

Department of Civil Engineering

Bachelor of Technology in Civil Engineering

Program Outcomes

POs:

[PO.1]. Engineering knowledge: An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to get the solution of the engineering problems.

[PO.2]. Problem analysis: Ability to Identify, formulates, review research literature, and analyze complex engineering problems.

[PO.3]. Design/Development of Solutions: Ability to design solutions for complex Engineering Problems by considering social, Economic and Environmental aspects.

[PO.4]. Conduct investigations of complex problems: Use research-based knowledge to design, conduct analyses experiments to get valid conclusion.

[PO.5]. Modern tool usage: ability to create, select, and apply appropriate techniques, and to model complex engineering activities with an understanding of the limitations.

[PO.6]. The engineer and society: Ability to apply knowledge by considering social health, safety, legal and cultural issues.

[PO.7]. Environment and sustainability: Understanding of the impact of the adopted engineering solutions in social and environmental contexts.

[PO.8]. Ethics: Understanding of the ethical issues of the civil engineering and applying ethical principles in engineering practices.

[PO.9]. Individual and teamwork: Ability to work effectively as an individual or in team, as a member or as a leader.

[PO.10]. Communication: An ability to communicate clearly and effectively through different modes of communication.

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[PO.11]. Project management and finance: Ability to handle project and to manage finance related issue.

[PO.12]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning.

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Program Specific Outcomes

PSOs:

[PSO.1]. Professional skills – The ability to analyze and design civil engineering structures as per the guidelines in Indian standards and other relevant codes like buildings, bridges, tunnels, railways, airports, water and sewage treatment plants etc

[PSO.2]. Problem solving skills – The ability to managed large infrastructural projects by making use of latest techniques of project management for optimum utilization of resources via man, material and money.

[PSO.3]. Successful Career and Entrepreneurship – Strong desire to acquire modern scientific knowledge by pursuing higher studies, which will lead them to identify problems in the civil engineering domains and thereby become entrepreneur to propose solution

[PSO.4]. Communication: Communicate effectively on complex engineering activities with the engineering community & with society at large, such as, being able to comprehend & write effective reports & design documentation, make effective presentations & give & receive clear instructions



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Semester I

Department of Civil Engineering

Subject: Engineering Chemistry

Code: BTE22011

3 Credits | Semester 1

Course Outcomes: At the end of the course, students will be able to:

- [CO1]** Understand the skills required to succeed in graduate school, the chemical industry or professional school.
- [CO2]** Comprehend the fundamentals of chemistry and critically interpret the primary chemical text.
- [CO3]** Recognize the importance of engineering chemistry in the context of domestic and industrial usage domain.
- [CO4]** Design economic methods of synthesizing new materials and apply their knowledge for protection of environment and application in their field.
- [CO5]** Develop an insight into latest (R&D oriented) topics, to enable the engineering student upgrade the existing technologies and pursue further research.

Subject: Engineering Mathematics–I

Code: BTE21001

Credit - 4 | Semester 1

Course Outcomes: At the end of the course, students will be able to:

- [CO1]** Remember the differential and integral calculus to notions of curvature and to improper integrals.
- [CO2]** Have a basic understanding of Beta and Gamma functions.
- [CO3]** Understand the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- [CO4]** Demonstrate the tool of power series and Fourier series for learning advanced Engineering Mathematics.
- [CO5]** Analyze functions of several variables that is essential in most branches of engineering

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[CO6] Evaluate the essential tool of matrices and linear algebra in a comprehensive manner.

Subject: Basic Electrical Engineering

Code: BTE21003

Credits- 4 | Semester 1

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Comprehend basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
- [CO2] Predict the behavior of any electrical and magnetic circuits.
- [CO3] Formulate and solve complex AC, DC circuits.
- [CO4] Identify the type of electrical machine used for that particular application.
- [CO5] Realize the requirement of transformers in transmission and distribution of electric power and other applications.

Subject: Engineering Mechanics

Code: BTE22009

Credits- 3 | Semester I

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Identify the force systems for given conditions by Apply the basics of mechanics.
- [CO2] Determine unknown force(s) of different engineering systems.
- [CO3] Apply the principles of friction in various conditions for useful purposes.
- [CO4] Find the centroid and center of gravity of various components in engineering systems.
- [CO5] Select the relevant simple lifting machine(s) for given purposes.

