**COURSE OBJECTIVES & OUTCOMES**

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| **Year** | **Course Name** | **Objectives** | **Outcomes** |
| **I/IV B.Tech** | | | |
| **I** | **CE 101 Differential Equations** | * To provide knowledge on solving ordinary differential equations. * To provide knowledge on applications of first order ordinary differential equations. * To provide knowledge on solving higher order ordinary differential equations. * Focused in partial differential equations. * To provide knowledge on Laplace transforms. | * Understand methods of solving first order differential equations. * Understand some physical applications of first order differential equations. * To solve higher order differential equations * To solve partial differential equations * To understand Laplace transforms. |
| **I** | **CE 102 Engineering Physics** | * To impart knowledge and understanding of basic principles of Ultrasound and its applications in imagingand industry * To understand about basic phenomena of light waves. * To understand about fundamentals of Laser, its types and applications. 3-D photography, principle andapplications of optical fiber. * To understand Essential formulation of physics in the micro world. * To understand development of Electromagnetic wave equations. | * Understand the concepts of Ultrasonic waves, production and applications in NDT. * Understand the interference in thin films and its application, Concept of diffraction and grating,birefringence and production and detection of different polarized lights. * Acquire Knowledge on basics of lasers, holography, fibers and their applications. * Understand Schrodinger wave equation and its applications in 1-D with respect to the domain of quantumworld. * Describe the nature of electromagnetic radiation and matter in terms of the particles. |
| **I** | **CE 103 Applied Chemistry** | * To know the softening methods and quality parameters of water used in industries. * To know the requirements and purification methods of drinking water. * To understand the construction and functioning of electrochemical energy systems. * To study the mechanisms, types, factors influencing corrosion and protection methods ofcorrosion. * To acquire knowledge on latest analytical techniques. | * Students acquire knowledge on quality and utility of water in industries. * Students gain knowledge on water treatment for drinking purpose. * Able to understand functioning of electrochemical energy systems. * Students can relate corrosion and environment and suggest methods to prevent corrosion. * Can analyse substances using techniques like Spectrophotometry, Colorimetry, Conductometryand Potentiometry. |
| **I** | **CE 104 English For Communication** | * To enable students improve their lexical and communicative competence. * To equip students with oral and written communication skills. * To help students understand and learn the correct usage and application of Grammar principles. * To get them acquainted with the features of successful professional communication. * To enable students acquire various specific features of effective written communication. | * Use vocabulary contextually. * Compose effectively the various forms of professional communication. * Apply grammar rules efficiently in spoken and written forms. * Understand and overcome the barriers in communication. * Develop professional writing. |
| **I** | **CE 105 Problem Solving With C** | * The basic problem solving process using Flow Charts and algorithms. * The basic concepts of control structures in C. * The concepts of arrays, functions, pointers and Dynamic memory allocation in C. * The concepts of structures, unions, files and command line arguments in C. | * Develop algorithms and flow charts for simple problems. * Use suitable control structures for developing code in C. * Design modular programs using the concepts of functions and arrays. * Design well-structured programs using the concepts of structures and pointers. * Develop code for complex applications using file handling features. |
| **I** | **CE 106 Engineering Mechanics** | * Force systems, free body diagrams, resultant of forces and equations of equilibrium * Supports and support reactions * Determination of Centroid and Moment of inertia of material bodies, plane figures * Analysis of the truss and determination of axial forces by Method of Joints and sections * Laws of friction and applications * Principle of virtual work * Force systems in space | * Construct free body diagrams and use appropriate equilibrium equations * Calculate unknown forces in a plane by resolution of force and equilibrium equations * Locate Centroid of composite figures and determine moment of inertia of material bodies, plane figures * Determine the axial forces in the members of determinate truss. * Analyze the systems with friction. * Calculate unknown forces using virtual work equation * Determine forces in space using equilibrium equations |
| **I** | **CE 151 Engineering Chemistry Lab** | * To learn the concepts of equivalent weight, molecular weight, normality, molarity, weight percent,volume percent. * To prepare molar solutions of different compounds. * To know the methods of determining alkalinity, hardness and chloride ion content of watersample. * To know the methods to determining purity of washing soda, percentage of available chlorine inbleaching powder. * To learn the redox methods to determine Fe2+ ions present in solution. * To know principles and methods involved in using instruments like conductivity bridge,spectrophotometer, pH meter and potentiometer | * Students acquire knowledge on normality, molarity, molecular weight, equivalent weight, oxidizingagent, reducing agent. * Students can prepare solutions with different concentrations. * Students can analyze water for its hardness, alkalinity, chloride ion content, iron content. * Students understand the principles behind the development of instruments suitable for chemicalanalysis. Later he can use the knowledge in modifying instruments. |
| **I** | **CE 152 C-Programming Lab** | * The fundamentals of C and working with ANSI C/Turbo C compilers. * The basic concepts of control structures in C. * The concepts of arrays, functions, pointers and Dynamic memory allocation in C. * The concepts of structures, unions, files and command line arguments in C. | * Write simple programs using C fundamentals and control statements. * Develop various menu driven programs using concepts of control statements, arrays, functionsand pointers. * Use dynamic memory allocation for efficient memory management. * Design well-structured programs using the concepts of structures, unions and file handlingfeatures. * Design applications using C. |
| **I** | **CE 153 Engineering Graphics Lab** | * To study and know the use of instruments applicable to Engineering Drawing. * To impart knowledge on shop floor dimensioning, lettering and line types. * To understand the fundamentals of geometry like scales and Engineering curves. * To make the students learn different methods in constructing conics and curves. * To study different types of projections and to impart knowledge on projecting one & twodimensional figures and to visualize the different positions of planes. | * Acquire basic skills in technical graphic communication and also get thorough knowledge ofvarious geometrical elements used in Engineering practice. * Be able to use the instruments required for Drawing. * Be able to dimension, print letters which can be understood globally. * Gather good knowledge in various kinds of scales and their practical usage. * Understand the Projections of points, lines and planes and their representation and dimensioning. |
