



BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Ibrahimpattanam - 501 510, Hyderabad

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES (COs)

B.TECH – CIVIL ENGINEERING

JNTUH: R13 REGULATIONS

Course Code	Course Title	Course Outcomes
I B.Tech		
A10001	English	At the end of this course, each student should be able to: CO1. Understand the value of English as an international language, as a Lingua-Franca and try to improve their knowledge regarding language skills and elements to be perfect in their usage. CO2. Usage of English Language, written and spoken. CO3. Enrichment of comprehension and fluency CO4. Gaining confidence in using language in verbal situations. CO5. Develop the ability to analyze the language used in descriptions and narrations.
A10002	Mathematics – I	At the end of this course, each student should be able to: CO1. Write the matrix representation of a set of linear equations and to analyze solutions of system of equations. CO2. Understand the methods of differential calculus to optimize single and multivariable functions. CO3. Evaluate the multiple integrals and can apply the concepts to find the areas, volumes, moment of inertia etc., of regions on a plane or in space. CO4. Identify the type of differential equation and uses the right method to solve the differential equation. Apply the theory of differential equations to the real world problems. CO5. Solve certain differential equations using Laplace transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.
A10302	Engineering Mechanics	At the end of this course, each student should be able to: CO1. Classify basic engineering mechanics concepts required for predicting behavior static structures. CO2. Identify an appropriate structural system to study a given problem and isolate it from its environment. CO3. Model the problem using free-body diagrams and accurate equilibrium equations. CO4. Communicate the solution to all problems in an organized and coherent manner and elucidate the meaning of the solution in the context of the problem. CO5. Develop concepts of rigid body kinematics and dynamics with an emphasis on the modeling, analysis, and simulation of how forces produce motion of rigid body systems. CO6. Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum
A10004	Engineering Physics	At the end of this course, each student should be able to: CO1. Learn the fundamental concepts on behavior of crystalline solids. CO2. The knowledge on fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so

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		<p>on.</p> <p>CO3. Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.</p> <p>CO4. Helps the student exposed to non-destructive testing methods.</p> <p>CO5. Develop problem solving skills and analytical skills.</p>
A10005	Engineering Chemistry	<p>At the end of this course, each student should be able to:</p> <p>CO1. Extrapolate the knowledge of cell, electrode, cathode, anode, electrolysis, electromotive force and reference electrode.</p> <p>CO2. Explore the engineering applications of polymeric materials.</p> <p>CO3. Develop awareness about the usage of conducting polymers as an engineering material.</p> <p>CO4. Justify the immense importance of basic constructional material, Portland cement in Civil Engineering works.</p> <p>CO5. Summarize the application of phase rule to one and two component systems.</p>
A10501	Computer Programming	<p>At the end of this course, each student should be able to:</p> <p>CO1. Identify and understand the working of key components of a computer system.</p> <p>CO2. Develop algorithms and flowcharts for solving mathematical and engineering problems.</p> <p>CO3. Design programs involving decision structures, loops and functions.</p> <p>CO4. Use structured data types and the concept of arrays in simple data processing applications.</p> <p>CO5. Understand the concept of recursion and describe its implementation using a stack.</p>
A10301	Engineering Drawing	<p>At the end of this course, each student should be able to:</p> <p>CO1. Identify the basic concepts of Engineering Drawing.</p> <p>CO2. Construct various conic sections, cycloids and scales.</p> <p>CO3. Apply the principles of orthographic projections to projections of points and lines.</p> <p>CO4. Sketch different sections and sectional views of solids.</p> <p>CO5. Show the orthographic projection of the isometric views.</p> <p>CO6. Design the perspective projections of various points, lines, plane figures and simple solids.</p>
A10581	Computer Programming Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Write programs in C to solve real-world problems.</p> <p>CO2. Choose the appropriate data structure and algorithm design method for a specified application.</p> <p>CO3. Implement linear data structures such as lists, stacks, queues.</p> <p>CO4. Implement simple searching and sorting methods.</p> <p>CO5. Understand which algorithm or data structure to use in different scenarios.</p> <p>CO6. Write complex applications using structured programming methods.</p>
A10081	Engineering Physics / Engineering Chemistry Lab	<p>At the end of this course, each student should be able to:</p> <p>Physics Lab:</p> <p>CO1. Understand the concept of error and its analysis.</p> <p>CO2. Develop experimental skills</p> <p>CO3. Design new experiments in engineering.</p> <p>CO4. Compare the theory and correlate with experiment.</p> <p>CO5. Understand the applications of physics experiments in day to</p>

