



COURSE OUTCOMES

3rd Semester

Course Name: Applied Mathematics - III		Code: BECVE301T
At the end of course Students will		
CO1	Apply Fourier series in the analysis of periodic functions not in terms sine and cosine encountered in engineering problems.	
CO2	Solve Partial differential equations of first, higher and second order using elementary techniques; formulate mathematical models to simple problems of vibration of strings and beams in terms of Partial differential equations and solving with elementary solution techniques.	
CO3	Learn the concept of finding maxima and minima of definite integral involving unknown function and its derivatives.	
CO4	Learn Eigen value problem and its applications.	
CO5	Learn to find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various Numerical Methods	
CO6	Formulate simple optimization problem and learn to solve it by Graphical method and Simplex method.	

Course Name : Fluid Mechanics		Code: BECVE302T
At the end of course Students will		
CO1	Understand the importance and practical significance of various fluid properties	
CO2	Comprehend and estimate various forces acting on partially and fully submerged bodies	
CO3	Evaluate the importance of various parameters on the fluid motion.	
CO4	Know various flow measuring devices with their practical applications	
CO5	Illustrate the concept of impulse momentum principle, dimensional analysis and model analysis of a fluid phenomenon	



Course Name: SOLID MECHANICS		Code: BECVE303T
At the end of course Students will		
CO1	Understand the behavior of materials under different stress and strain conditions.	
CO2	Evaluate and draw shear force diagram and bending moment diagram and their relation.	
CO3	Formulate the bending and shear stresses equations and able to draw bending and shear stress diagrams.	
CO4	Formulate slope and Deflection equations for beams subjected to various loads by Macaulay's method	
CO5	Analyze and Evaluate the torsion in circular section, Direct and Bending Stresses	

Course Name: GEOTECHNICAL ENGINEERING		Code: BECVE304T
At the end of course Students will		
CO1	Find the index and engineering properties of the soil.	
CO2	Determine properties & demonstrate interaction between water and soil.	
CO3	Analyze and compute principles of compaction and consolidation settlements of soil.	
CO4	Ability to analyze to calculate bearing capacity, earth pressure and foundation settlement.	
CO5	Study and identify different type's natural materials like rocks & minerals and soil.	

Course Name: BUILDING CONSTRUCTION AND ELEMENTARY BUILDING DRAWING		Code: BECVE305T
At the end of course Students will		
CO1	Identify components of a building.	
CO2	Differentiate and identify types of building materials.	
CO3	Select appropriate material for building construction.	
CO4	Plan various construction related activities and their quality control.	
CO5	Know & identify the latest techniques and materials used.	



Course Name: EFFECTIVE TECHNICAL COMMUNICATION		Code: BECVE306T
At the end of course Students will		
CO1	Participate effectively in groups with emphasis on listening and meta cognitive thinking.	
CO2	Prepare memorandum and report.	
CO3	Deliver an effective oral presentation.	
CO4	Acquire public speaking skills handling the audience professionally.	
CO5	Analyze causes of deterioration of concrete components	

4th Semester

Course Name: CONCRETE TECHNOLOGY		Code: BTCVE401T
At the end of course Students will		
CO1	Think logically for development Concrete technology application in field of Civil Engineering	
CO2	Gain an experience in the implementation of Concrete Materials on Engineering concepts which are applied on Construction Fields	
CO3	Understand the process of mix design of concrete.	
CO4	Differentiate special concrete from conventional concrete.	
CO5	Analyze causes of deterioration of concrete components	

Course Name: STRUCTURAL ANALYSIS		Code: BTCVE402T
At the end of course Students will		
CO1	Apply knowledge to analyse determinate and indeterminate structures.	
CO2	Apply knowledge to perform analysis of beams and frames using Slope Deflection Method and Moment Distribution Method.	
CO3	Apply knowledge of Influence Line Diagram to analyse structural members for rolling loads.	
CO4	Apply knowledge of Direct Stiffness Method to analyse Beams and Plane Frames.	
CO5	Apply knowledge of Direct Stiffness Method to formulate Stiffness Matrix, Transformation Matrix, and Load Matrix to analyse Plane Truss.	



Course Name: ENVIRONMENTAL ENGINEERING		Code:BTCVE403T
At the end of course Students will		
CO1	Have knowledge of characteristics of water, drinking water standards and necessity of treatment.	
CO2	Design various units of conventional water treatment plant.	
CO3	Understand the characteristics of waste water, necessity of treatment, types of treatment processes	
CO4	Equip with the basic knowledge related to design of waste water treatment	
CO5	Understand of significance of air pollution, solid waste , climate change, geo environment etc.	

