

Course Outcomes

Third Semester	
(BTAM-103) Engineering Mathematics-III	CO1 Able to be proficient in the application of the laws of logic to mathematical statements e.g. Integral transformations, use of complex variables.
	CO2 Able to be competent enough to analyze the data based on statistics and probability, this also enables students to make use of data through curve fitting and differential equations.
	CO3 Able to formulate and analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions.
	CO4 Use mathematical and statistical techniques to solve well-defined problems and present their mathematical work.
	CO5 Able to explain the importance of mathematics and its techniques to solve real life problems.
(BTCE-301) Fluid Mechanics-I	CO1 Able to describe appropriate physical properties and show how these allow differentiation between solids and fluids as well as between liquids and gases.
	CO2 Able to determine pressures and forces on submerged bodies.
	CO3 Able to analyze flow rates, velocities, energy losses and momentum flux for fluid system and also understand the fundamentals of laminar and turbulent boundary layer.
	CO4 Able to present data or governing equations in non-dimensional form, design experiments, and perform model studies.
	CO5 Able to decide when appropriate to use ideal flow concepts and the Bernoulli equation.
(BTCE-302) Rock Mechanics & Engineering	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.
(BTCE- 303) Strength of Materials	CO1 Able to apply the linear laws of elasticity as related to stress and strain.
	CO2 Able to understand the behaviour of columns and struts under axial loading and also the effect of combined axial and bending stress .
	CO3 Able to provide students with exposure to the systematic methods for solving engineering problems in solid mechanics.
	CO4 Able to analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behaviour of materials.
	CO5 Able to build the necessary theoretical background for further structural analysis

	and design courses.
(BTCE- 304) Surveying	CO1 Able to understand the different methods and techniques of surveying like levelling, compass survey, contouring and curve settings etc. and their applications in surveying.
	CO2 Able to use survey instruments in carrying out survey, collect data, write reports and able to perform required calculations to achieve the objective for different types of surveying for different Engineering projects.
	CO3 Able to apply the concept of Tacheometry for surveying in difficult and hilly areas to obtain the topographical map of area.
	CO4 Able to control the accumulation of errors in projects.
(BTCE- 305) Building Materials & Construction	CO1 Able to Impart the knowledge about the characteristics, sources and defects in various materials used for construction purposes.
	CO2 Able to design and test the materials either in the laboratory or in the field before their actual use at the site.
	CO3 Able to attain the knowledge of different components of building, their classification, materials and methods of construction and causes of their failures.
	CO4 Able to understand the types and functions of main building services to be provided and the defects in the buildings along with the remedial measures for proper maintenance of the buildings.
(BTCE-306) Fluid Mechanics-I Lab	CO1 Able to understand the behaviour of water current in rivers, canal and drains.
	CO2 Able to use important practical results in common fluid flows.
	CO3 Able to determine metacentre of a floating vessel.
	CO4 Able to calibrate various flow measuring devices in pipe and open channel flow .
	CO5 Able to determine various losses and velocity in pipe flow in field.
(BTCE-307) Strength of Materials Lab	CO1 Able to study the stress-strain curves of different materials used in the field under different loading conditions.
	CO2 Able to differentiate between properties of materials affect strength under various conditions.
	CO3 Able to calculate simple tensile and shear stress using the appropriate guidelines and formats.
	CO4 Able to analyze the bending stress on different types of sections.
	CO5 Able to understand deflection of different sections at different loading conditions.
(BTCE-308) Surveying Lab	CO1 Able to Prepare the survey sheet according to the method used.
	CO2 Able to apply theoretical considerations in field and other engineering projects.
	CO3 Able to survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically.
	CO4 Able to record the reduced levels using various methods of levelling and measurement of horizontal & vertical angles by Theodolite.
	CO5 Able to determine the location of any point horizontally and vertically using

	Tachometry.
(BTCE-309) Workshop Training of 4 weeks duration after 2nd semester Carpentry, Electrical, Plumbing, Masonry, CAD	CO1 Able to understand modern manufacturing operations, including their capabilities, limitations, and how to design economically.
	CO2 Able to gain insight into how designers influence manufacturing schedule and cost, and cost of different components.
	CO3 Able to learn to analyze products and to improve their manufacturability and make the cost effectively.
	CO4 Able to acquire skills in basic engineering practice and identify the hand tools and instruments.
	CO5 Able to know various commands to draw drawing in software.