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Subject: Engineering Chemistry Lab

Code: BTE22015

Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

- [CO1]** Understand the principles of chemistry relevant to the study of science and engineering
- [CO2]** Estimate rate constants of reactions from concentration of reactants/products as a function of time
- [CO3]** Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- [CO4]** Differentiate between hard and soft water, solve the related numerical problems on water purification and comprehend its significance in industry and daily life.

Subject: Basic Electrical Engineering Lab

Code: BTE21005

Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

- [CO1]** Understand different meters and instruments for measurement of electrical quantities
- [CO2]** Understand the linear and nonlinear characteristics of different types of loads experimentally
- [CO3]** Design and experiment potential divider circuits
- [CO4]** Experimentally verify the basic circuit theorems
- [CO5]** Measure power and power factor in AC circuits

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Subject: Engineering Mechanics Lab

Code: BTE22013

Credits- 1 | Semester I

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Identify the force systems for given conditions by Apply the basics of mechanics.
- [CO2] Determine unknown force(s) of different engineering systems.
- [CO3] Apply the principles of friction in various conditions for useful purposes.
- [CO4] Find the centroid and centre of gravity of various components in engineering systems.
- [CO5] Select the relevant simple lifting machine(s) for given purposes.

Subject: Engineering Graphics & Design

Code: BTE21004

Credits- 2 | Semester I

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Perform basic sketching techniques
- [CO2] Increase understanding related to architectural and engineering scales.
- [CO3] Draw orthographic projections and sections.
- [CO4] Draft the engineered drawings in practical application
- [CO5] Become familiar with office practice and standards.



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Semester II

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Subject: Engineering Physics

Code: BTE22010

4 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Identify and understand the kinds of experimental results, which are incompatible with classical Physics leading to the development of a quantum theory of matter and light.
- [CO2] Use basic concepts to analyze and design a wide range of semiconductor devices.
- [CO3] Understand & solve different types of wave equations.
- [CO4] Use the principles of optics to solve various complex engineering problems.
- [CO5] Use fundamental laws and relations to solve problems in electricity, electromagnetism.

Subject: Programming for Problem Solving

Code: BTE21259

3 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Formulate simple algorithms for arithmetic and logical problems.
- [CO2] Test and execute the programs and correct syntax and logical errors and implement conditional branching, iteration and recursion
- [CO3] Apply programming to solve matrix addition and multiplication problems as well as searching and sorting problems.
- [CO4] Use arrays, pointers and structures to formulate algorithms and programs
- [CO5] Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- [CO6] Understand various types of files and operations on them

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English for Communication

Code: BTE22370

3 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to:

- [CO1] Understand the basics of communication and represent communication process as well as know about its practical implementations at the work place.
- [CO2] Understand verbal and non-verbal modes of communication effectively in practical situations
- [CO3] Analyze vocalic and basic grammar.
- [CO4] Become competent in reading and writing.
- [CO5] Evaluate the process of speaking

Subject: Constitution of India

Code: BTE25095

0 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the emergence and evolution of the Indian Constitution.
- [CO2] Understand and analyse federalism in the Indian context
- [CO3] Understand and explain the significance of Indian Constitution as the fundamental law of the land.
- [CO4]. Exercise fundamental rights in proper sense and at the same time identify with responsibilities towards the process of nation building.
- [CO5] Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail
- [CO6] Understand the Electoral Process, Emergency provisions and the Amendment procedure.