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		<p>day life</p> <p>CO6. Able to meet the challenges in various emerging areas of engineering technology</p> <p>Chemistry Lab:</p> <p>CO1. Expected to learn from this laboratory course the concept of error and its analysis.</p> <p>CO2. Develop experimental skills to design new experiments in Engineering. c. Exposure to these experiments the student can compare the theory and correlate with experiment.</p> <p>CO3. Understand general characteristics and uses of rubbers.</p> <p>CO4. Determine hardness of various water samples.</p> <p>CO5. Estimate the number of free ions, charge & mobility of ions in the mixture of acids using conductivity meter and also gets an idea about titrations without using any indicator.</p> <p>CO6. Determine the presence and quantity of impurities in water and he can estimate amount of metal in metal ores.</p>
A10083	English Language Communication Skills Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Ability to discuss role and importance of communication skills and learn to make use of various forms of communication in their respective professional fields.</p> <p>CO2. Ability to use communication tool to be an effective team leader or team member.</p> <p>CO3. Ability to use communication modes as a tool for success in career progression.</p> <p>CO4. Ability to present in various social and professional situations formally.</p> <p>CO5. Ability to analyze and share the ideas by various media of information transfer.</p> <p>CO6. Ability to design various behavioral aspects in relation to problem solving.</p>
A10082	IT Workshop / Engineering Workshop	<p>At the end of this course, each student should be able to:</p> <p>Engineering Workshop</p> <p>CO1. Prepare various jobs with carpentry trade and fitting trade.</p> <p>CO2. Prepare various jobs with Black smithy trade.</p> <p>CO3. Produce various patterns with foundry techniques.</p> <p>CO4. Combine various metal pieces with the techniques of welding.</p> <p>CO5. Identify various power tools in construction, wood working, electrical and mechanical engineering.</p> <p>CO6. Recognize the methods of plumbing.</p> <p>IT Workshop</p> <p>CO1. Understand various aspects of information technology.</p> <p>CO2. Demonstrate capability to work with LaTeX.</p> <p>CO3. Perform upgrading and repairing of PC's.</p> <p>CO4. Learn actual exposure to various computer hardware components & assemblies including PC hardware.</p> <p>CO5. Knowing Internet, www, productivity tools including word, excel and power point.</p> <p>CO6. Ability to learn troubleshoot of PCs</p>
II B.TECH I SEM		
A30006	Mathematics-II	<p>At the end of this course, each student should be able to:</p> <p>CO1. Find a root of a given equation.</p> <p>CO2. Find a root of a given equation and will be able to find a</p>

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		<p>numerical solution for a given differential equation. Helps in describing the system by an ODE, if possible.</p> <p>CO3. Find the solution as a first approximation. Ability to apply beta, gamma functions to evaluate integrals which cannot be expressed in terms of elementary functions</p> <p>CO4. Find the expansion of a given function by Fourier series and Fourier Transform of the function. Helps in phase transformation, Phase change and attenuation of coefficients in acoustics</p> <p>CO5. Find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.</p> <p>CO6. Evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.</p>
A30203	Electrical And Electronics Engineering	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the basic electrical circuits, parameters, and operation of the transformers in the energy conversion process.</p> <p>CO2. Understand the electromechanical energy conversion, construction operation characteristics of DC and AC machines.</p> <p>CO3. understand the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc</p> <p>CO4. Evaluate the different semiconductor devices, their voltage-current characteristics, operation of diodes, transistors, realization of various electronic circuits</p> <p>CO5. Analyze various semiconductor devices, and cathode ray oscilloscope</p> <p>CO6. Apply the above conceptual things to real-world electrical and electronics problems and applications.</p>
A30107	Strength Of Materials – I	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the simple stress strains flexural Stresses in members</p> <p>CO2. Understand the shear stresses and deflection in beams</p> <p>CO3. Analyze the statically determinate and indeterminate problems.</p> <p>CO4. Determine the stresses and strains in the members subjected to axial, bending.</p> <p>CO5. Evaluate the slope and deflection of beams subjected to loads</p> <p>CO6. Determine the principal stresses and strains in structural members.</p>
A30108	Surveying	<p>At the end of this course, each student should be able to:</p> <p>CO1. Calculate angles, distances and levels.</p> <p>CO2. Identify data collection methods and prepare field notes.</p> <p>CO3. Understand the working principles of survey instruments.</p> <p>CO4. Estimate measurement errors and apply corrections.</p> <p>CO5. Interpret survey data and compute areas and volume.</p> <p>CO6. Evaluate the data of the odolite, tachometric surveying.</p>
A30101	Fluid Mechanics	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand basic concepts and principles of Fluid Mechanics & Dynamics.</p> <p>CO2. To study fundamental concepts in Fluid Mechanics including objectives, scope and importance appreciate the relation between equation of continuity for 1D,2D & 3D flows.</p> <p>CO3. Effective approach to the static fluids for measurement of</p>