Fourth Semester	
(BTCE 401) Geomatics Engineering	CO1 Able to understand the basic principles of aerial photogrammetry and its instrumental knowledge.
	CO2 Able to Illustrate different types of satellites and their characteristics.
	CO3 Able to analysis the data based on GIS Systems and GIS errors.
	CO4 Able to Classify coordinate system based on GPS and its applications.
(BTCE 402) Construction Machinery & Works Management	CO1 Able to describe the requirement of planning and management.
	CO2 Able to recognize the critical path and pert suitability for research projects.
	CO3 Able to determine projects schedule and estimate the activity time of CPM.
	CO4 Able to discuss resource scheduling and planning of civil engineering. Projects.
	CO5 Able to illustrate various construction equipments, machinery and their utility.
(BTCE 403) Design of Concrete Structures-I	CO1 Able to describe about composition and characteristics of Portland cement.
	CO2 Able to classify the aggregate and their various properties.
	CO3 Able to identify the various properties of concrete and analyzing its workability.
	CO4 Able to illustrate design philosophies.
	CO5 Able to solve problems in context to singly, doubly and flanged Beam.
(BTCE 404) Fluid Mechanics-II	CO1 Able to study about flow transition and laminar flow of fluid.
	CO2 Able to discuss energy gradient and effects of turbulent flow in pipes.
	CO3 Able to explain the concept of Boundary layer.
	CO4 Able to classify the flow in open channel and various momentum principles in open channels.
	CO5 Able to compute water surface profile by different approaches and to analyze

	hydraulic jump and energy dissipation.
(BTCE 405) Irrigation Engineering-I	CO1 Able to understand various techniques and parameters of irrigation.
	CO2 Able to classify the canal and tube well irrigation and applicability of various theories on it.
	CO3 Able to analyse the design of lined canal and its problems.
	CO4 Able to Illustrate various irrigation projects.
	CO5 Able to analyse the design and classification of river training works according to ISI recommendations.
(BTCE 406) Structural Analysis-I	CO1 Able to interpret the various methods of structural displacements.
	CO2 Able to analyze the determinate structure and its reaction diagram.
	CO3 Able to draw the influence line diagram for rolling loads.
	CO4 Able to compute the pressure on supporting tower, suspension bridge etc. and to calculate loads for no tension criteria on domes chimneys and retaining walls.
	CO5 Able to interpret the various methods of structural displacements.

Fifth Semester	
(BTCE-501) Design of Steel Structures-I	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.
(BTCE-502) Geotechnical Engineering	CO1 To understand the origin of soil and to identify different types of soil and apply the knowledge of soil and rock to judge its behavior and suitability for civil engineering structures.
	CO2 Able to describe Darcy's law for the flow of water through saturated soils; determine the coefficient of permeability and equivalent hydraulic conductivity in stratified soil.
	CO3 To understand the various physical and engineering characteristics of different types of soil.
	CO4 Able to calculate seepage, pore water pressure distribution, uplift forces and seepage stresses for simple geotechnical systems.
	CO5 Able to describe the direct shear test method and concept of slope stability structures.
(BTCE-503) Structural Analysis-II	CO1 To understand develop computer program for the analysis of structures.
	CO2 Able to use slope deflection 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.
(BTCE-504) Transportation Engineering-I	CO1 Able to Judge the properties of various pavement materials and their applications.
	CO2 Able to design the flexible and rigid pavements.
	CO3 Able to compute road vehicle characteristics and estimate braking and stopping distances based on vehicle and human factors.
	CO4 Able to calculate traffic flow parameters.
(BTCE-505) Environmental Engineering –I	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.
(BTCE-506) Transportation Engineering Lab	CO1 Understand the properties of materials used for construction of highways and airports.
	CO2 Understand the transportation characteristics, operations, design, planning, and maintenance.
	CO3 Able to collect and analyze of transportation data for use in design.
	CO4 Able to prepare formal reports and describing complex design procedures.
(BTCE-507) Geotechnical Engineering Lab	CO1 Understand site specific field investigation including collection of soil samples for testing and observation of soil behavior.
	CO2 Able to identify and classify soil based on standard geotechnical engineering practice.
	CO3 Able to perform laboratory compaction and in –place density test for fill quality control.
	CO4 Able to determine different soil properties and classification of soil.
(BTCE-508) Computer Aided Steel Structural Drawing	CO1 Application of software’s in design and drawings of Civil Engineering structures.
	CO2 Able to proficiency, including the ability to use industry-standard computer software to generate 2D and 3D drawings.
	CO3 Understanding of the theory of orthographic projection and the conventions associated with Civil engineering drawings.
	CO4 Able to apply computer-aided design techniques to use computer-aided visualization techniques to prepare.
(BTCE-509) Survey Camp of 04 weeks duration after 4th Semester	CO1 Able to prepare Topographical map of the given area using different devices.
	CO2 Understand field activity which provide real application of theoretical principles of surveying.
	CO3 Able to doing simultaneously field work and office work.