| **I** | **CE 107 Calculus** | * Finding the Eigen values and Eigen vectors and inverse of a matrix and getting familiarity withdiagonalization and quadratic forms. * To give basic knowledge on evaluation of double, triple integrals, area and volume. * To provide sufficient theoretical and analytical background of differentiation and integration ofvector functions. * To provide knowledge on complex analysis because technology we rely on requires scientistsand engineers to understand this topic. * Complex analysis is widely used in the fields of science and technology. * To provide knowledge on singularities, poles and residues. | * Understand the basic linear algebraic concepts. * To evaluate double, triple integrals and the area, volume by double & triple integrals respectively. * To solve gradient, divergence, curl and integration of vector function problems. * Apply Cauchy-Riemann equations and harmonic functions to problems of fluid mechanics,thermodynamics and electro-magnetic fields. * Find singularities of complex functions and determine the values of integrals using residues. |
| **I** | **CE 108 Physics Of Materials Practice** | * To understand the general, scientific concepts required for technology. * To familiarize with the new concepts of composite, ceramic and nano science and technology. | * Characterization of materials and introduction to advanced materials to present technologies. * Acquire knowledge on properties of solids, fluids & nano, composite materials and theirapplications. * To know the concepts of rotational motion, principles & moment of inertia. * To understand the modern engineering materials (shape memory & ceramic materials) and theirapplications |
| **I** | **CE 109 Chemistry of Engineering Materials** | * To acquire knowledge on formation of polymers and conditions to act as conducting polymers. * To gain knowledge on the chemistry of some important plastics and rubbers commonly used. * To understand parameters related to efficiency of various fuels * To gain knowledge on the characteristics of refractories and lubricants. * To understand the requirements and chemistry of explosives and utility of liquid crystals | * Students know the formation of polymers and the utility of conducting polymers in electronics,electrical and other fields. * Students would be able to know usage of plastics and elastomers in day-to-day life and in fieldslike automobile, electronics, etc. * Would acquire knowledge on composition, quality and uses of various fuels. * Would be capable of selecting appropriate lubricant for a given system, and know thecharacteristics and utility of refractories. * Students acquire knowledge on the requirements, applications of liquid crystals and explosives. |
| **I** | **CE 110 Environmental Studies** | * To give a comprehensive insight into natural resources, ecosystems and bio diversity. * To create an awareness on various aspects of environmental pollution and effects. * To educate the ways and means to protect the environment from pollution. * To impart fundamental knowledge on human welfare and environmental acts. * To demonstrate the environmental problems like global warming, ozone layer depletion, acidrains. | * Define and explain the basic issues concerning the ability of the human community to interact in asustainable way with the environment. * Describe and discuss the environmental implications of biologically important materials throughthe ecosystems. * Describe and discuss the environmental pollution implications and watershed management. * Discuss the benefits of sustaining each of the following resources - food, health, habitats, energy,water, air, soil and minerals. * Understand the causes, effects and controlling measures of different types of environmentalpollutions with some case studies. |
| **I** | **CE 111 Engineering Drawing** | * Comprehend general projection theory with emphasis on orthographic projection to representthree dimensional objects in two dimensional views. * To visualize the different positions of solids and to be able to plan and prepare neat orthographicdrawings of solids. * To evident the features when solids are cut into sections, to draw and identify various types ofsection views. * To enable the students learn various aspects of development of surfaces used in sheet metalworking along with a thorough knowledge in interpenetration of solids. * To know various isometric and orthographic views and their applications in the daily life. | * Be able to visualize and communicate with two dimensional as well as three dimensional shapes. * Understand the application of industry standards and best practices applied in Engineeringdrawing. * Be able to apply the knowledge of development of surfaces in real life situations. * Get insight into the concepts of projection, representation and dimensioning of three dimensionalobjects like Prisms, Cylinders, Pyramids, Cones. * Thoroughly understand the concept of isometric & orthographic projections which will be usefulfor the visualization of any object. This subject also paves the way for learning Auto Cad andadvanced software packages. |
| **I** | **CE 112 Solid Mechanics – I** | * To establish an understanding of the fundamental concepts of * The stress, strains and different engineering properties of materials. * The internal resistances against the applied loads on different shaped materials. * Shear force and bending moment. * Torsion and design for torsion for materials. | * Understand the concepts of stress and strain at a point as well as the stress-strain relationshipsfor homogenous, isotropic materials. * Draw bending moment and shearing force diagrams for beams. * Design simple bars, beams, and circular shafts for allowable stresses and loads. * Understand the concept of shear flow in sections. * Understands the core and kernel of the section. |
| **I** | **CE 154 Physics Laboratory** | * To understand the general, scientific concepts required for technology. | * Use CRO, signal generator, spectrometer for making measurements. * 2. Test the optical components using principles of interference & diffraction. * 3. Determination of the selectivity parameter in electrical circuits. |
| **I** | **CE 155 English Communication Skills Lab** | * To acquaint the students with the standard English pronunciation, i.e., ReceivedPronunciation(RP), with the knowledge of stress and intonation. * To develop the art of effective reading and answer comprehension passages. * To enable the students use phrasal verbs and idiomatic expressions in an apt manner. * To equip with appropriate and spontaneous speech dynamics. * To develop production and process of language useful for social and professional life. | * Know the IPA phonetics symbols, and their relation to pronunciation; recognize the differenceamong the native, regional and neutral accent of English. * Employ different skills, inferring lexical and contextual meaning and attempt comprehensionpassages. * Use confidently phrases and idioms for effective communication. * Develop appropriate speech dynamics in professional situations. * Focus on communication skills and social graces necessary for effective communication. |
