAB

COURSE OUTCOMES OF MATERIAL TESTING LAB

At the end of the course, the student will be able to:

CO1 students will be able to conduct tension test on steel, aluminium, copper and brass

CO2they will be able to conduct compression tests on spring, wood and concrete.

CO3 they conduct flexural and torsion test to determine elastic constants.

CO4 they Conduct Quality Control tests on concrete making materials.

CO5 they Conduct Quality Control tests on fresh & hardened concrete.

BTCEPCC409: HYDRAULICS ENGINEERING LAB

COURSE OUTCOMES OF HYDRAULICS ENGINEERING LAB

At the end of the course, the student will be able to:

CO1 Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases, as well as documenting them in engineering reports.

CO2 analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design.

CO3 Given the required flow rate and pressure rise, select the proper pump to optimize the pumping efficiency•

CO4 to provide exposure to modern computational techniques in fluid dynamics.

BTCEPCC410: BUILDING DRAWING

COURSE OUTCOMES OF BUILDING DRAWING

At the end of the course, the student will be able to:

CO1 Prepare simple layout of buildings.

CO2 Produce working drawings for individual components like doors and windows etc.

CO3 Develop line diagram, building section, elevation, key plan and sectional elevation.

CO4 Illustrate hand drafting any parts of a building and implement the regulations for layout of plan.

BTCEPCC411: ADVANCED SURVEYING LAB

COURSE OUTCOMES OF ADVANCED SURVEYING LAB

At the end of the course, the student will be able to:

CO1 Apply the principle of surveying for civil Engineering Applications.

CO2 Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level.

CO3 Conduct survey and collect field data, Prepare field notes from survey data.

CO4 Interpret survey data and compute areas and volumes.

C05 study of Total station and measurement.

BTCEPCC412: CONCRETE LAB

COURSE OUTCOMES OF CONCRETE LAB

At the end of the course, the student will be able to:

CO1 Identify the functional role of ingredients of concrete.

CO2 Apply this knowledge to mix design philosophy to get different grade of concrete.

CO3 Student should be able to test of different concrete property to specify quality of concrete.

CO4 Student shall learn to work in a team to achieve the objective.

V SEMESTER

CONSTRUCTION TECHNOLOGY AND EQUIPMENT

BTCE501

At the end of the course, the student will be able to:

CO1: To introduce various construction equipment and study the efficient utilization of the same using scientific principles

CO2: Manage the equipment, cost control and maintenance of a project

CO3: . Identify and understand the working principle of earthwork equipments

CO4: Identify and understand the working of various equipments for different construction process

CO5: Identify and understand the working principle of material handling equipments

STRUCTURE ANALYSIS-I

BTCE502

CO1 :- Ability to use structural codes and standards such as ASCE-7 and IBC to model dead, live, snow, wind, and earthquake loads on structures

CO2 :- Ability to analyze statically determinate trusses, beams, and frames and obtain internal loading

CO3 :- Ability to analyze cable and arch structures

CO4 :- Ability to obtain the influence lines for statically determinate and indeterminate structures

CO5 :- Ability to determine deflections of beams and frames using classical methods

CO6 :- Ability to solve statically indeterminate structures using classical methods

CO7 :- Ability to solve statically indeterminate structures using matrix (stiffness) method

DESIGN OF CONCRETE STRUCTURES

BTCE503

CO1 :-Students will understand the general mechanical behavior of reinforced concrete.

CO2 :-. Students will be able to analyze and design reinforced concrete flexural members.

CO3 :-Student will be able to analyze and design reinforced concrete compression members.

CO4 :-. Students will be able to analyze and design for vertical and horizontal shear in reinforced concrete.

CO5 :- Students will be able to analyze transfer and development length of concrete reinforcement.

CO6 :- Students will be able to analyze and design for deflection and crack control of reinforced concrete members.

GEOTECHNICAL ENGINEERING

BTCE504

CO1 :- To introduce soil as three-phase system, index properties and engineering classification methods of soils.

CO2 :- To study flow through soils (permeability) and influence of presence of water on engineering properties of soil.

CO3 :- To study compressibility characteristics (compaction and consolidation) of soils and estimate settlements. To study variation of geostatic stresses and stress due external load in soils.

CO4 :-To study methods of determination of shear strength of soils and factors influencing its magnitude

CO5:- To understand different types of soils condition

WATER RESOURCE ENGINEERING

BTCE505

CO1:-To introduce various types and methods of irrigation.