Sixth Semester	
BTCE-601 Design of Concrete Structures-II	CO1 Able to design, analysis, and proportioning of reinforced concrete members and structures.
	CO2 Able to design different type of foundations.
	CO3 How to design various types of elevated tanks according to IS code.
	CO4 Able to effective use of latest industry standard formula, table, design aids used for design of Reinforced concrete Structure.
BTCE-602 Elements of Earthquake Engineering	CO1 Able to apply the basics of structural dynamics in analysis of structures subjected to earthquakes.
	CO2 Understand plate tectonics, ground motion magnitude, intensity, and frequency.
	CO3 Analyze earthquake characteristics and associated effects on structures, including linear and nonlinear responses.

	CO4 Able to Apply the basic principles for seismic design and construction of structures in accordance with the provisions of International Building Codes.
BTCE-603 Foundation Engineering	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.
BTCE-604 Numerical Methods in Civil Engineering	CO1 Able to apply finite element method for the analysis of complex Civil Engineering structures using advanced techniques. CO2 Understand the mathematical and statistical knowledge and skills applying in various civil engineering structures . CO3 Able to proficient in the application of the laws of logic to mathematical statements. CO4 Able to develop mathematical thinking in the conduct of different experiments and presentation of results precisely.
BTCE-605 Professional Practice	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.
BTCE-606 Environment Engineering –II	CO1 Able to know about sewerage system and its drainage. CO2 Able to implement technology related with purification of waste water according to IS parameters and low cost sanitation systems. CO3 Understand various fundamental scientific processes underlying the design and operation of waste water treatment plants. CO4 Understand chemical and biological principles behind unit processes used in waste water treatment unit processes.
BTCE-607 Environmental Engineering Lab	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.
BTCE-608 Computer Aided Concrete Structures Drawing	CO1 Able to operate softwares related design and drawings of Civil Engineering structures. CO2 Able to Design of different component of various structures and representation in different drawings for carrying out construction activity CO3 Ability to produce design calculations and drawings in appropriate professional formats identify and compute the design loads on a typical steel building. CO4 Able to select the most suitable section shape and size for tension and compression members and beams according to specific design criteria.

Seventh Semester	
(BTCE-701) Software Training (6 weeks) and Industrial Training	CO 1 Able to use the practical knowledge of the various techniques of construction.
	CO2 Understanding the professional and ethical responsibilities.
	CO3 To learn about design parameter through different softwares.
	CO4 Present a proper report, both orally and in writing on their work experience.

(12 weeks)	CO5 Able to know the techniques skill, and modern engineering tools necessary for practice such as procurement, billing, quality assurance in construction industry, interaction with clients, professionals etc.
Eighth Semester	
(BTCE-801) Design of Steel Structures-II	CO1 Able to design various huge steel structures in the field of civil engineering works.
	CO2.Able to understand properties of steel under loading conditions.
	CO3 Able to determine the ultimate bending moment capacity of steel members considering both yielding and lateral buckling.
	CO4Ability to analyze railway bridge, footbridge and industrial sheds.
(BTCE-802) Disaster Management	CO1 To be familiar with techniques related to the safety of people during disasters.
	CO2 Identify various types of disasters, its causes, effect & mitigation of each and describe the various important phases of disaster management cycle having concern of vulnerability & risk for mankind and need of emergency management system to tackle the problems.
	CO3 To design and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.
	CO4 Understand the role of media, various agencies, and technology for the capacity building for effective disaster management & preparedness for future through various case studies.
	CO5 Understand the importance of integration of public policy and how planning & design of infrastructure, community based approach and various ecological & sustainable models can be used for effective disaster management.
(BTCE-803) Irrigation Engineering-II	CO1 Able to calculate Seepage force and uplift pressure using different theories of seepage.
	CO2 Understand the weirs and energy dissipating devices.
	CO3 Able to Design Different cross drainage works at canals .
	CO4 Understand location and necessity of canal falls.
	CO5 Able to design the canal regulators and canal outlets with their requirements and classifications.
(BTCE-804) Transportation Engineering-II	CO1 Gain knowledge about railways, permanent way stations, yards, tunnels and able to design the railway track by geometric method.
	CO2 Know the different types of points and crossings used in railway tracks.
	CO3 Knowledge of signalling systems in railway stations and yards.
	CO4 Ability to design and orient airport runways.
	CO5 Able to apply various visual aids in the designing of airport.
(BTCE-805) Major Project	CO1 An understanding of professional and ethical responsibilities
	CO2 An ability to use various techniques, engineering knowledge and skill, and modern engineering tools necessary for planning, analysis and designing of engineering projects like building, roads, geotechnical works/problems.
	CO3 Recognition of the need for, and ability to engage in life-long learning.
	CO4 Knowledge of contemporary issues.
(BTCE-820) Bridge Engineering	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.
--	---