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		<p>physical properties such as viscosity, surface tension , bulk modulus</p> <p>CO4. Identify important fluid parameter like pressure and compressibility in Pitot tube, venturimeter, orifice meter.</p> <p>CO5. To learn Boundary layer concept to ascertain the crucial fluid parameters in the solid –fluid boundary region and Turbo Machinery run by hydraulic power.</p> <p>CO6. Evaluate closed conduit flow, total energy line & hydraulic gradient line.</p>
A30010	Managerial Economics And Financial Analysis	<p>At the end of this course, each student should be able to:</p> <p>CO1. Analyze & grasp the importance of elasticity of demand</p> <p>CO2. Identify various features of production & cost analysis.</p> <p>CO3. Understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations</p> <p>CO4. Understand the demand and supply, production function, cost analysis, markets, forms of business organizations.</p> <p>CO5. Estimate the capital budgeting and financial accounting and financial analysis.</p> <p>CO6. Understand the importance of financial accounting & financial analysis.</p>
A30185	Surveying Lab – I	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand Survey of an area by chain survey (closed traverse) & Plotting, Chaining across obstacle.</p> <p>CO2. Determine the distance between two inaccessible points with compass.</p> <p>CO3. Estimate a given area by prismatic compass (closed traverse) and plotting after adjustment.</p> <p>CO4. Perform Radiation method, intersection methods by plane Table survey, Two point and three point problems in plane table survey Traversing by plane table survey</p> <p>CO5. Perform Fly leveling (differential leveling)</p> <p>CO6. Understand and perform L.S and C.S and plotting, contouring</p>
A30183	Strength Of Materials Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the operating principles of UTM</p> <p>CO2. Understand the operating principles Brinnell's / Rock well's hardness testing machine</p> <p>CO3. Understand the operating principles of Spring testing machine</p> <p>CO4. Understand the operating principles. Compression testing machine</p> <p>CO5. Understand the operating principles Izod Impact machine, Shear testing machine</p> <p>CO6. Understand the operating principles Beam setup for Maxwell's theorem verification, Continuous beam setup, Electrical Resistance gauges.</p>
II B.TECH II SEM		
A40008	Probability & Statistics	<p>At the end of this course, each student should be able to:</p> <p>CO1. Recall the basics of permutation and combination</p> <p>CO2. Demonstrate an understanding of the basic concepts of probability and random variables</p> <p>CO3. Classify the types of random variables and calculate mean and variance.</p>