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Subject: Engineering Physics Lab

Code: BTE21261

1 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand calculation of specific resistance of wire by Carey Foster bridge
- [CO2] Calculate thermal conductivity of poor conductors
- [CO3] Measure resonance frequency and quality factor of LCR Circuit & RC circuit with A/C current
- [CO4] Understand the characteristics of transistors, photoelectric cells and determine operational parameters associated with their performance.
- [CO5] Work with laboratory sodium light and lasers and understand the method to measure the wavelength of the light emitted from a laser and sodium light

Subject: Programming for Problem Solving Lab

Code: BTE21262

Credits- 2 | Semester II

Course Outcomes: At the end of the course, students will be able to

- [CO1] Formulate simple algorithms for arithmetic and logical problems, translate the algorithms to programs (in C language), test and execute the programs and correct syntax and logical errors.
- [CO2] Program for solving simple numerical method problems, namely root finding of function, differentiation of function and simple integration.
- [CO3] Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- [CO4] Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

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Subject: Engineering Workshop Practice

Code: BTE22267

2 Credits | Semester II

Course Outcomes: At the end of the course, students will be able to;

- [CO1] Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment and machines
- [CO2] Understand job drawing and complete jobs as per specifications in allotted time
- [CO3] Inspect the job for the desired dimensions and shape
- [CO4] Operate, control different machines and equipment by adopting safety practices



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Semester III

Department of Civil Engineering

Subject: Mathematics III

Code: BTE23022

4 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the concept of partial differential equations, theory of probability and its applications on engineering problems, theory of data distribution, standard deviation and different charts.
- [CO2] Apply concept of differential equation, concept of static in data sampling for solving general engineering problems.
- [CO3] Analyze the process of partial differentiation, probability, statically formulation and data sampling.
- [CO4] Evaluate the result of partial differentiation and its applications, probability, static and sampling of data.

Subject: Biology for Engineers

Code: BTE23018

3 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the biological concepts from an engineering perspective
- [CO2] Understand the concepts of biological sensing and its challenges
- [CO3] Understand development of artificial systems mimicking human action
- [CO4] Integrate biological principles for developing next generation technologies

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Subject: Surveying and Geomatics

Code: BTE23272

3 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

[CO1] Understand the surveying techniques that will remain correct for long period.

[CO2] Understand the different methods using instrument such as Chain, Compass, Leveling, minor instruments like plani-meter, etc.

[CO3] Understand the Area & Volume calculation.

[CO4] Evaluate trigonometrically leveling.

[CO5] Analyze simple & complex problems of different instrument methods of survey.

Subject: Mechanics of Solid

Code: BTE23021

3 Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be able to:

[CO1] Interpret the concepts of stress at a point as well as the stress-strain relationships for homogenous, isotropic materials.

[CO2] Analyze the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.

[CO3] Demonstrate the capability to conduct experiments, as well as to analyze and interpret data

[CO4] Classify a component to meet desired needs within realistic constraints of safety.

[CO5] Apply various failure criteria for general stress states at points.

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Subject: Introduction to Civil Engineering

Code: BTE23273

4 Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be able to:

[CO1] Understand the fundamental aspects of civil engineering

[CO2] Implement plan for the building

[CO3] Understand about surveying for making horizontal and vertical measurements.

[CO4] Illustrate the usages of various building materials and construction of different components of a building.

Subject: Environmental Science

Code: BTE24085

0 Credits | Semester III

COURSE OUTCOMES: By the end of this course, students will be:

[CO1] Understand the ecosystem and related terminology

[CO2] Understand the ecosystem knowledge to produce eco-friendly products

[CO3] Understand the suitable extent of air & noise pollution and control related measures and acts.

[CO4] Understand the suitable extent of water and soil pollution and control related measures and acts.

[CO5] Understand different renewable energy resources and efficient process of harvesting.

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Subject: Surveying and Geomatics Lab

Code: BTE23274

1 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Prepare a topographical map, which shows the hills, valleys, rivers, villages, towns, forests, etc. of a country.
- [CO2]** Prepare a cadastral map showing the boundaries of fields, houses and other properties
- [CO3]** Prepare an engineering map, which shows the details of engineering works such as roads, railways, reservoirs, irrigation canals, etc.
- [CO4]** Prepare a military map showing the road and railway communications with different parts of a country
- [CO5]** Prepare a contour map to determine the capacity of a reservoir and to find the best possible route for roads, railways, etc.

Subject: Mechanics of Solid Lab

Code: BTE23025

1 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Measure tensile and compressive strength of a specimen for applying in a practical design based project work
- [CO2]** Determine hardness, impact strength, fatigue strength to analyze the application of a specific material for a given design requirement for different loading conditions of structures.
- [CO3]** Observe bending in beams and calculate the bending stresses which further builds the foundation of using modern analysis software.
- [CO4]** Judge the capacity of a material to withstand torsional stresses for a safe and sustainable design of machine elements.