| **I** | **CE 156 Workshop Practice Lab** | * To provide the students hands on experience to make different jointsin carpentry with hand toolslike jack plane, various chisels & handsaws * To provide the students hands on experience to make different jointsin welding with tools &equipment like electric arc welding machine, * TIG Welding Machine, MIG Welding Machine, hack saws, chippingtools etc. * To provide the students hands on experience to make different jointsin Sheet metal work withhand tools like snips, stacks, nylon malletsetc. * To provide the students hands on experience to make differentconnections in house wiring withhand tools like cutting pliers ,tester,lamps& lamp holders etc . | * To familiarize with\_ The Basics of tools and equipment used in Carpentry, Tin Smithy, * Welding and House Wiring. * The production of simple models in the above four trades |
| **II/IV B.Tech** | | | |
| **II** | **CE 201 Computational Techniques & Statistical Methods** | * To provide knowledge on Fourier series. * To provide basic knowledge of numerical methods including solving systems of linear equations. * To provide knowledge on numerical solution of ordinary differential equations. * To impart the basic principles of various probability distributions. * To provide basic knowledge of statistical inference and applying it to practical problem | * Find Fourier series. * Find numerical solution of ordinary differential equations. * Evaluate integrals using numerical techniques. * Apply knowledge of distribution theory to various data. * Test hypotheses and draw inference for engineering problems |
| **II** | **CE 202 Surveying – I** | * To study the basics of linear/angular measurement methods like chain surveying, compasssurveying. * To study the basics of leveling and theodolite survey in elevation and angular measurements. * To determine the relative positions of the existing features on the ground. * To acquaint with procedures of leveling by dump level & auto level. * To study the significance of plane table surveying in plan making. | * To determine the relative positions of a point on the existing ground by conducting the survey. * To take the levels of existing ground and to determine the reduced levels. * To minimize the errors while taking measurements. * To gain knowledge about traversing and various methods of adjustments. * To know about difficulties in leveling. |
| **II** | **CE 203 Fluid Mechanics** | * To explain various properties of fluids and pressure measurement. * To determine the hydrostatic forces on plane & curved surfaces and principle of buoyancy. * To derive basic equations of conservation of mass, energy & momentum and their applications. * To determine the discharge using various flow measuring devices. * To learn analysis of laminar & turbulent flow through pipes. | * Understand properties of fluids and pressure measurement. * Calculate the hydrostatic forces on plane & curved surfaces and Analyze the stability ofsubmerged and floating bodies. * Determine the variation of pressure and velocity in a flow field and force on pipe bends. * Determine the discharge by using various flow measuring devices. * Calculate the head loss, power loss and discharge in laminar & turbulent flow through pipes. |
| **II** | **CE 204 Solid Mechanics - II** | * Equations for transformation of plane stress. * Strain energy in uni-axial, pure bending and shear. * Failure theories and the behavior of columns subjected to different end conditions for differentloadings. * Deflection of statically determinate beams by using relation of moment curvature, moment of areaand conjugate beam method. * Three hinged and two hinged, circular arches and cables for static loads and moving loads * Influence line diagrams. | * Understand and application to several number of stresses on a plane. * Understand problems on columns. * Apply mathematics to deflection of beams along with other methods of finding the deflections ofbeams. * Analyze determinate arches subjected to different loading which in turn helps them to resolveforces of certain type of circular and arched structures. * Draw influence line diagrams for Determinate Beams, simple trusses and three-hinged arches. |
| **II** | **CE 205 Building Materials, Planning & Construction** | * To teach the basics involved in selection of good quality building materials for construction * To demonstrate various types of masonry works including types of bonds and their finishing * To give knowledge about various building elements and their specifications * Effectively deals with the types of form work and rehabilitation work of building * Presents the basics of planning strategies, building bye laws and acoustics of building | * Students are familiar with various building materials * Students are familiar with types of masonry works and bonds used in construction * Students will have knowledge regarding acoustics of building * Students are capable of understanding building plan and have knowledge about building rules,bye-laws and building elements * Students will have knowledge about the form work, scaffolding and shoring |
| **II** | **CE 206 Engineering Geology** | * Develops the ability to understand the importance of geology in civil engineering * Develops the ability to identifying the various rock forming group of minerals and rocks andanalyze the attitude of rock formations * Develops the skills for site investigations for projects like dams, tunnels etc * Develops the solutions for various geological problems at different projects * To introduce the concept of RS& GIS concepts. | * Students able to understand the importance of geology in civil engineering * Students are familiar with identifying the geological process of the region related to the civilengineering works * Students are able to evaluate the formation and properties of the minerals , rocks and soil * Develops the ability to understand the site and solutions for different geological problems. * Will be able to know that GIS & RS can be used for managing resources and solving the problems |
| **II** | **CE 251 Material Testing Laboratory** | * To study the behaviour of materials like steel, wood, concrete etc under direct tension,compression, shear, torsion and bending by conducting relevant tests * To find young’s modulus, modulus of rigidity, hardness, impact resistance of the given materialslike steel, wood by conducting relevant tests * To determine the modulus of rigidity of the spring * To determine the compressive strength and percentage of water absorption of bricks | * Behavior of materials like steel, wood, concrete etc under direct tension, compression, shear,torsion and bending * Finding properties of materials like young’s modulus, modulus of rigidity, hardness, impactresistance * Determining the strength properties of concrete * Determinining the percentage of water absorption of bricks |
| **II** | **CE 252 Building Drawing Laboratory** | * To learn basic commands of Auto CAD software. * To draw conventional signs, symbols of materials and building services. * To draw plan, section and elevations of buildings and various building components. * To create 3D building model and rendering the model. | * Basic Auto CAD commands. * Various conventional signs, symbols of materials and building services. * Drawing plan, section and elevations of buildings and various building components. * Basics of creating 3D building model and rendering the model. |