Course Code	Course Title	Course Outcomes
		<p>CO4. Calculate the correlation and regression to the given data</p> <p>CO5. Understand the concept of sampling distribution of statistics and in particular describe the behavior of the sample mean.</p> <p>CO6. Apply testing of hypothesis for large samples and small samples.</p>
A40114	Strength of materials -II	<p>At the end of this course, each student should be able to:</p> <p>CO1. Calculate the stresses developed in the shafts subjected to torque, bending moment and thrust and understand the design considerations to prevent the failure</p> <p>CO2. Understand the failure phenomenon of columns and struts and finding the stresses developed in them</p> <p>CO3. Apply the design principles for the design of beams curved in plan.</p> <p>CO4. apply the design principles for the design of dam, chimneys, retaining walls which are subjected to both direct and bending stresses</p> <p>CO5. Calculate the stresses induced in thin cylinders and thick cylinders and obtain safe dimensions.</p> <p>CO6. calculate the stresses induced in beam columns</p>
A40111	Hydraulic & Hydraulic Machinery	<p>At the end of this course, each student should be able to:</p> <p>CO1. Apply the practical applications on Francis and Kaplan turbine.</p> <p>CO2. Understand concept of velocity distribution, energy and momentum correction factors for different flows.</p> <p>CO3. Understand Chezy's, Manning's and Basin formulae for uniform flow</p> <p>CO4. Derive the problems based on Rayleigh's method and Buckingham's pi theorem with applications.</p> <p>CO5. Remember the concepts of dimensionless numbers to solve numerical problems</p> <p>CO6. Remember the concept of work done, efficiency for different vanes and application to the concept of turbines</p>
A40009	Environmental studies	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand and realize the importance of multi-disciplinary nature of the environment in day to day life</p> <p>CO2. Examine how pollutants move through various levels in an ecosystem in our daily life.</p> <p>CO3. Correlate the exploitation and utilization of conventional and non-conventional resource</p> <p>CO4. Establish a foundation on different pollutants and pollutions in the environment</p> <p>CO5. Knowledge of proper decontamination techniques for solid waste management.</p> <p>CO6. Understand the importance of EIA for developmental activities to have minimum negative impacts on people.</p>
A40115	Structural Analysis-I	<p>At the end of this course, each student should be able to:</p> <p>CO1. Differentiate between the perfect, imperfect and redundant pin jointed frames.</p> <p>CO2. Analysis of determinate pin jointed frames by tension coefficient method for vertical, horizontal and inclined loads.</p> <p>CO3. Analysis of three hinged circular arches at different levels.</p> <p>CO4. Draw the shear forces and bending moments in three hinged arches using energy methods</p> <p>CO5. Apply the methods of slope deflection to carry out structural</p>

Course Code	Course Title	Course Outcomes
		analysis of 2D portal frames with various loads and boundary conditions CO6. Construct the influence line diagram for shear force and bending movement for the entire beam.
A40109	Building materials , construction & planning	At the end of this course, each student should be able to: CO1. Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc. CO2. Predict the properties of building stones and its classifications. CO3. Analyze the importance of mineral and chemical admixtures, requirements of the concrete in construction. CO4. Understand the different of trusses, RCC roofs, madras terrace/shell roofs. CO5. Understand masonry, English and Flemish bonds. finishing plastering painting and know about building services CO6. Understand the Principle of building planning and by laws and standards of building material Components and orientation of the building.
A40186	Computer Aided Drafting Of Buildings	At the end of this course, each student should be able to: CO1.Apply CAD Commands for detailing & drawing. CO2.Utilize the Software for CAD- Auto CAD. CO3.Draw plans of buildings using software for Single, Multi storeyed. CO4.Detail of building components like doors, windows using CAD software. CO5.Develop the sections and elevations for Single storeyed. CO6.Develop the of building components like roof trusses using CAD software
A40190	Surveying Lab-II	At the end of this course, each student should be able to: CO1. Study about Theodolite in detail-practice for measurement of horizontal and vertical angles. CO2. Understand the operating principles Trigonometric leveling. CO3. Understand the operating principles Tachometric surveying. CO4. Develop Setting out works for buildings & pipe lines. CO5. Understand the operating principles Total Station. CO6. Distance, gradient, difference in height between two inaccessible points using total station
III B.TECH I SEM		
A50116	Concrete Technology	At the end of this course, each student should be able to: CO1. Understand & Identify Quality Control tests on concrete making materials. CO2. Acquire knowledge on different admixtures. CO3. Understand the behavior of fresh and hardened concrete. CO4. Design concrete mixes as per IS and ACI codes. CO5. Understand the durability requirements of concrete. CO6. Understand the need for special concretes.
A50121	Reinforced Concrete Structures Design And Drawing	At the end of this course, each student should be able to: CO1. Design RC Structural elements. CO2. Design the Reinforced Concrete beams using limit state Design. CO3. Design Reinforced Concrete slabs. CO4. Design the Reinforced Concrete Columns and footings. CO5. Design structures for serviceability.