CO2:- To have knowledge of various terms and aspects related to water requirement of crops.

CO3 :-To design canal head-works and various hydraulic structures using various design philosophies.

CO4 :-To understand canal regulation works and related hydraulic structures.

CO5 :-To have knowledge of canal outlet and cross drainage works.

AIR & NOISE POLLUTION AND CONTROL

BTCE506A

CO1:- Demonstrate the concept of participates, air pollutants, natural and artificial methods of ventilation; the concept of noise pollution

CO2:- Calculate the units for participates and air pollution treatment

CO3:- Discuss about the methods to control air pollutants, noise pollution, ventilation.

CO4:- Explain the principal of equipments, technological units for air pollution treatment

CO5:- Select suitable technology for noise pollution control; participates, air pollution treatment system; ventilation system

DISASTER MANAGEMENT

BTCE506B

CO1:-Understanding foundations of hazards, disasters and associated natural/social phenomena

CO2:- Familiarity with disaster management theory (cycle, phases)

CO3:- Knowledge about existing global frameworks and existing agreements

CO4:- Capacity to manage the Public Health aspects of the disasters.

CO5 :- Capacity to analyse and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.

TOWN PLANNING

BTCE506C

CO1; - To interpret civil engineering drawing to know various types of drawing

CO2:- To gain knowledge about various building components, size; abbreviations, symbols used in drawing

CO3:- To understand basic Principles of Planning

CO4:- To learn Building Bye laws for residential and public building

CO5:- To learn fundamental of perspective drawing

CO6:- To learn fundamentals of town planning

REPAIR AND REHABILITATION OF STRUCTURES

BTCE507A

CO1: Various distress and damages to concrete and masonry structures

CO2: The importance of maintenance of structures, types and properties of repair materials etc

CO3: Assessing damage to structures and various repair techniques

CO4: Get an idea of repair techniques.

CO5: Understand the properties of repair materials and Understand the retrofitting strategies and techniques

GROUND IMPROVEMENT TECHNIQUES

BTCE507B

CO1:- Understand the different ground improvement techniques

CO2:- Understand the methods of stabilization

CO3:- Understand the methods and properties of reinforced soil

CO4:- Understand the basic concepts of geosynthetics

CO5:- Understand the basic concept of consolidation of soil

CO6:- Understand the concept of shear strength in soil

ENERGY SCIENCE AND ENGINEERING

BTCE507C

CO1 :- Know percentages and have understanding for magnitudes of energy and resources used

CO2 :- Know the differences between energy use in USA vs elsewhere in the world

CO3 :- Understand the differences between large quantities of fuel and waste vs. minuscule quantities of each, but with high potential for causing harm or inconvenience

CO4 :-Fully appreciate the aspect of capital cost amortization and allocation to unit of energy produced.

CO5 :- Be able to analyze comparisons of capital cost allocation, operating cost, including fuel costs. Special attention is given to the renewable for which there is zero or negligible fuel cost

CONCRETE STRUCTURES DESIGN LAB

BTCE508

CO1:-Able to *design*, analysis, and proportioning of reinforced *concrete* members and *structures*.

CO2:- Able to *design* different type of foundations

CO3:- Able to design various types of elevated tanks according to IS code.

CO4:-Able to design about concrete grade and steel grade

GEOTECHNICAL ENGINEERDING LAB

BTCE509

CO1 Characterise and classify soils

CO2 Identify shear strength parameters for field conditions

CO3 Understand the principles of compaction and its control

CO4 Determine index properties of soils

CO5 Determine engineering properties of soils

WATER RESOURCES ENGINEERING DESIGN LAB

BTCE510

CO- 1 Various components of hydrologic cycle that affect the movement of water in the earth

CO- 2 Various Stream flow measurements technique

CO- 3 the concepts of movement of ground water beneath the earth

CO- 4 the basic requirements of irrigation and various irrigation techniques, requirements of the crops

CO- 5 Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design CO- 6 Basic components of river Training works.

CO- 7 Apply math, science, and technology in the field of water resource Engineering

VI SEMESTER

WIND & SEISMIC ANALYSIS

BTCE601

At the end of the course, the student will be able to:

CO1: Apply the concepts of structural dynamics of MDOF systems for analysis of structures.

CO2: Model and analyse the structures to resist earthquake forces by different methods.

CO3: . Design the various structural elements resisting earthquake forces as per IS Codes.