Course Name: TRANSPORTATION ENGINEERING		Code:BTCVE404T
At the end of course Students will		
CO1	Define and describe different objectives and requirements of Highway Development and Planning, Alignments.	
CO2	Explain, Discriminate and Design various Geometric Features of Highways & Pavement Design	
CO3	Understand, analyze, apply and evaluate the parameters of Traffic Engineering.	
CO4	Explain and describe various terms in railway engineering and should be able to explain, discriminate and design various geometric features of railway track.	
CO5	Understand the aircraft characteristics and terminal area functions, analyze, and evaluate the basic runway length, orientation of runway.	

Course Name: SURVEYING AND GEOMATICS		Code:BTCVE405T
At the end of course Students will		
CO1	Measure length and bearing of lines using various instruments and calculate area of given field.	
CO2	Use the theodolite to measure angle and distances for traversing also identify and Correct the errors in traverse. Design and lay-out the various types of curves.	
CO3	To carry out levelling and contouring also able to determine volume of earthwork.	
CO4	Use modern instrument like Total work station , GPS, DGPS for surveying and able to prepare maps in CAD	
CO5	Use Remote Sensing and Geographical Information System (GIS), UAV Drone and LiDAR Survey.	



5th Semester

Course Name: HYDRAULIC ENGINEERING		Code:BTCVE501
At the end of course Students will		
CO1	Understand the concepts related to boundary layer theory and determination of drag and lift forces	
CO2	Apply the knowledge of theories and equations of pipe flow in analyzing and designing the pipe network systems and to discuss effects of water hammer pressures.	
CO3	Use the concepts of uniform and critical flow through open channels, design of Efficient channel sections and application of specific energy concept.	
CO4	Understand gradually varied flow analysis and its computation, and its application in open channel flow.	
CO5	Understand and apply basics principles related to turbines & Pumps in water Resources planning	

Course Name: REINFORCED CEMENT CONCRETE DESIGN		Code:BTCVE502T
At the end of course Students will		
CO1	Understand the fundamental concepts of working stress method as per IS 456- 2000 and Pre-stressed concrete method.	
CO2	Apply the fundamental concepts of limit state method on limit state of serviceability	
CO3	Analyze the fundamental concepts of limit state of collapse in flexure, Shear & Bond as per IS 456-2000.	
CO4	Evaluate the fundamental concepts of limit state of collapse in compression and Design of footing as per IS 456-2000.	
CO5	Design of Simply supported Two-way slab	



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Course Name: Civil Engineering Materials, Testing and Evaluation Code:BTCVE503	
At the end of course Students will	
CO1	Evaluate the role of materials in Civil Engineering
CO2	Know the mechanical behavior and properties of steel and concrete by standard testing procedures for identifying their performance
CO3	Explain special materials, composite materials and use of new techniques in constructions for satisfying the future needs of industry.
CO4	Exposure to a variety of established material testing procedures/techniques and the relevant codes of practice
CO5	Evaluate and write a technical laboratory report.

Course Name: Professional Practice, Law & Ethics Code:BTCVE504	
At the end of course Students will	
CO1	Understand basic purpose of profession, professional ethics and various moral and social issues.
CO2	Analyse various moral issues and theories of moral development.
CO3	Realize their roles of applying ethical principles at various professional levels
CO4	Identify their responsibilities for safety and risk benefit analysis.
CO5	understand their constructive roles in dealing various global issues

Course Name: Industrial Training & Professional Skill Training Code: BTCVE507P	
At the end of course Students will	
CO1	Understand organizational skills & professional practices
CO2	Interpret the communication skills of organizational members with each other
CO3	Analyze the structural problems by using STADD.PRO
CO4	Design the structural members by using STADD.PRO

Course Name: Organizational Behaviour Code:BTCVE508AU	
At the end of course Students will	
CO1	Understand the concept and importance of organizational behavior.
CO2	Acquire the knowledge of interpersonal behavior and transaction analysis
CO3	Know different traits and theories of personality
CO4	Analyze the importance of motivation in organization and types of leadership



Course Name: Advanced Building Materials (Elective-I)		Code:BTCVE505T
At the end of course Students will		
CO1	Understand the structural, physical and long term performance of building materials used in construction.	
CO2	Understand special mortars and admixtures used in Civil engineering applications.	
CO3	Understand the properties of Ceramic materials in construction projects.	
CO4	Understand the uses of polymeric materials in construction.	
CO5	Understand green building concept and materials.	