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Subject: Computer Aided Civil Engineering Drawing Lab

Code: BTE23275

1 Credits | Semester III

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Use the AutoCAD commands for drawing 2D & 3D building drawings required for different civil engineering applications.
- [CO2]** Plan and draw Civil Engineering Buildings as per aspect and orientation
- [CO3]** Present drawings as per user requirements and preparation of technical report.
- [CO4]** Become familiar with computer aided drafting useful to share the design model with different industries as well as for research & development purposes.
- [CO5]** Understand projection of line, surface and solids to create the knowledge base of orthographic and isometric view of structures and machine parts.



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Semester IV

Department of Civil Engineering

Subject: Materials, Testing & Evaluation

Code: BTE24280

3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the different materials used in civil engineering applications.
- [CO2] Plan an experimental program, select the test configuration, select the test specimens and collect raw data.
- [CO3] Document the experimental program including the test procedures, collected data, method of interpretation and results.
- [CO4] Analyze various modes of failure in compression, tension, and shear.
- [CO5] Analyze various types of material behavior under similar loading conditions.

Subject: Engineering Geology

Code: BTE24055

3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Characterize a site and collect, analyse and report geologic data using standards in engineering practice
- [CO2] Understand the fundamentals of the engineering properties of Earth materials and fluids.
- [CO3] Understand the Rock mass characterization and the mechanics of planar rockslides and topples.
- [CO4] Use suitable software to examine geology, soil, geologic hazard, and NEHRP data to characterize a geologic site
- [CO5] Understand the mechanics of soils & fluids and their influence on settlement, liquefaction, and soil slope stability.

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Subject: Fluid Mechanics

Code: BTE24080

3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Measure pressure and determine total hydrostatic pressure for different conditions.
- [CO2] Understand various parameters associated with fluid flow.
- [CO3] Determine head loss of fluid flow through pipes.
- [CO4] Find the fluid flow parameters in open channels.
- [CO5] Understand the various types of flow

Subject: Structural Analysis-I

Code: BTE24057

3 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Analyze statically determinate trusses, beams, and frames and obtain internal loading
- [CO2] Analyze cable and arch structures
- [CO3] Determine deflections of beams and frames using classical methods.
- [CO4] Solve statically indeterminate structures using classical method
- [CO5] Obtain the influence lines for statically determinate and indeterminate structures

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Subject: Geotechnical Engineering

Code: BTE24056

3 Credits | Semester IV

COURSE OUTCOMES: At the end of the course, students will be able to

- [CO1]** Understand the various phase diagrams and derive various phase relationships of the soil
- [CO2]** Classify any soils based on their particle size distribution and index properties
- [CO3]** Calculate the effective permeability of anisotropic soil mass
- [CO4]** Evaluate ground settlements against time.
- [CO5]** Understand the significance of shear strength parameters in various geotechnical analyses

Subject: Civil Engineering- Societal & Global Impact

Code: BTE24059

3 Credits | Semester IV

COURSE OUTCOMES: At the end of the course, students will be able to;

- [CO1]** Understand the importance of Civil Engineering and the impact it has on the Society and at the global level.
- [CO2]** Understand the impact of Civil Engineering for the various specific fields of human endeavor.
- [CO3]** Think innovatively to ensure Sustainability.
- [CO4]** Understand the new civil engineering projects & their impact on society.
- [CO5]** Understand the importance of Civil Engineering in shaping & affecting the world.

Department of Civil Engineering

Subject: Material Testing & Evaluation Lab

Code: BTE24388

1 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Identify different types of cement by performing laboratory tests.
- [CO2] Know the physical properties of fine and coarse aggregates
- [CO3] Prepare concrete as per required specifications.
- [CO4] Understand compression & tensile loading
- [CO5] Apply relevant admixtures for concreting.