| **II** | **CE 253 Surveying Field Work – I Lab** | * To measure chainage of a line using tape and chain and recording of details along the chain line. * To find the included angles and local attraction of traverse by using compass. * To determine the elevation difference between two points & eliminate errors due to curvature ofearth and refraction. * To prepare a contour plan of a small area by method of blocks. * To plot a building by using plane table surveying. * To measure the horizontal and vertical angles of various points by theodolite. | * To perform basic field surveys. * To prepare a plan of residential building by making use of a chain and compass. * To gain excellence in using Auto level, theodolite instruments. * To take the levels of existing ground & prepare a contour plan. * To prepare the plan or map showing the ground features from the data obtained by surveying. |
| **II** | **CE 207 Professional Ethics And Human Values** | * To provide essential complementarily between ''VALUES'' and ''SKILLS'' to ensure sustainedhappiness and prosperity. * To introduce Ethical concepts that are relevant to resolving Moral issues in Engineering and toimpart reasoning and analytical skills needed to apply ethical concepts to Engineering decisions. * To facilitate the development of a Holistic perspective towards life, profession and happiness,based on a correct understanding of the Human reality. * To understand the need for lifelong learning and have the knowledge and skills that prepare themto identify the moral issues involved in engineering areas. * To provide an understanding of the interface between Social, Technological and Naturalenvironments. | * Comprehend a specific set of behaviours and values the professional interpreter must know andmust abide by, including confidentiality, honesty and integrity. * Strive to achieve the highest quality, effectiveness and dignity in both the process and products ofprofessional work. * Understand the moral requirements of engineering experiments, and have the ability to applytheir knowledge to the solution of practical and useful problems; * Understand Lack of communication, prejudice in not asking for clarification, fear of law and plainneglect will lead to the occurrence of many repetitions of past mistakes. * Know and respect existing laws pertaining to professional work. The students can speak outagainst abuses in these areas affecting the public interest. |
| **II** | **CE 208 Surveying – II** | * To introduce about EDM, Digital theodolite and total station. * To deal with various methods employed for the measurement of areas and volumes. * To determine distances and relative positions using tachometric surveying and trigonometricleveling * To study different methods of setting & design of simple circular curves. * To study the positioning of structure, setting out foundation, setting out a sewer and setting outculvert. | * To know about the latest Surveying Instruments. * He gains enough knowledge about tachometric survey. * To find out the reduced level of different structures when base is inaccessible and accessible. * To design and layout curves for a roads and railways. * To layout or to mark the positions of the proposed structures on the ground. |
| **II** | **CE 209 Hydraulics and Hydraulic Machines** | * To introduce the various types of flows and concepts of specific energy, critical flow and theirapplications. * To introduce different surface profiles of the gradually varied flow and computation of length ofGVF profiles. * To derive the relation between sequent depths of hydraulic jump and energy loss in hydraulicjump. * To introduce dimensional analysis techniques and various similarities between prototype andmodel. * To impart knowledge of hydraulic turbines and centrifugal pumps. | * Analyze and design open channel * Analyze GVF problems. * Determine the relation between sequent depths and energy loss in hydraulic jump. * Obtain dimension less numbers and construct models using similarity laws. * Apply momentum principle in the analysis of flow through turbines and pumps. |
| **II** | **CE 210 Structural Analysis – I** | * Degree of Indeterminacy and stability of Structures. * Influence lines for continuous members. * Methods of structural analysis: Three moment theorem, Slope Deflection Method, MomentDistribution Method, Energy Methods. * Analyze plane frames undergoing side sway by Slope Deflection Method, Moment DistributionMethod and Kani’s method. * Three hinged and two hinged parabolic and circular arches for static and moving loads. * To analyze multistoried frames by using Approximate Methods. | * Analyze the statically indeterminate structures like fixed beams, continuous beams, two hingedarches and influence lines for continuous members * Calculate the forces in arches, cables with different end conditions of the structure subjected todifferent loading which in turn helps them to resolve forces of certain type of parabolic and circular arched structures * Formulate questions and develop analytical answers for analysis of structures, and solve broad- based structural analysis problems. * Make qualitatively correct sketches of Shear force and bending moment diagrams, Deflections forbeams and frames. * Students will learn to analyze multistoried frames by using portal and cantilever methods. |
| **II** | **CE 211 Environmental Engineering – I** | * To estimate future population at the end of design period and to determine water requirement tosatisfy various water demands and to select a suitable water supply source based on quality and quantity criteria. * To design required pipe diameter by using various hydraulic formulae and to discuss the methodof laying and testing of pipes. * To discuss methods for determining the physical, chemical and biological characteristics of waterand to ascertain suitability for drinking based on BIS standards for drinking water. * To understand theory and design aspects of water treatment facilities-sedimentation, coagulation,filtration and to discuss various methods of disinfection with special emphasis on chlorination. * To introduce methods for water softening, defloridation, desalination and removal of colour, odourand taste. * To learn about various layouts of distribution networks and analyse distribution systems byHardy-cross method and Equivalent pipe method.. | * Determine the future population at the end of design period and select a suitable water supply source to satisfy present and future water demands. * Conduct tests on physical, chemical and biological characteristics of water and to ascertain the suitability of water for drinking purpose based on water quality standards. * Design various water treatment facilities and select a suitable method of disinfection. * Suggest suitable treatment method for the removal of hardness, salinity, excess fluorides and colour, odour and taste. * Analyse complex water distribution networks. |
| **II** | **CE 212 Concrete Technology** | * Composition, manufacturing process, types and testing of cement * Properties and standards of materials used for making concrete i.e cement, Fine aggregate,coarse aggregate, water and admixtures * Properties and behaviour of concrete during fresh state and hardened state by various conceptsand tests * Concrete production process and mix design procedure using Indian standard code * Special concretes | * Students are familiar with the properties of materials used for concrete production * Students will have knowledge about the behaviour of the concrete during fresh and hardenedstate * Students are capable of designing the concrete mix as per IS:10262 code * Students will have knowledge in special concretes using different admixtures and constructionchemicals * Students are familiar with the problems associated with concrete during its life time. |