CO4: Practice ductile detailing of reinforced concrete and masonry buildings as per codal provisions.

CO5: Identify and understand the working principle of Different codes of sesismic analysis

STRUCTURAL ANALYSIS-II

BTCE602

CO1 :-To understand develop computer program for the analysis of structures.

CO2 :- Able to use slope defection method and rotation contribution method for various civil engineering structures.

CO3 :- Able to analysis various type of loads by influence line diagram method.

CO4 :- Able to identify determinate, indeterminate, stable and unstable structures..

ENVIRONMENTAL ENGINEERING

BTCE603

CO1 Understand different methods are used to purify the water and rectify the water which improves the standard and living style of the community.

CO2 Able to determine the population forecast for a city to meet its water requirement.

CO3 Able to design water treatment plant by different methods.

CO4 Able to know about the drainage and plumbing system in commercial , residential and industrial area

DESIGN OF STEEL STRUCTURES

BTCE 604

CO1: Learn the basic elements of a steel structure

CO2: Learn the fundamentals of structural steel fasteners

CO3: Able to design basic elements of steel structure like tension members, compression members, beams and beam-columns

CO4: Able to design column splices and bases

CO5: Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria.

ESTIMATING & COSTING

BTCE605

CO1 :-Prepare quantity estimates for Buildings, roads & rails and canal structures as per specifications.

CO2.:- Draft detailed specifications and work out Rate Analysis for all works related to civil engineering

projects.

CO3.:- Ascertain the quantity of materials required for Civil engineering works as per specifications.

CO4:- Prepare cost estimate and valuation of civil engineering works.

CO5:- Prepare tenders & contract documents. Evaluate contracts and tenders in construction practice..

PRE-STRESSED CONCRETE

BTCE606A

CO1 :- Students will understand the general mechanical behavior of prestressed concrete.

CO2 :-Students will be able to analyze and design prestressed concrete flexural members.

CO3 :- Students will be able to analyze and design for vertical and horizontal shear in prestressed concrete.

CO4 :- Student learn about the pre tensioning and post tensioning method.

SOLID AND HAZARDOUS WASTE MANAGEMENT

BTCE606B

CO1:-Understanding foundations of hazards, disasters and associated natural/social phenomena

CO2:- Familiarity with disaster management theory (cycle, phases)

CO3:- Knowledge about existing global frameworks and existing agreements

CO4:- Capacity to manage the Public Health aspects of the disasters.

CO5 :- Capacity to analyse and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people’s responsibility for how it is used.

TRAFFIC ENGINEERING AND MANAGEMENT

BTCE606C

CO1 :-The students will gain knowledge in the fundamentals components of traffic engineering and its features.

CO2 :-The students will get a vast understanding on various traffic enforcements rules and regulations.

CO3:- The students will get aware of the different software used in the field of transportation and its utility in solving the traffic problems.

BRIDGE ENGINEERING

BTCE607A

CO1 Able to learn about components, classifications and choice of bridge type along with the investigation for bridges in detail.

CO2 To apply various standard specifications for road bridges.

CO3 Able to apply the knowledge about R.C.C. bridge and steel bridge and their types also.

CO4 To understand various types of sub-structures and foundations, bearing, joints and appurtenances required for bridges.

CO5 Able to learn about methods of construction and maintenance of bridges along with causes of bridge failure

ROCK ENGINEERING

BTCE607B

CO1 Able to know the importance of seismic activity considerations in a terrain.

CO2 Able to learn geology and its types, various structural features like folds, faults,joints, weathering etc., minerals, rocks, and rock formations in relation to civil engineering projects.

CO3 Able to understand various techniques to determine engineering properties of rocks etc. and distinguish the different types of rocks and minerals.

CO4 Able to understand various techniques to analyze and to make possible solutions for various Geological Engineering problems

GEOGRAPHIC INFORMATION SYSTEM & REMOTE SENSING

BTCE607C

CO1 : Analyse the principles and components of photogrammetry and remote sensing.

CO2 : Describe the process of data acquisition of satellite images and their characteristics

CO3 : Compute an image visually and digitally with digital image

processing techniques.

CO4 : Explain the concepts and fundamentals of GIS.

CO5 : Compute knowledge of remote sensing and GIS in different civil engineering applications

ENVIRONMENTAL ENGINEERING DESIGN AND LAB

BTCE608

CO1 Able to determine different parameters of water and waste water.

CO2 Able to examine biochemical oxygen demand and chemical oxygen demand of given samples.