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		CO6. Design staircases, canopy.
A50118	Engineering Geology	<p>At the end of this course, each student should be able to:</p> <p>CO1. Introduce the fundamentals of the engineering properties of earth materials for the use of civil Engineering constructions.</p> <p>CO2. Characterize the engineering properties of rocks and soils.</p> <p>CO3. Assess different geological hazards, their causes effects,</p> <p>CO4. Acquire knowledge of the Use seismic and electrical methods to investigate the subsurface Geology.</p> <p>CO5. Introduce the fundamentals of the engineering properties of earth materials for the use of civil Engineering constructions.</p> <p>CO6. Develop quantitative skills and a frame work for solving basic engineering geology problems.</p>
A50120	Geotechnical Engineering	<p>At the end of this course, each student should be able to:</p> <p>CO1. Impart the fundamental concepts of soil mechanics</p> <p>CO2. Understand the Bearing capacity of soil.</p> <p>CO3. Identify the properties for good foundation sites to find permeability of soil.</p> <p>CO4. Know the importance engineering properties such as consolidation, shear strength</p> <p>CO5. know the stress distribution in soil , shear strengths of soils</p> <p>CO6. Understand the concept of compaction and consolidation of soils.</p>
A50122	Water Resources Engineering-I	<p>At the end of this course, each student should be able to:</p> <p>CO1. Analyze hydro-meteorological data.</p> <p>CO2. Estimate abstractions from precipitation.</p> <p>CO3. Compute yield from surface and subsurface basin.</p> <p>CO4. Develop rainfall-runoff models.</p> <p>CO5. Formulate and solve hydrologic flood routing models.</p> <p>CO6. Estimate runoff, design discharge from catchment.</p>
A50117	Disaster Management	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand Learn about types of natural and environmental disasters and its causes.</p> <p>CO2. Learn about different types of disaster& its damages.</p> <p>CO3. Estimate the causes, effects, control measures.</p> <p>CO4. Understand about the early warning systems, monitoring of disasters effect and necessity of rehabilitation.</p> <p>CO5. Learn emerging approaches methodologies for disaster risk assessment</p> <p>CO6. Understand about the engineering and non-engineering controls of mitigating various natural disasters.</p>
A50181	Fluid Mechanics and Hydraulic Machinery Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand & explain the effect of fluid properties on a flow system.</p> <p>CO2. Identify type of fluid flow patterns and describe continuity equation.</p> <p>CO3. Analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design</p> <p>CO4. Analyze an appropriate turbine with reference to given situation in power plants.</p> <p>CO5. Estimate performance parameters of a given Centrifugal and Reciprocating pump.</p> <p>CO6. Demonstrate boundary layer concepts.</p>

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A50191	Engineering geology Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Acquire practical Knowledge on geology and on various types of rocks and minerals.</p> <p>CO2. Categorize rocks and minerals by their origin.</p> <p>CO3. Understand different engineering properties.</p> <p>CO4. Apply geological principles to rock masses and discontinuities for use in engineering design e.g. rock slopes, foundation.</p> <p>CO5. Interpret & draw different sections for geological maps showing tilted beds, faults, uniformities etc.,</p> <p>CO6. Solve simple structural geology problems.</p>
III B.TECH II SEM		
A60130	Steel structures design & drawing	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the behavior of steel as a structural member & different types of connections.</p> <p>CO2. Apply the knowledge of mathematics, science and engineering fundamentals in the design of structural element like compression member, beams.</p> <p>CO3. Analyze the structural element, bolted, riveted and welded connections.</p> <p>CO4. Design various components of trusses.</p> <p>CO5. Design the plate girders and gantry girders.</p>
A60119	Environmental Engineering	<p>At the end of this course, each student should be able to:</p> <p>CO1. Analyze characteristics of water and wastewater</p> <p>CO2. Estimate the quantity of drinking water and domestic wastewater generated</p> <p>CO3. Design components of water supply systems Design sewerage system</p> <p>CO4. Estimate the BOD & COD of waste water</p> <p>CO5. Design sludge digestion tanks & adopt safe disposal methods.</p>
A60132	Transportation Engineering-I	<p>At the end of this course, each student should be able to:</p> <p>CO1. Illustrate the factors affecting highway alignment and its design</p> <p>CO2. perform various engineering surveys and can prepare highway report</p> <p>CO3. Design various geometric elements like curves, gradients, super elevation, etc.</p> <p>CO4. Demonstrate the accident patterns in a road network and take up preventive measures</p> <p>CO5. Compute traffic flow characteristics like speed, density and volume</p> <p>CO6. Explain about highway construction, maintenance and their importance.</p>
A60126	Foundation Engineering	<p>At the end of this course, each student should be able to:</p> <p>CO1. Learn the basics of different types of shallow foundations.</p> <p>CO2. Learn to compute the bearing capacity of shallow footings in various types of soils and situations.</p> <p>CO3. Learn about special footings like mats and also about computation of settlements of shallow foundations.</p> <p>CO4. Able to design various types of retaining walls.</p> <p>CO5. Learn about pile foundations and different aspects of pile foundations.</p>
A60131	Structural analysis-II	<p>At the end of this course, each student should be able to:</p> <p>CO1. Analyze single bay single storey portal frames by using slope</p>