| **II** | **CE 254 Concrete Technology Laboratory** | * To develop adequate knowledge * To conduct tests like Normal consistency and fineness of cement, Initial setting and final settingtime of cement, Specific gravity, soundness, Compressive strength of Cement to find the qualityof cement * To determine the workability of fresh concrete using Slump cone, Compaction factor, Vee-Beeconsistometer tests * To study the Bulking characteristics of fine aggregate and to determine the Specific gravity of fineand coarse aggregates and fineness modulus of fine aggregate and coarse aggregate. * To determine the compressive strength of concrete & split tensile strength of concrete. * To determine the modulus of Elasticity of concrete by conducting compression test on cylinders. * To demonstrate the Non-destructive testing on concrete and concrete mix design (IS method) * To understand the flow properties of SCC | * Behavior of materials like steel, wood, concrete etc under direct tension, compression, shear,torsion and bending * Finding properties of materials like young’s modulus, modulus of rigidity, hardness, impactresistance * Finding the quality of cement * Fresh concrete workability properties to judge the suitability of concrete for the field conditions * Physical properties of concrete making materials like cement, fine aggregate and coarseaggregate to judge suitability for making concrete * Know the quality of concrete i.e compressive, tensile strength of concrete and also by using non-destructive testing methods. |
| **II** | **CE 255 Hydraulics and Hydraulic Machines Laboratory** | * To determine the Darcy's friction factor for the pipes. * To determine the coefficient of discharge of venturimeter, orfice, orifice meter, mouth piece and v- notch. * To determine the efficiency of jet of vane. * To determine the loss of head in pipes due to sudden expansion and contraction. * To determine the manning’s and chezy’s constant for open channel. * To study the performance and determine the efficiencies of pelton turbine and Francis turbine. * To study the performance characteristics and efficiency of centrifugal pump | * To understand the determination of discharge for hydraulic equipments. * To understand the minor and major losses in pipes. * To understand the performance of turbines and pumps with varying speed |
| **II** | **CE 256 Environmental Engineering Lab** | * To determine the physical characteristics of drinking water/sewage Turbidity. * To determine chemical characteristics of drinking water/sewage -pH, various types of solids,acidity, alkalinity, D.O etc. * To determine the chlorine dosage and residual chlorine in treated water sample. * To determine the Bio-chemical and Chemical Oxygen Demands of sewage. * To estimate Most Probable Number of given water sample. * To train the student for using instruments like pH meter, turbidimeter etc. * To estimate optimum dosage of coagulant (Alum). | * Conduct tests for physical, chemical, biological quality of water/sew-age. * Use the instruments with appropriate precautions to obtain maximum precision in thereadings. * Conduct jar test to determine the exact quantity of alum needed at treatment plant based on theturbidity of the given sample. * Ascertain whether the given water sample contain pathogens or not. * Conclude whether the given water is fit for drinking or not by comparing the quality parameterswith BIS standards (IS 10500 - 1991 * Decide whether the given sewage can be directly disposed off into a stream or to be treated. |
| **III/IV B.Tech** | | | |
| **III** | **CE 301 Geotechnical Engineering – I** | * To introduce the subject including genesis and historical aspect to the student. * To understand the significance of the basic principles of soil mechanics and theirapplications. * To go through basic definitions, simple tests, plasticity characteristics, flow of waterthrough soils, permeability, seepage and effective stress principle. * To bring out the importance of concepts of stresses due to vertical loads, compression,consolidation and shear strength of soil and their applications. | * Understand index properties of soils * Classify the soil. * Assess engineering properties of soils like permeability. * Compaction, consolidation, shear strength and their importance. * Calculate vertical stresses increase due to applied loads, useful to determine settlement ofstructures |
| **III** | **CE 302 Water Resources Engineering – I** | * To study measurement of rainfall and computation of runoff over a basin. * To introduce concept of Unit Hydrograph and to construct storm hydrograph of any duration usingUnit Hydrograph concept. * To introduce various methods of stream gauging. * To study steady state well hydraulics and to determine yield from open well. * To introduce necessity, methods of irrigation and computation of irrigation scheduling. * To introduce different silt theories and design aspects of channels. * To discuss the causes and remedial measures of water logging and to design lined canals. | * Compute rainfall, runoff and peak flood discharge over a basin. * Measure stream flow by different methods. * Determine the discharge from tube wells and open wells. * Estimate crop water requirement and irrigation scheduling. * Design lined and unlined canals. * Suggest suitable methods to control water logging of irrigation lands. |
| **III** | **CE 303 Railway, Airport & Harbor Engineering** | * To understand the role of railways in transportation. * To understand various parts of a railway track. And Introduction to geometric design of a railwaysection. * To emphasize on various requirements of stations * It will present the concept airport planning, various obstruction runway and structural design ofairport pavement. * Emphasize on various facilities of a harbor and port and various controlling devices of an harbor. | * An ability to understand the importance of railway sector * An ability to judge and select proper material and component for a railway track and tounderstand and deign various component of a track. * For basic knowledge of a railway station. * Better planning of various amenities of an airport and planning and also serves as a basic for airport pavement design and runway design. * Creates a basic introduction of various features of a harbor and a port to enable for proper designand maintenance of various amenities. |
| **III** | **CE 304 Design Of Concrete Structures - I** | * Course is designed to shape the concrete and use the steel bars in concrete for external loads onstructural elements. * To bring about an understanding of the behavior of reinforced concrete for flexure by workingstress method for different types beams. * To understand the design of limit state method for flexure in different types of beams. * To understand the analysis and design shear and torsion for RC elements. | * Design the beams for flexure in working stress method. * Design the beams for flexure in limit state method. * Design the beams for shear and torsion. * Design of beam for Bond and Development length |