CO3 Able to understand the technologies required for domestic and industrial

wastewater treatment

STEEL STRUCTURE DESIGN LAB

BTCE609

CO1 Understand the behavior and properties of structural steel members to resist bending, shear, tension and compression and apply the relevant codes of practice.

CO2 Able to analyses the behavior of structural steel members and undertake design at both serviceability and ultimate limit states.

CO3 Able to design bolted and welded connections for tension and compression members and beams.

CO4 Able to design the various steel structures.

QUANTITY SURVEYING AND VALUATION LAB

BTCE610

CO1 Able to calculating the quantities and billing of various work and specifications.

CO2 Develop an understanding of various laws applicable to buildings and

construction industry.

CO3 Able to write Measurement Book, Cash book and muster roll.

CO4 Perform rate analysis as required in preparing specifications, detailed estimate and tender documents etc

WATER AND EARTH RETAINING STRUCTURES DESIGN LAB

BTCE611

CO1 :-The student will be able to: ... Levelling and contouring

CO2 :-Description of a point (position) on the earth's

CO3 :-Design of cantilever Retaining walls

CO4 :-Design of RC Circular Water tank- Design of single story

FOUNDATION DESIGN LAB

BTCE612

CO1 Able to apply the knowledge of concepts of Soil Mechanics and to describe the objectives and methods of soil investigation.

CO2 Able to apply the various earth pressure theories

CO3 Able to design various kinds of foundations and to perform various required tests for foundation.

CO4 Able to apply the utility of caissons and wells in the different conditions.

SEMESTER VII

WATER RESOURCES ENGINEERING – I (BTCE701)

COURSE OUTCOMES OF WATER RESOURCES ENGINEERING – I

At the end of the course, the student will be able to:

CO1: Students will be able to understand Necessity and brief description of water supply system, Sources of Water uses as per IS standards.

CO2: Students will be able understand about water system and different types of treatment methods.

CO3: students will be able to understand uses and explain various water distribution system and pipes.

CO4: students will be able to laying of pipes and alignment.

CO5: students will be able to layout of water supply arrangement for a building as per IS Code.

DESIGN OF STEEL STRUCTURES – I (BTCE702)

COURSE OUTCOMES OF DESIGN OF STEEL STRUCTURES – I

At the end of the course, the student will be able to:

CO1: Students will be able to use appropriate methods of structural design for the design of Steel structures by applying the fundaments of mechanics.

CO2: Students will acquire adequate knowledge in the design of steel structural elements.

CO3: Students will be able to check and specify the serviceability requirements of the designed steel structures.

CO4: students will be calculated and find out axially and eccentrically loaded tension members in beam and lintel.

DESIGN OF CONCRETE STRUCTURES-II (BTCE703)

COURSE OUTCOMES OF DESIGN OF CONCRETE STRUCTURES-II

At the end of the course, the student will be able to:

CO1: Identify and compute the main mechanical properties of concrete and steel.

CO2: Identify and calculate the design loads and distribution

CO3: Analyze and design R.C. beams for flexure and shear.

CO4: Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements

CO5: Utilize advanced computer software packages for the analysis and design of concrete structures.

TRANSPORTATION ENGINEERING – II (BTCE704)

COURSE OUTCOMES OF TRANSPORTATION ENGINEERING – II

At the end of the course, the student will be able to:

CO1: Understand the various concepts in railway design and components of railway track.

CO 2: Analyze the construction process, maintenance and operation of railway track.

CO 3: Evaluate the design of airport, cost estimation and geometric design of airports.

CO 4: Understand the various components of airports, planning concepts and air traffic controls.

CO 5: Understand the various terms in harbor engineering and its classification.

Applications Numerical Methods in Civil Engineering (BTCE705)

COURSE OUTCOMES OF Applications Numerical Methods in Civil Engineering

At the end of the course, the student will be able to

CO.1Identify the application potential of numerical methods

CO.2Solve Civil engineering problems using numerical methods

CO.3Demonstrate application of numerical methods to civil engineering problems

CO.4Apply differential equations and integration to solve civil engineering problems

CO.5 Outline and Propose the finite difference techniques

ADVANCE TRANSPORTATION ENGINEERING (BTCE706A)

COURSE OUTCOMES OF ADVANCE TRANSPORTATION ENGINEERING

At the end of the course, the student will be able to:

CO1: Students will be understood about the introduction and history of transportation engineering and economics also which will remain correct for long period of time.