Subject: Engineering Geology Lab

Code: BTE24062

1 Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the site characterization and collect, analyze, and report geologic data using standards in engineering practice
- [CO2] Understand the fundamentals of the engineering properties of Earth materials and fluids.
- [CO3] Understand the Rock mass characterization and the mechanics of planar rockslides and topples.
- [CO4] Use suitable software to examine geology, soil, geologic hazard, and NEHRP data to characterize a geologic site.
- [CO5] Understand the mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability

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Subject: Geotechnical Engineering Lab

Code: BTE24063

1Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the various phase diagrams and derive various phase relationships of the soil
- [CO2] Classify any type of soil based on particle size distribution and index properties
- [CO3] Calculate the effective permeability of anisotropic soil mass
- [CO4] Evaluate ground settlements against time
- [CO5] Understand the significance of shear strength parameters in various geotechnical analyses

Subject: Fluid Mechanics Lab

Code: BTE24086

1Credits | Semester IV

Course Outcomes: At the end of the course, students will be able to

- [CO1] Measure pressure and determine total hydrostatic pressure for different conditions.
- [CO2] Understand various parameters associated with fluid flow
- [CO3] Determine head loss of fluid flow through pipes
- [CO4] Find the fluid flow parameters in open channels
- [CO5] Understand the various types of flow



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Semester V

Department of Civil Engineering

Subject: Hydraulic Engineering

Code: BTE25089

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the principle of operation of Hydraulic machineries (Pumps and Turbines).
- [CO2] Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
- [CO3] Relate the theoretical and practical problems of Hydraulic Engineering.
- [CO4] Develop dimensional analysis and similitude to present and interpret experimental data and models in fluid engineering problems.
- [CO5] Design calculations through pipe networks and various hydraulic structures such as Weirs.

Subject: Structural Analysis-II

Code: BTE25090

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1] Utilize the knowledge of structural mechanics in addressing design problems of Structural engineering.
- [CO2] Apply the knowledge of Plastic Analysis in addressing Design problems.
- [CO3] Analyse structures using Slope-Deflection and Moment-Distribution Method.
- [CO4] Judge the comparative advantages of analysis using Flexibility and Stability Method.
- [CO5] Develop shape factors of simple sections.

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Subject: Hydrology & Water Resource Engineering

Code: BTE25091

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Explain the process governing transfer of water between atmosphere, land, sub-surface and natural channels and the quality of water in aquifers, rivers, lakes and reservoirs.
- [CO2]** Interpret hydrological parameter measurement techniques.
- [CO3]** Examine simple hydrological models in Environmental engineering applications.
- [CO4]** Quantify the process controlling water flow and sediment transport in catchments.
- [CO5]** Design water distribution systems and Dams.

Subject: ENVIRONMENTAL ENGINEERING - I

Code: BTE25092

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the impact of humans on environment and environment on humans
- [CO2]** Conversant with implementation of basic environmental legislation.
- [CO3]** Examine the effect of the pollutants on the environment: atmosphere, water and soil.
- [CO4]** Select the most appropriate technique for the treatment of water.
- [CO5]** Develop strategies to control, reduce and monitor pollution.

Department of Civil Engineering

Subject: Professional Practice, Law & Ethics

Code: BTE25373

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Define what constitutes Professional practice and the respective roles of various stakeholders.
- [CO2]** Execute the types of roles they are expected to play in the society as practitioners of Civil Engineering profession.
- [CO3]** Examine the utility of Contracts and Contract Management in Civil Engineering, Dispute Resolution mechanisms, and Laws governing Engagement of Labour.
- [CO4]** Evaluate the different Intellectual Property Rights, Patents etc.
- [CO5]** Develop good ideas related to the legal and practical aspects of their profession.

Subject: Organizational Behavior

Code: BTE24060

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Define the key ideas and issues in OB.
- [CO2]** Interpret the dynamics of human behavior in work context.
- [CO3]** Examine the determinants of work behavior from different levels.
- [CO4]** Judge the issues in OB that influence the way people behave in an organizational setting.
- [CO5]** Develop competencies of analyzing behavioral issues in the work environment.

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Subject: Disaster Preparedness & Planning

Code: BTE25298

3 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Get acquainted with basic information on various types of Disasters.
- [CO2]** Apply the disaster concepts to management.
- [CO3]** Analyze the relationship between Development and Disasters.
- [CO4]** Decide the first action to be taken under various disasters.
- [CO5]** Formulate the precautions and awareness regarding various disasters and get familiarized with organization in India dealing with disasters.