Course Name: Advanced Concrete Structure (Elective-II)		Code:BTCVE506T
At the end of course Students will		
CO1	Understand the behavior and failure modes of different RC structural members	
CO2	Analyze and apply the results in designing various RC structural members.	
CO3	Apply the knowledge and skills in practical problems	
CO4	Understand the relevant software and use the same in the analysis and design of RC members.	

6th SEMESTER

Course Name: Estimating and Costing		Code: BTCVE601T
At the end of course Students will		
CO1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.	
CO2	Write the specification of the works to be undertaken, prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor.	
CO3	Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project	
CO4	Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.	
CO5	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads & Arrive the exact value of the asset (movable & immovable) using different Valuation techniques	



Course Name: Construction Engineering and Management		Code:BTCVE602T
At the end of course Students will		
CO1	Get themselves acquainted with various economic and managerial aspects of construction industry	
CO2	Understand the tools and techniques of economic analysis for improving their decision making skills	
CO3	Analyze the structure of market and effects of inflation with special reference to Construction industry.	
CO4	Understand the importance of marketing management and its effect on construction industry.	
CO5	Acquire financial acumen for construction business.	

Course Name: Water Resource Engineering		Code: BTCVE603T
At the end of course Students will		
CO1	Understand occurrence, movement and distribution of water and estimate water abstractions, runoff and hydrographs	
CO2	Illustrate different systems and methods of irrigation and estimate the quantity of water required by crops and estimate the quantity of water required by crops.	
CO3	Estimate reservoir capacity and analyse and design earth dams	
CO4	Design and analyse gravity dams and illustrate types of Spillways and energy dissipaters	
CO5	Design unlined and lined channels and illustrate concepts of other irrigation structures	

Course Name: Prestressed Concrete (Elective-III)		Code:BTCVE604T
At the end of course Students will		
CO1	Understand the behavior of pre-stressed concrete.	
CO2	Design of the pre-stressed concrete structures.	
CO3	Understand the knowledge of basic theories and fundamental behavior of prestress concrete.	
CO4	Perform the analysis and design of pre-stress elements.	
CO5	Apply the fundamental knowledge to the solution of practical problems.	



Course Name: ENVIRONMENTAL ENGINEERING-II		Code: BECVE605
At the end of course Students will		
CO1	Use the concept related to water & its quality, sewage, sewer, storm water, etc. in its hydraulic design	
CO2	Apply the knowledge of different components of sewer in construction, testing & maintenance of sewers,	
CO3	To test the sample of waste water in the laboratory for physical & chemical characteristics.	
CO4	Take-up functional planning, layout and design of water treatment plant components.	
CO5	Take-up functional planning, layout and design of sewage treatment plant components	
CO6	Plan for rural sanitation provisions, perform functional design of septic tank,	
CO7	Analyze the industrial waste water for its treatment units.	
CO8	Make use of knowledge & effect of air pollution, solid waste in planning for its prevention and control.	

Course Name: SITE VISITS & MINI PROJECT		Code: BECVE606
At the end of course Students will		
CO1	Get an idea of various project details such as contracts, layout, planning, drawing, estimates, Arbitration provision, licensee & licensor, architects, structural designer, etc.	
CO2	Get an idea of various construction equipment, manpower & techniques used at site, techniques of batching, mixing, transportation, and placement of different construction materials.	
CO3	Get an overview on safety measures, basic amenities to provide, inventory control.	
CO4	Write a legible, correct and technically sound report after the visit.	
CO5	Ascertain the provisions and execution as per the working drawing.	

7th SEMESTER

Course Name: ADVANCED CONCRETE STRUCTURES	
Code: BECVE701	
At the end of course Students will	
CO1	Understand the behavior and failure modes different concrete members
CO2	Analyze and apply the results in designing various concrete member of structure.
CO3	Apply the knowledge & skills in practical problems
CO4	Understand the relevant software and use the same in analysis & design of concrete members



Course Name: ESTIMATING AND COSTING		Code: BECVE702
At the end of course Students will		
CO1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.	
CO2	Write the specification of the works to be undertaken, prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor.	
CO3	Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project	
CO4	Schedule the project for its timely completion.	
CO5	Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.	
CO6	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads	
CO7	Arrive the exact value of the asset (movable & immovable) using different Valuation techniques.	