CO2: Students will be able to calculate and design the different component in transportation engineering such as sight distances, horizontal curves, super elevation, extra widening, transition curves and gradient, vertical curves etc.

CO3: Students will learn about the design criteria of pavements by IRC guideline.

CO 4: Analyze the construction process, maintenance and operation of railway track.

CO 5: Evaluate the design of airport, cost estimation and geometric design of airports.

DESIGN OF PRE-STRESSED CONCRETE STRUCTURES (BTCE706B)

COURSE OUTCOMES OF DESIGN OF PRE-STRESSED CONCRETE STRUCTURES

At the end of the course, the student will be able to:

CO1 students will be able to understand about the reinforced beam.

CO2 students will detail working drawing of R.C.C. cantilever retaining wall.

CO3 they will be able to know about the column and footing.

RURAL WATER SUPPLY AND SANITATION (BTCE706C)

COURSE OUTCOMES OF RURAL WATER SUPPLY AND SANITATION

At the end of the course, the student will be able to:

CO1: Various distress and damages to concrete and masonry structures

CO2: The importance of maintenance of structures, types and properties of repair materials etc

CO3: Assessing damage to structures and various repair techniques

CO4: Get an idea of repair techniques.

CO5: Understand the properties of repair materials and understand the retrofitting strategies and techniques

DESIGN OF WATER RESOURCES STRUCTURES LAB – I (BTCE707)

COURSE OUTCOMES OF DESIGN OF WATER RESOURCES STRUCTURES LAB – I

At the end of the course, the student will be able to:

CO1: Various components of hydrologic cycle that affect the movement of water in the earth

CO2: Various Stream flow measurements technique and the concepts of movement of ground water beneath the earth

CO3: the basic requirements of irrigation and various irrigation techniques, requirements of the crops

CO4: Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design

CO5: Apply math, science, and technology in the field of water resource Engineering

STEEL STRUCTURES DESIGN LAB – I (BTCE708)

COURSE OUTCOMES OF STEEL STRUCTURES DESIGN LAB – I

At the end of the course, the student will be able to:

CO1: Students will be able to use appropriate methods of structural design for the design of Steel structures by applying the fundaments of mechanics.

CO2: Students will acquire adequate knowledge in the design of steel structural elements.

CO3: Students will be able to check and specify the serviceability requirements of the designed steel structures.

CO4: students will be calculated and find out axially and eccentrically loaded tension members in beam and lintel.

CONCRETE STRUCTURES DESIGN LAB -II (BTCE709)

COURSE OUTCOMES OF CONCRETE STRUCTURES DESIGN LAB -II

At the end of the course, the student will be able to:

CO1: Identify and compute the main mechanical properties of concrete and steel.

CO2: Identify and calculate the design loads and distribution

CO3: Analyze and design R.C. beams for flexure and shear.

CO4: Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements

CO5: Utilize advanced computer software packages for the analysis and design of concrete structures.

APPLICATION OF NUMERICAL METHODS IN CIVIL ENGINEERING LAB (BTCE710)

COURSE OUTCOMES OF APPLICATION OF NUMERICAL METHODS IN CIVIL ENGINEERING LAB

At the end of the course, the student will be able to:

CO.1: Apply the concept of partial differential equations and Solve practical problems

CO.2: Solve Civil engineering problems using numerical methods

CO.3: Demonstrate application of numerical methods to civil engineering problems

CO.4: Apply differential equations and integration to solve civil engineering problems

SEMESTER VIII

Water Resource Engineering-II (BTCE801)

COURSE OUTCOMES OF Water Resource Engineering-II

At the end of the course, the student will be able to:

CO1.Apply strategies of water resources management

CO.2Identify and select appropriate water resources for domestic, commercial and industrial application.

CO3. Collect, compute and analyze hydrological data.

CO4.Select the appropriate methods of artificial recharging for rain water and rainwater harvesting structures.

CO5.Apply advanced irrigation methods.

Design of Steel Structures-II (BTCE802)

COURSE OUTCOMES OF DESIGN OF STEEL STRUCTURES-II

At the end of the course, the student will be able to:

CO1.Analysis and design of steel structure.

CO2.Design of bolted and welded connections.

CO3. Analysis and design of axially loaded tension member, axially loaded column, design of lacing and batten system, design of slab base foundation.