| **III** | **CE 305 Design Of Steel Structures – I** | * To introduce steel structures and its basic components * To introduce structural steel fasteners like welding and bolting * To design tension members, compression members, beams and beam-columns * To design column splices and bases | * Learn the basic elements of a steel structure * Learn the fundamentals of structural steel fasteners * Able to design basic elements of steel structure like tension members, compression members,beams and beam-columns * Able to design column splices and bases. |
| **III** | **CE 306 Structural Analysis – II** | * Stiffness and flexibility in matrix form. * To analyze the structures like beams and simple frames using stiffness and flexibility matrixmethods. * The plastic behavior of structures and collapse load analysis of the structures. * Evaluation of element stiffness matrix and nodal load vector for one-dimensional and two- dimensional problems of elasticity. * Basic concepts of structural dynamics and system descritisation methods. | * Analyze the structures like continuous beams and single bay, storey rigid jointed frames forinternal forces using stiffness and flexibility matrix methods. * Develop a computer program by various software's. * Behavior of structures beyond yield load, finding shape factors, length of plastic hinge. * Collapse load analysis * Know evaluation of element stiffness matrices and element load vectors for one-and two- dimensional problems of elasticity. * Can obtain global stiffness matrix and nodal load vector. |
| **III** | **CE 351 Surveying Field Work – II Laboratory** | * The main objective of this laboratory course is to introduce Total Station instrument for regularfield survey purpose. * To make every student familiar with Total Station * All of the experiments which are done by mechanical instruments before are now done with Totalstation. * To set out a simple circular curve by various methods using tape, theodolite. * This course will also present a survey camp after completing the regular lab sessions. | * Gain required excellence in using the Total Station Instrument by avoiding manual errors. * Every student can meet the requirement of knowing the Total Station instrument which is vital forany construction firm. * Students can make accurate designs and set out a simple circular curve for roads. * Not only he/she can work out the experiments inside the institution but also they are trained forthe on-site works outside the institution. |
| **III** | **CE 352 Geotechnical Engineering Laboratory** | * To determine physical properties like water content, specific gravity, bulk unit weight,Atterberg limits and gradation analysis. * To determine engineering properties of soils like permeability, compaction, consolidation andshear strength of soils. | * Classify the soil. * Based on classification plan for suitability of soil for various civil engineering projects. * Determine engineering properties of soils which are required design of retaining walls, foundations, checking settlements and stability of slopes. |
| **III** | **CE 353 Engineering Geology Laboratory** | * Develops the ability to understand the importance of geology in civil engineering * Develops the ability to identifying the various rock forming group of minerals and rocks andanalyze the attitude of rock formations * Develops the knowledge in interpreting the topographic geological maps and satellite Imageries | * Students able to understand the importance of geology in civil engineering * Students are familiar with identifying the geological process of the region related to the civilengineering works * Students are able to evaluate the formation and properties of the minerals , rocks and soil * Develops the ability to prepare the geological section and maps and interpret the site conditions |
| **III** | **CE 307 Geotechnical Engineering – II** | * To introduce the soil exploration, field testing of soil to know soil strata, strength and water tablelocation. * The civil engineering structures like retaining wall which are to resist lateral stresses are alsointroduced. To introduce concepts of stability of slopes, bearing capacity, pile capacity and itsdetermination. | * Equip the student with knowledge of how to explore the soil, * Calculation of earth pressures to design retaining walls * Checking stability of slopes * Determination of Allowable bearing pressure so as to determine dimensions of the footings. * Selection of pile and its capacity |
| **III** | **CE 308 Water Resources Engineering – II** | * To discuss the planning criteria of a reservoir, flood routing methods and to determine storagecapacity & life of reservoir. * To study modes of failure, stability analysis and design of gravity dam. * To study types, causes of failures of earth dams and seepage control measures. * To study various types of spillways and their suitability, energy dissipation below spillways. * To study seepage theories and their applications in the design of weirs on permeablefoundations. * To study functions, types and suitable locations for outlets, falls, regulators , cross drainageworks and escapes of a canal. * To study about component parts and their function of a hydel project and introduction of loadfactor, capacity factor, utilization factor. | * Calculate the storage capacity of a reservoir and estimate the life of a reservoir. * Analyse stability of gravity dam and obtain section of an earth dam based on the locally availablematerials. * Suggest a suitable spillway at a dam site and understand the criteria for design of stilling basin forenergy dissipation under spillway. * Design weirs on permeable foundations based on Bligh's creep theory and Khosla's theory. * Understand the functions and suitable locations of canal outlets, canal falls, canal regulators andcross drainage works. * Understand the functions of component parts of a hydro electric power scheme and determineload, capacity, and utilization factors for a hydel project. |
| **III** | **CE 309 Highway Engineering** | * To emphasize on highway development planning and various surveys to be conducted. * To understand material properties and performances and limits of various tests * Introduction to the design concepts, vehicle loading criteria and to demonstrate how they are combined to design and construct road pavements. * To understand the principles of geometric design, both vertical and horizontal * Emphasize on various traffic control operations and regulations. | * For proper planning of a road network by linking of various surveys and to evaluate and develop master plans for a better road network. * Selecting the appropriate materials for use in different road layers for different types of pavements. * Perform road pavement design and analysis by various IRC and other methods. * Interpret geometric design fundamentals, in relation to safety and driver comfort, focusing on horizontal and vertical alignment. * An ability to develop traffic signals and help to properly regulate the traffic and better use of road network. |
| **III** | **CE 310 Design of Steel Structures** | * To impart the knowledge on steel structures and its basic components as per IS 800:2007 * To understand behavior and compression members and built up compression members * To understand behavior and design of beams and beam-columns. * Understanding the concepts of Welded Plate girder. * To understand and design column splices, bases and roof truss. | * Students can handle the isolated design of individual elements independently * Indian Standards of approach can be practiced by the student. |