Course Name: EARTHQUAKE RESISTANT DESIGN OF STRUCTURE		Code: BECVE703
At the end of course Students will		
CO1	Understand the different aspects related to seismology and terms related to it	
CO2	Analyze earthquake loading effect on structures.	
CO3	Perform the analysis and design of structures against earthquake loading.	
CO4	Analyze multi-storey structure using different methods like Equivalent Static Lateral Load Method and Response Spectrum Method	
CO5	Understand the different seismic retrofitting techniques and its implementation	
CO6	Use the knowledge in practical situation	

Course Name: ADVANCED TRAFFIC ENGINEERING (ELECTIVE-I)		Code: BECVE704
At the end of course Students will		
CO1	Use the knowledge to carry out traffic studies and give solutions to planning of transportation system.	
CO2	Apply basic principles for the geometric design of roads and other traffic controlling devices	
CO3	To understand the parking systems, riding quality standards, traffic safety and accident study and suggest the solutions to the practical problems.	



Course Name: AIR POLLUTION AND SOLID WASTE MANAGEMENT (ELECTIVE- I) Code: BECVE704	
At the end of course Students will	
CO1	Understand different aspects of air pollutants, its sources and effects on man and material etc.
CO2	Design controls methods and equipment's for air pollution to reduce its impact on environment.
CO3	Understand problems arriving in handling large amount of solid waste generated, its collection and transportation, processing and will be able to design safe collection and disposal methods.

Course Name: ADVANCED HYDRAULICS (ELECTIVE-I) Code: BECVE704	
At the end of course Students will	
CO1	Apply the concept of uniform flow and critical flow in open channels.
CO2	Analyze and identify GVF profiles and its importance in practical aspects.
CO3	Understand the concept of rigid water column theory and elastic water column theory and apply it to the hydraulic projects
CO4	Understand water hammer theories and problems encountered in practical situations.

Course Name: SUSTAINABLE RESOURCE MANAGEMENT IN CIVIL ENGINEERING (ELECTIVE-I) Code: BECVE704	
At the end of course Students will	
CO1	Understand the concept of sustainability, sustainable resources management and make use of understanding in planning the civil engineering project.
CO2	Understand the need of environment protection and energy saving through the use of alternative green construction materials

Course Name: BUILDING SERVICES (ELECTIVE I) Code: BECVE704	
At the end of course Students will	
CO1	To design a building with all essential facilities for better life style.
CO2	To create a sustainable structure.
CO3	To design a green building



Course Name: ADVANCED CONSTRUCTION MATERIALS (ELECTIVE I) Code: BECVE704	
At the end of course Students will	
CO1	Understand properties and utilities of cement, mortar, concrete ceramic materials.
CO2	Understand properties and its utilities of metals and various composites
CO3	Study the importance of Construction chemicals
CO4	Study shoring and formwork materials
CO5	Understand the elementary concepts of smart materials

Course Name: ADVANCED CONSTRUCTION MATERIALS (ELECTIVE I) Code: BECVE704	
At the end of course Students will	
CO1	Demonstrate the understanding of various types of projects, modern construction techniques and will exhibit the mastery in construction planning, scheduling and various controls
CO2	Achieve the knowledge of various types' of equipment's to be used in the construction and its operational cost estimates, understand manpower requirement, planning, resources utilization and management.
CO3	To know the quality control aspects in planning & management, modern trends project management, application of information system in management of construction projects, safety provisions and equipment's
CO4	Analyze the legal aspects in construction projects through the understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations

Course Name: TRANSPORTATION ENGINEERING-II Code: BECVE705	
At the end of course Students will	
CO1	Understand the functions of various elements of railways, airports, tunnels and docks and harbor.
CO2	Plan and design various elements of railways, airports, tunnels and docks and harbor.
CO3	Understand the various principles traffic control in railways, airports, tunnels and docks and harbor.
CO4	Understand layout, design and construction permanent way, runway, taxiways, tunnels, births and jetty.



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CO5	Understand the maintenance of various elements of railways, airports, tunnels and docks and harbor. Unlined canals and detail out the cross sections.
CO6	Understand water logging and provide the solution to such problem.