PROJECT PLANNING & CONSTRUCTION MANAGEMENT (BTCE803)

COURSE OUTCOMES OF PROJECT PLANNING & CONSTRUCTION MANAGEMENT

At the end of the course, the student will be able to:

CO3: Student will learn how to analyze the rates for different items of works including labor and material.

CO4: Interpret fundamental concepts of valuation.

CO5: Students will be able to identify various legal issues related to construction.

BRIDGE ENGINEERING (BTCE804A)

COURSE OUTCOMES OF BRIDGE ENGINEERING

At the end of the course, the student will be able to:

CO1: Discuss the IRC standard live loads and design the deck slab type bridges.

CO2: Analyze the box culverts for the given loading and detail the box culverts.

CO3: Design and detail of T-Beam bridges.

CO4: Design and check the stability of piers and abutments.

CO5: Discuss the bridge foundations and prepare the bar bending schedule

ADVANCED FOUNDATION ENGINEERING (BTCE804B)

COURSE OUTCOMES OF ADVANCED FOUNDATION ENGINEERING

At the end of the course, the student will be able to:

CO1: Identify a suitable foundation system for a structure.

CO2: Evaluate the importance of raft foundation and principles of design for buildings and tower structures.

CO3: Analyze and design pile foundations.

CO4: Examine and discuss various machine foundations.

CO5: Analyze and design Sheet piles and cofferdams.

EARTHQUAKE RESISTANT CONSTRUCTION & DESIGN (BTCE804C)

COURSE OUTCOMES OF EARTHQUAKE RESISTANT CONSTRUCTION & DESIGN

At the end of the course, the student will be able to:

CO1: students will be able to know about the various types of earthquake zone and its types.

CO2: students will be able to calculate the design the earthquake resistant and its effect on structure.

CO3: students will get knowledge about earthquake design code and masonry the concrete building.

CO4: students will be known about various types of disaster and its management and its types.

CO5: and the students will get knowledge about the various National Environment Policy and Human Resource Development and Function

DESIGN OF WATER RESOURCES STRUCTURES– II LAB (BTCE805)

COURSE OUTCOMES OF DESIGN OF WATER RESOURCES STRUCTURES– II LAB

At the end of the course, the student will be able to:

CO1.To Knowing extremity of water crisis, we must appreciate water as "Nature's greatest gift". Our water requirement is rapidly increasing due to vast industrial development, population growth and changing life style. We are mostly dependent on rains as a predominant source of water.

CO2. Enlist preventing measures for sea water intrusion.

CO.3Ensure effective/optimum utilization of water.

CO4.Maintain water resources.

PROFESSIONAL PRACTICES AND ESTIMATING LAB

(BTCE806)

COURSE OUTCOMES OF PROFESSIONAL PRACTICES AND ESTIMATING LAB

At the end of the course, the student will be able to:

CO1: Student will be able to prepare specification for using materials of construction and its items of works.

CO2: Student will be able to illustrate a detailed estimation of material consumption and abstracts for entire construction projects.

CO3: Student will learn how to analyze the rates for different items of works including labor and material.

STEEL STRUCTURES DESIGN LAB – II (BTCE807)

COURSE OUTCOMES OF STEEL STRUCTURES DESIGN LAB – II

At the end of the course, the student will be able to:

CO1.To knows the basic properties of steel and to understand the behavior according to it.

CO2.To knows the different steel structure analysis and design.

CO3.To knows the design and analysis of angle sections, bolted & welded connection.

CO4.Design of steel structures according to IS-800-2007 by limit state method.

Design of Foundations Lab (BTCE808)

COURSE OUTCOMES OF DESIGN OF FOUNDATIONS LAB

At the end of the course, the student will be able to:

CO1 Characterize and classify soils.

CO2 Identify shears strength parameters for field conditions.

CO3 Understand the principles of compaction and its control.

CO4 Determine index properties of soils.

CO5 Determine engineering properties of soils.

STRUCTURAL ANALYSIS BY MATRIX METHODS LAB

(BTCE809)

COURSE OUTCOMES OF STRUCTURAL ANALYSIS BY MATRIX METHODS LAB

At the end of the course, the student will be able to:

CO1.Gain basic knowledge of structural systems and application of concepts of flexibility and stiffness matrices for simple elements.

CO2.Understand flexibility and stiffness matrices to solve problems in beams, frames and trusses.

CO3. Gain knowledge of direct stiffness method to solve problems in beams, frames and trusses.

CO4.Gain knowledge of solving problems involving temperature changes and lack of fit.