Subject: Essence of Indian Knowledge Tradition

Code: BTE25299

0 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the basic structure of Indian Knowledge System and Modern Science.
- [CO2]** Apply the basic principles of thought processes, reasoning and inferencing.
- [CO3]** Draw connection between the basic structure of Indian Knowledge and Modern science.
- [CO4]** Evaluate the Indian philosophical, linguistic and artistic traditions.
- [CO5]** Develop knowledge regarding Indian traditions with the help of various Case Studies.

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Subject: Hydraulic Engineering Lab

Code: BTE25096

1 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the principle of operation of Hydraulic machineries (Pumps and Turbines).
- [CO2] Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
- [CO3] Relate the theoretical and practical problems of Hydraulic Engineering
- [CO4] Develop dimensional analysis and similitude to present and interpret experimental data and models in fluid engineering problems.
- [CO5] Design calculations through pipe networks and various hydraulic structures such as Weirs.

Subject: Structural Analysis-II Lab

Code: BTE25097

1 Credits | Semester V

Course Outcomes: At the end of the course, students will be able to

- [CO1] Utilise the knowledge of structural mechanics in addressing design problems of Structural engineering.
- [CO2] Apply the knowledge of Plastic Analysis in addressing Design problems.
- [CO3] Analyse structures using Slope-Deflection and Moment-Distribution Method.
- [CO4] Judge the comparative advantages of analysis using Flexibility and Stability Method.
- [CO5] Develop shape factors of simple sections.



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Semester VI

Department of Civil Engineering

Subject: Construction Engineering & Management

Code: BTE26126

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the various kind of materials used in construction work.
- [CO2]** Understand different types of building foundation, that is, shallow and deep foundation, their mechanisms and uses.
- [CO3]** Analyze various structural members of a building like-walls, door, window, stair, flooring, roof etc.
- [CO4]** Apply their knowledge at the time of decision making for application of structural member including material used.
- [CO5]** Evaluate the characteristics and suggest treatment of sewage

Subject: Transportation Engineering - I

Code: BTE25093

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand various types of contracts and when they are used
- [CO2]** Suggest the relevant type of contract for the given civil engineering work.
- [CO3]** Prepare the typical Tender document for the given civil engineering work
- [CO4]** Decide type of payment for the executed work.
- [CO5]** Justify the rent fixation and valuation of a given civil structure

Department of Civil Engineering

Subject: Engineering Economics, Estimation & Costing

Code: BTE26127

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Identify alternative uses for limited resources and obtain appropriate data.
- [CO2]** Understand the key economic concepts and place them in a real world context facilitating practical insights.
- [CO3]** Establish a framework of basic economic theory, which can be extended and applied at later stages of the degree program
- [CO4]** Develop an appreciation of the importance of economic forces in shaping the contemporary world.
- [CO5]** Employ critical thinking skills to analyze financial data as well as the effects of different financial accounting methods on the financial statement.

Subject: Rock Mechanics

Code: BTE26315

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand about the Properties of Rock
- [CO2]** Understand the Physical Strength and Deformability of Rock Mass and Failure.
- [CO3]** Understand the Physico-mechanical properties of soil and Ground Water
- [CO4]** Understand the engineering classification of rocks and rock masses

Department of Civil Engineering

Subject: Foundation Engineering

Code: BTE26316

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the foundation and anchoring design challenges in civil engineering
- [CO2]** Understand the soil behavior relevant to the foundation and anchoring systems.
- [CO3]** Understand the techniques used to investigate and characterize the ground for design
- [CO4]** Understand the technologies used to install or construct foundation and anchoring system

Subject: Environment Engineering-II

Code: BTE26130

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand key current environmental problems like level of pollution
- [CO2]** Identify and value the effect of the pollutants on the environment: atmosphere, water and soil.
- [CO3]** Analyze an industrial activity and identify the environmental problems.
- [CO4]** Plan strategies to control, reduce and monitor pollution.
- [CO5]** Select the most appropriate technique to purify and/or control the emission of pollutants.