8th SEMESTER

Course Name: PRE-STRESS CONCRETE (ELECTIVE-II)	
Code: BECVE802	
At the end of course Students will	
CO1	Gaining the thorough knowledge of the basic theories and the fundamental behavior of pre-stressed concrete
CO2	Perform the analysis and design of pre-stress elements.
CO3	Apply the fundamental knowledge to the solution of practical problems.

Course Name: PAVEMENT ANALYSIS AND DESIGN (ELECTIVE-II)	
Code: BECVE802	
At the end of course Students will	
CO1	Analyze and Design pavement and under different loading conditions for highways and airfields taking into consideration different characteristics.
CO2	Propose a pavement management system framework.
CO3	Design highway appurtenance and highway drainage
CO4	Perform different tests considering field conditions and using the knowledge to increase the strength of pavements along with its economy point of view.

Course Name: WATERSHED MANAGEMENT (ELECTIVE II)	
Code: BECVE802	
At the end of course Students will	
CO1	Understand the Watershed and its characteristics
CO2	Understand the importance of watershed in terms of drinking water, irrigation water, increases in ground water
CO3	Plan and design of Watershed protection, conservation elements
CO4	Envisage the management plan of Watershed.



Course Name: ENVIRONMENTAL MANAGEMENT SYSTEM (ELECTIVEII)	
Code:BECVE802	
At the end of course Students will	
CO1	Understand the Environmental issues such as pollution, degradation and its impact.
CO2	Understand the environment management system and certificate
CO3	Understand and carry out Environment Impact Analysis of a civil engineering project
CO4	Learn to Perform the risk analysis.

Course Name: WATER TRANSMISSION AND DISTRIBUTION SYSTEM (ELECTIVE II)	
Code:BECVE802	
At the end of course Students will	
CO1	Understand concepts of pipes, reservoir, pumps and valves.
CO2	Analyze water distribution networks and its designing process
CO3	Carry out optimal design of water distribution network
CO4	Carryout the reliability analysis of water distribution network

Course Name: GEOTECHNICAL INVESTIGATION & GROUND IMPROVEMENT TECHNIQUE (ELECTIVE II)	
Code:BECVE802	
At the end of course Students will	
CO1	Understand methods of soil exploration and analysis of the results
CO2	Understand the methods ground improvement and material used.
CO3	Understand the use of geosynthetic materials.

Course Name: ADVANCE ENGINEERING GEOLOGY (ELECTIVE- II)	
Code:BECVE802	
At the end of course Students will	
CO1	Acquire sufficient knowledge of existing rocks, its failure and its remedial methods.



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CO2	Understand the application of Geological fundamentals in various fields of Civil Engineering.
CO3	Understand different Geological Hazards on earth and plan for the mitigation of such hazards.

Course Name: WATER POWER ENGINEERING (ELECTIVE- II)	
Code: BECVE802	
At the end of course Students will	
CO1	Understand the significance of water power and hydraulic structures related to water power engineering
CO2	Apply the knowledge of mathematics, statistics, fluid mechanics, in design of penstocks, surge tanks and intakes
CO3	Understand concepts of turbines and pumped storage tanks.
CO4	Design complete unit of hydroelectric power station & its components.

Course Name: FORENSIC CIVIL ENGINEERING (ELECTIVE II)	
Code: BECVE802	
At the end of course Students will	
CO1	Understand various testing methods of Failed Structures.
CO2	Understand the aspects of failures connected with various structural systems and materials.
CO3	Plan the strategic measures against failures.
CO4	Can write the legal and technical report of the failure in lucid manner.

Course Name: DISASTER RESPONSE AND MANAGEMENT TECHNIQUES	
(ELECTIVE II) Code: BECVE802	
At the end of course Students will	
CO1	After studying the subject, student should be able to understand the nature & types of disaster, its preparedness, Role of different government & private agencies, Act & other Statute Provisions, Management of Disaster, Post disaster condition & its management.



Course Name: WATER AND WASTE WATER TREATMENT (ELECTIVE III)	
Code: BECVE803	
At the end of course Students will	
CO1	Understand composition of typical municipal solid wastes, their sources, and collection, treatment and disposal methods.
CO2	Attain an ability to use the techniques, skills, and modern engineering tools necessary for environmental engineering practices.
CO3	Designing of different units of water & waste water treatment plant.
CO4	Give the knowledge about recent development in water & waste water treatment.