| **III** | **CE 311 Environmental Engineering – II** | * To introduce water carriage systems of sanitation and their relative merits. * To estimate quantities of sewage and drainage and to learn procedures for sewer design and to discuss the importance of various sewer appurtenances like manholes etc. * To discuss cycles of decomposition and methods for determining the quality and characteristics of waste water. * To discuss theoretical aspects and design procedures for primary and secondary wastewater treatment units – grit chambers, sedimentation tanks, Trickling Filters and Activated Sludge Process, Oxidation ponds. * To discuss various stages and factors affecting anaerobic sludge digestion and to design anaerobic sludge digester and to learn methods of sludge handling and disposal. * To introduce sanitary fittings and plumbing systems of drainage and to discuss principles governing house drainage. * To design wastewater treatment and disposal in un-sewered areas using septic tanks and to learn concepts of biogas generation. | * Determine the quantity of drainage and sewage and design sewers along with suitable location of various sewer appurtenances. * Ascertain the quality and characteristics of wastewater. * Design various primary treatment units, biological treatment units. * Design anaerobic digester for primary and secondary sludge and to select suitable method for disposal of wet or conditioned sludge * Plan plumbing system for various types of residential buildings * Design septic tanks and its effluent disposal methods understand the biogas production concepts. |
| **III** | **CE 312 Design Of Concrete Structures - II** | * Course is designed to shape the concrete and use the steel bars for external loads on different building elements. * To understand the codal recommendations for methods of design. * To understand the design of continuous beams. * To understand the design of continuous slabs. * To understand the design of two way slabs, and flat slabs. * To understand the design of columns. * To understand the design of retaining walls and foundations | * Students can handle the isolated design of individual elements independently. * Indian Standards of approach can be practiced by the student. |
| **III** | **CE 354 Professional Communication Skills Lab.** | * Improve the dynamics of professional presentations. * Develop the ability to compeer professional occasions. * Enable to read news paper for their communicative competence. * Equip with effective business correspondence. * Develop in them communication and social graces necessary for employable ready skills and win in the job interviews * Build confidence to handle professional tasks. | * Develop effective communication and presentation skills. * Learn corporate etiquette - organizing and managing professional events. * Understands how reading enhances their communicative competency. * Conduct effective correspondence and prepare reports which produce results. * Develop all-round personalities with a mature outlook to function effectively in different circumstances. * Know his/her skills and abilities for better career plans. |
| **III** | **CE 355 Computer Programming In Civil Engineering Laboratory** | * To write programmes for design of various structural elements like beams, slab, steel structural connections, slab base, open channel etc using C or C++ programming languages * To write programmes for determining various properties of soils using C or C++ programming languages * To write programmes for solving different problems in surveying | * Writing programmes for design of various structural elements like beams, steel structural connections, slab base, open channel etc using C or C++ programming languages * Writing programmes for determining various properties of soils using C or C++ programming languages * Writing programmes for solving different problems in surveying |
| **III** | **CE 356 Highway Engineering Laboratory** | * This course presents the major strength and shape parameters involved in selection of aggregate for various types of construction works * This course exhibits various tests conducted on aggregate in order to propose it for suitable construction work * This course later presents the detail investigation on sub-base course (soil) by conducting a laboratory test for evaluation of pavement thickness * This course also deals with the various properties of bitumen and the tests required to determine   them | * Know the important parameters for selection of aggregate for different construction components * Student can evaluate and conduct the required tests on the given aggregate and propose the suitable inference * Student can evaluate the grade of bitumen by conducting the required tests and propose it for suitable region and place of pavement construction |
| **IV/IV B.Tech** | | | |
| **IV** | **CE 401 Bridge Engineering** | * To explain various investigations to be conducted before constructing a bridge * To introduce various types of RC bridges and IRC loadings * To design slab culvert and T-beam bridge * To design substructure for bridges * To explain various types of bearings and design of elastomeric bearing * To explain various types of foundations and design of well foundation | * Learn about the various investigations to be conducted before constructing a bridge * Know about various types of RC bridges and IRC loadings * Able to design slab culvert and T-beam bridge * Able to design substructure like piers and abutments * Know various types of bearings and able to design elastomeric bearing * Know the various types foundations used for bridges and able to design well foundation |
| **IV** | **CE 402 Quantity Surveying** | * Quantity estimation for different civil engineering works like single storey residential building, BT road, canal etc. * Cost estimation for different civil engineering works like single storey residential building, BT road, canal etc. * Rate analysis for different items of work * Quantity estimation and preparing schedule of bars of different items of RC works using software like MS Excel * To prepare project management report for different civil engineering projects like residential building, BT road, canal etc using software packages like Primavera/MS Project etc | * Estimating quantities required for different civil engineering works like single storey residential building, BT road, canal etc. * Cost estimation of different civil engineering works like single storey residential building, BT road, canal etc. * Finding the unit rate of different items of work * Prepare schedule of reinforcement bars * Preparing tender notice and various approvals needed for a project * Valuation of building and rent fixation |
| **IV** | **CE 404/A Basic Surveying** | * To study about the various surveying instruments. * To study the basics of chain survey in linear measurements. * To determine the relative positions of the existing features on the ground. * To obtain basic knowledge on Total Station. * To acquaint with procedures of leveling by dump level & auto level. | * To determine the relative positions of a point on the existing ground by conducting the survey. * To use all basic surveying instruments. * To operate Total Station instrument. * To take the levels of existing ground and to determine the reduced levels. |