Department of Civil Engineering

Subject: Rural Water Supply and onsite Sanitation System

Code: BTE26317

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to;

- [CO1]** Identify problems pertaining to rural water supply and sanitation.
- [CO2]** Design water supply and sanitation systems for rural community.
- [CO3]** Design low cost waste management system for rural areas.
- [CO4]** Plan and design an effluent disposal mechanism

Subject: Design of Steel Structures

Code: BTE26134

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Design riveted and welded connections.
- [CO2]** Design built-up sections.
- [CO3]** Analyze and design simple bolted and welded connections
- [CO4]** Design steel framing system and connections of a building in a team setting
- [CO5]** Understand the structural steel fabrication process and construction through field trip and/or speaker presentation

Department of Civil Engineering

Subject: Earthquake Engineering

Code: BTE26318

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the theoretical and practical aspects of earthquake engineering along with planning and design aspect.
- [CO2] Acquire diverse knowledge pertaining to earthquake engineering practices as applicable to real life problems.
- [CO3] Analyze the potential consequences of an earthquake.
- [CO4] Understand the earthquake intensity and earthquake magnitude.
- [CO5] Evaluate the enormous energies released during earthquakes.

Subject: Design of Concrete Structure-I

Code: BTE26319

3 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to;

- [CO1] Comprehend the basic information on various types of disasters
- [CO2] Understand the precautions and awareness regarding various disasters
- [CO3] Decide first action to be taken when facing various types of disasters.
- [CO4] Familiarize themselves with organizations in India which are dealing with disasters
- [CO5] Select IT tools to assist in disaster management



Department of Civil Engineering

Subject: Transportation Engineering-I Lab

Code: BTE25098

1 Credits | Semester VI

Course Outcomes: At the end of the course, students will be able to;

- [CO1] Understand various types of contract and when they are used
- [CO2] Suggest the relevant type of contract for the given civil engineering work
- [CO3] Prepare the typical Tender document for the given civil engineering work
- [CO4] Decide upon the type of payment for the executed work
- [CO5] Justify the rent fixation and valuation of a given civil structure



Department of Civil Engineering

Semester VII

Department of Civil Engineering

Subject: Air & Noise Pollution and Control

Code: BTE27341

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the different models of dispersion
- [CO2]** Understand the air quality measurement and the standards set by different organizations.
- [CO3]** Understand the sampling methods and collection techniques
- [CO4]** Understand the measurement of Air Quality
- [CO5]** Understand the basics related to Noise Pollution and its control

Subject: Solid & Hazardous Waste Management

Code: BTE27342

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the solid waste generation and its types
- [CO2]** Apply methods to dispose off solid wastes depending upon the hazardous level.
- [CO3]** Design landfill sites
- [CO4]** Take measures for minimization of waste.
- [CO5]** Analyze the current site remediation facilities present in the country.

Department of Civil Engineering

Subject: Design of Concrete Structure-II

Code: BTE27343

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the continuous beam design
- [CO2]** Understand the various parameters associated with the design of water tanks
- [CO3]** Understand the different types of staircases
- [CO4]** Understand the Retaining Wall Design.
- [CO5]** Understand the design concept of framed structures.

Subject: Prestressed Concrete

Code: BTE27344

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the behavior of prestressed concrete structure which is an advanced topic of civil engineering.
- [CO2]** Design, analyse, detail and construct prestressed concrete structural.
- [CO3]** Determine flexural strength
- [CO4]** Solve deflections
- [CO5]** Obtain the mechanism of transfer of prestress.

Department of Civil Engineering

Subject: Metro Systems & Engineering

Code: BTE27345

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Know about the various types of metro systems
- [CO2]** Understand the role of Civil Engineering in Metro Rail Technology
- [CO3]** Understand the role of Electronics & Communication Engineering in Metro Rail Technology
- [CO4]** Understand the role of Mechanical Engineering in Metro Rail Technology
- [CO5]** Understand the role of Electrical Engineering in Metro Rail Technology

Subject: History of Science & Engineering

Code: BTE27346

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Know about the development of science with respect to different branches
- [CO2]** Know about Science & Technology during Medieval India era
- [CO3]** Know about Science & Technology during Colonial India era
- [CO4]** Know about Indian Scientists and their contributions
- [CO5]** Know about Civil Engineers and their roles