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		<p>deflection method and moment distribution method.</p> <p>CO2. Analyze continuous beams and frames by using Kani's method.</p> <p>CO3. Demonstrate the arch action and types of arches and analyze the two hinged arches.</p> <p>CO4. Analyze multi storey frames for lateral loads and gravity loads using approximate methods.</p> <p>CO5. Apply the knowledge of mathematics (matrices) in analyzing the structural elements such as continuous beams, portal frames by flexibility and stiffness methods.</p> <p>CO6. Analyze indeterminate beams with different moment of inertia.</p> <p>CO7. Analyzing the indeterminate structures by Castigliano's theorem.</p>
A60128	Ground Water Hydrology	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand Ground Water occurrence, Ground Water Movement Well constructional etc.</p> <p>CO2. Understand the porous medium properties that control groundwater flow and transport, including porosity, hydraulic conductivity, and compressibility.</p> <p>CO3. To interpreting groundwater field data, identify contamination, salt water intrusion.</p> <p>CO4. To conduct sub surface investigation and identify aquifer distress using latest technology and methods.</p> <p>CO5. To allot groundwater usage according to sustainable yield; they will be able to carry out groundwater quantification of aquifers.</p> <p>CO6. To suggest remediation techniques for contaminated aquifers.</p>
A60194	Geotechnical Engineering Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. To understand & classify different Grain Analysis.</p> <p>CO2. To understand & perform acquire knowledge about Atterbergs limit.</p> <p>CO3. To understand & perform CBR, Core cutter & sand replacement apparatus.</p> <p>CO4. Learn the principles and applications various apparatus like compaction, consolidation, Unconfined compression test</p> <p>CO5. Learn the principles and applications various apparatus like Tri axial compression test, direct shear test.</p> <p>CO6. Learn the principles and applications various apparatus like , Vane shear test.</p>
A60086	Advanced Communication Skills Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Accomplishment of sound vocabulary and its proper use contextually</p> <p>CO2. Flair in writing and felicity in written expression</p> <p>CO3. Enhanced job prospects</p> <p>CO4. Effective speaking abilities</p> <p>CO5. Enrich group discussions and interview skills</p> <p>CO6. Enhanced interpersonal skills</p>
IV B. TECH I SEM		
A70140	Remote Sensing & GIS	<p>At the end of this course, each student should be able to:</p> <p>CO1. Identify the basic remote sensing concepts and its characteristics</p> <p>CO2. Implement the photogrammetric concepts and fundamentals of Air photo Interpretation</p> <p>CO3. Use various analysis and interpretation of GIS results</p>

Course Code	Course Title	Course Outcomes
		CO4. Introducing Vector And Rater Data Models
A70143	Transportation Engineering -II	<p>At the end of this course, each student should be able to:</p> <p>CO1. Know various railways constructions design techniques and its maintenance</p> <p>CO2. Understand the components of railway engineering and their functions</p> <p>CO3. Identify the requirements of an Airport and Harbour</p> <p>CO4. Implement intelligent transportation system in actual day to day practice</p>
A70138	Estimating & Costing	<p>At the end of this course, each student should be able to:</p> <p>CO1. Prepare a detailed estimate for different types of structures</p> <p>CO2. Prepare valuation reports and cost quality control</p> <p>CO3. create contract documents</p> <p>CO4. Prepare the reinforcement bar bending & bar requirement schedule.</p>
A70133	Water Resources Engineering-II	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the basic concepts of the water resources structures</p> <p>CO2. Design dams, spillways, canals and cross-drainage works.</p> <p>CO3. Understand various water harvesting techniques and manage watersheds.</p> <p>CO4. Know the details and the aim of construction of different type of the dams and be able to follow the basic design calculations.</p>
A70136	Air Pollution and Control	<p>At the end of this course, each student should be able to:</p> <p>CO1. Identify the major sources of air pollutants.</p> <p>CO2. Understand the key chemical transformations of air pollution& control the gas and particulate emission.</p> <p>CO3. Relate air pollution regulation and its scientific basis.</p> <p>CO4. Have an idea on air quality management.</p> <p>CO5. Describe engineering solutions to air pollution problems</p>
A70139	Industrial Waste Water Treatment	<p>At the end of this course, each student should be able to:</p> <p>CO1. Analyze and industrial activity and identify the environmental problems.</p> <p>CO2. Apply pre and preliminary treatment.</p> <p>CO3. Plan strategies to control and reduce pollution.</p> <p>CO4. Select the most appropriate technique to control and treat industrial pollution.</p>
A70195	Concrete & Highway Materials Lab	<p>At the end of this course, each student should be able to:</p> <p>CO1. Understand the operating principles of Aggregate impact machine</p> <p>CO2. Understand the operating principles of vicat apparatus</p> <p>CO3. Understand the operating principles of NDT Methods.</p> <p>CO4. Estimate different properties of cement</p> <p>CO5. Evaluate different properties of fine aggregate, coarse aggregates.</p> <p>CO6. Understand properties of Bitumen.</p>
A70192	Environmental Engineering Lab	<p>CO1. To learn testing methods of Ph meter, conductivity meter.</p> <p>CO2. Estimate the BOD of waste water</p> <p>CO3. Analyze properties of Waste water such as alkalinity, chlorides, acidity, nitrates...</p> <p>CO4. Estimate the COD of waste water</p>