Department of Civil Engineering

Subject: River Engineering

Code: BTE27347

3 Credits | Semester VII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand fluvial geomorphology
- [CO2]** Understand the concept of analysis of river flow hydraulics
- [CO3]** Analyse hydraulic geometry and design stable alluvial channels
- [CO4]** Understand the fluvial design for riverbank protection
- [CO5]** Understand the environmental aspect of river engineering



Department of Civil Engineering

Semester VIII

Department of Civil Engineering

Subject: Bridge Engineering

Code: BTE28365

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the load-flow mechanisms and identify loads on bridges.
- [CO2]** Interpret the load-carrying capacity of various types of bridges.
- [CO3]** Execute the concepts of proportioning and design of bridges in terms of aesthetics, geographical location and functionality.
- [CO4]** Select a design of bridge starting from conceptual design, selecting suitable bridge, geometry to sizing of its elements.
- [CO5]** Design short and medium span bridges, using existing codes of practice.

Subject: Ground Water Engineering

Code: BTE28389

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the basic concepts of Hydrogeology, Well Hydraulics and Groundwater Management.
- [CO2]** Address practical groundwater engineering problems.
- [CO3]** Characterize the sub-surface using aquifer tests, transport and remediation of contaminants, and innovations in groundwater management.
- [CO4]** Select the best method of Surface and Sub-surface investigation.
- [CO5]** Develop a conceptual model of an area's hydrogeology that can be used to guide a site investigation or engineering design project.

Department of Civil Engineering

Subject: Railway Engineering

Code: BTE28366

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the basic concepts of Track components, geometric design, track and railway maintenance.
- [CO2] Demonstrate different Interlocking and modern Signal Systems in Railways.
- [CO3] Analyze various facets of geometric design of tracks.
- [CO4] Select the most suitable method of track maintenance, rehabilitation and renewal of track.
- [CO5] Develop simple track layout.

Subject: Traffic Engineering & Management

Code: BTE28367

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand traffic Forecast, Accident Analysis and Traffic Simulation.
- [CO2] Comprehend the basic characteristics of traffic stream.
- [CO3] Conduct traffic studies and analyse traffic data.
- [CO4] Determine the capacity of highways.
- [CO5] Design traffic signal system.

Department of Civil Engineering

Subject: Soft Skills and Interpersonal Communication

Code: BTE25386

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the Corporate communication culture.
- [CO2] Implement Corporate Social Responsibility and Ethics.
- [CO3] Acquire corporate email, mobile and telephone etiquettes.
- [CO4] Judge presentation and entrepreneurial skills of individuals.
- [CO5] Develop business reports and proposals expected of a corporate professional.

Subject: Human Resource Development &Organizational Behavior

Code: BTE26387

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1] Understand the key ideas and issues in HRD & OB.
- [CO2] Interpret the dynamics of human behavior in work context.
- [CO3] Examine the determinants of work behavior from different levels.
- [CO4] Judge the issues in OB that influence the way people behave in an organizational setting.
- [CO5] Develop competencies of analyzing behavioral issues in the work environment

Department of Civil Engineering

Subject: Civil Engineering Design-I

Code: BTE28368

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the concept of Design and EIA.
- [CO2]** Demonstrate the role of Geomatics in Civil Engineering Design.
- [CO3]** Examine the importance of modern tools and software in design.
- [CO4]** Judge the relevance of Site Appraisal and Safety in Design.
- [CO5]** Develop the Plan of a Building using modern tools.

Subject: Geographic Information Systems & Science

Code: BTE28369

3 Credits | Semester VIII

Course Outcomes: At the end of the course, students will be able to

- [CO1]** Understand the basic concepts of GIS and list the software/hardware requirements for implementing GIS Project.
- [CO2]** Demonstrate the geospatial features in computing environment.
- [CO3]** Analyse spatial and attribute data for solving spatial problems.
- [CO4]** Judge the relationship of GIS to GPS and satellite generated data.
- [CO5]** Create GIS and cartographic outputs for presentation.