Course Code	Course Title	Course Outcomes
		CO5. Understand the operating principles of Coagulant testing machine. CO6. Identify the standards of different water using its permissible limits.
IV B.TECH II SEM		
A80151	Rehabilitation and Retrofitting of Structures	At the end of this course, each student should be able to: CO1. Understand different types of damages CO2. Implement different types of inspection and testing techniques. CO3. Evaluate the health monitoring of different constructions. CO4. Understand the fire rating of structures
A80150	Prestressed Concrete Structures	At the end of this course, each student should be able to: CO1. Know different methods of prestressing and its losses CO2. Design the sections for flexure and shear CO3. Design the composite sections CO4. Identify factors influencing the deflections.
A80146	Construction Management	At the end of this course, each student should be able to: CO1. Implement generic and special Construction Project Management skills to a higher level CO2. Understand the special management skills required in multidisciplinary and global Construction Industry CO3. Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice CO4. Implement idea on occupational and safety hazards management.
A80087	Industry Oriented Mini Project	At the end of this course, each student should be able to CO1. Apply the relevant knowledge and skills, which are acquired within the technical area, to a given problem CO2. within given constraints, even with limited information, independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area CO3. Reflect on, evaluate, and critically assess one's own and others' scientific results CO4. Document and present one's own work, for a given target group, with strict requirements on structure, format, and language usage. CO5. Identify one's need for further knowledge and continuously develop one's own competencies CO6. Understand how to apply technology for the real time problems
A80089	Seminar	At the end of this course, each student should be able to CO1. To assess and enhance the capability of the student to present a seminar on a technical topic CO2. Understand the learning and critical thinking about a technical topic CO3. Draw upon literature from different traditions to help the students appreciate the universal importance social trust, truth telling and mutual obligations CO4. Learn how to document and present a technical reports CO5. Acquire awareness on latest technology and current trends in the field of power systems CO6. Participate in discussions for enhancement of knowledge and

Course Code	Course Title	Course Outcomes
A80088	Project Work	<p>Adapt professional ethics.</p> <p>At the end of this course, each student should be able to</p> <p>CO1. Apply the relevant knowledge and skills, which are acquired within the technical area, to a given problem</p> <p>CO2. within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area</p> <p>CO3. Reflect on, evaluate, and critically assess one's own and others' scientific results</p> <p>CO4. Document and present one's own work, for a given target group, with strict requirements on structure, format, and language usage.</p> <p>CO5. Identify one's need for further knowledge and continuously develop one's own competencies</p> <p>CO6. Understand how to apply technology for the real time problems</p>
A80090	Comprehensive Viva	<p>At the end of this course, each student should be able to:</p> <p>CO1. Students able to have a comprehensive understanding of techniques applicable to their own area of professional practice</p> <p>CO2. Demonstrate originality in the application of knowledge, together with a practical understanding</p> <p>CO3. Able to critically evaluate current professional practice in their discipline</p> <p>CO4. Be able to demonstrate self-direction and originality in tracking and solving problems.</p> <p>CO5. Act autonomously in planning and implementing tasks at professional or equivalent level</p> <p>CO6. Continue to advance their knowledge and understanding, to develop new skills to high level</p>