| **IV** | **CE 404/B Building Materials & Estimation** | * To teach the basics involved in selection of good quality building materials for construction * To give knowledge about various building elements and their specifications * Presents the basics of planning strategies, building bye laws and acoustics of building * preparing tender notice and various approvals needed for a project * Valuation of building and rent fixation | * Students are familiar with various building materials * Students are familiar with types of masonry works and bonds used in construction * Students are capable of understanding building plan and have knowledge about building rules, bye-laws and building elements * Students will have knowledge about Valuation of building and rent fixation |
| **IV** | **CH 404/A Energy Engineering** | * To provide the knowledge about formation, classification, ranking, analysis, testing, carbonization, gasification and liquefaction of coal, manufacture of cock. * To provide the knowledge about design, occurrence, composition, classification, exploration and production of petroleum, refining, testing and analysis of petroleum products. * To provide knowledge about the non -conventional energy resources sun and wind. * To provide knowledge about the non -conventional energy resources like ocean thermal, geothermal energy, biomass and fuel cells * To provide knowledge about the energy storage and related problems in the world and its solutions. | * An ability to understand the importance of environment and conservation of natural resources. * An ability to succeed in the competitive exams of energy industry. * An ability to utilize the non-conventional energies in place of conventional energies and its manufacture. * An ability to utilize the non- conventional energies in place of conventional energies and its manufacture. * An ability to maintain the sustainability in the environment |
| **IV** | **CH 404/B Bio Fuels** | * To provide the knowledge about properties, composition, features of bio fuels and uses of biomass and their environmental impacts. * To provide the students a substantial knowledge of bio fuel production technologies. * To provide knowledge about the process of biogas production and methods of production of biodiesel and comparison of the standards to the conventional diesel. * To provide knowledge about the production of lipids, bio hydrogen from different bacteria and algae. * To provide knowledge about the fuel cell technology | * An ability to describe the functional principle of biofuel technologies in small and large scale. * An ability to describe the main steps and components in bioethanol, biodiesel and biogas production. * An ability to Participate actively in teamwork and work with case related problem solving. * An ability to work with professional problem solving in an industrial environment. * An ability to work in other fields of engineering. |
| **IV** | **CS 404/A Java Programming** | * Understand the basic concepts and fundamentals of platform independent object oriented language. * Demonstrate skills in writing programs using exception handling techniques and multithreading. * Understand streams and efficient user interface design techniques. | * Use the syntax and semantics of java programming language and basic concepts of OOP. * Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages. * Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. * Demonstrate how the java program communicates with the console and disk files using the concept of streams. * Design event driven GUI and web related applications which mimic the real word scenarios. |
| **IV** | **CS 404/B Database Management Systems** | * To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of Databases. * To understand the types of integrity constraints in a relational database system and the concepts of SQL to create and access the database. * To understand basic concepts of ER model and database design using normalization process. * To understand concurrency, Recovery techniques. | * An understanding of basic concepts and use of various database systems. * An ability to enforce integrity constraints to maintain validity & accuracy. * An ability to write relational expressions for the queries. * An ability to design and develop a database using normalization theory. * An ability to use different concurrency control and Recovery techniques. |
| **IV** | **EC 404/A Applied Electronics** | * To understand about various modern electronic systems. * To provide clear explanation of the operation of all the important electronic devices and systems available. * To know about modern audio and video systems. * To know about various Telecommunication Systems. | * Understand the working, types and applications of microphones and loudspeakers. * Understand the features of commercial, theatre sound recording and colour TV standards * Understand the working of various electronic systems, telecommunication and switching systems. * Understand the working of various applications like digital clocks, fiber optics, microprocessor and mobile radio systems. * Understand consumer electronic equipment and systems like washing machines. |
| **IV** | **EC 404/B Basic Communication** | * To understand an overview of communication systems. * To understand the modulation technique, need of modulation,Amplitude modulation. * To understand fundamentals of digital communications. * To understand broadband communication systems and Television fundamentals. | * Understand transmission of analog signals using amplitude modulation. * Understand the transmission of digital signals through PCM, PAM, PPM and DELTA Modulation techniques * Know about various Broad band communication systems. * Know about the monochrome and colour Television fundamentals. * Know about Optical communication systems. |
| **IV** | **EE 404/A Non-Conventional Energy Sources** | * To know the depletion rate of conventional energy resources and importance of renewable energy resources. * To know the importance of Energy Storage Devices. * To know alternate viable energy sources to meet the energy requirements. * To discuss about solar energy, wind energy, tidal energy and geothermal energy as alternate resources. | * Know the national scene of energy production, utilization, consumption and energy storage systems. * Understand about the basics of solar energy, collectors & generation of electricity from solar energy &photovoltaic’s. * Understand the assessment of wind energy potential, wind turbines and wind generators. * Know about ocean energy, temperature differences & principles, extraction of energy from waves. * Understand about geothermal, types & how biogas is produced & digester for power generation. |
| **IV** | **EE 404/B Utilization Of Electrical Energy** | * To know about the different types of lamps & lighting schemes. * To know about the different types electric heating methods. * To know the design heating elements such as furnaces and ovens. * To know to utilize the electrical energy for production of heat and welding process. * To provide specific knowledge on Principles and characteristics of storage batteries. | * To give the overall idea for the different types of lamps & lighting schemes. * To know about the different types electric heating methods. * To know the designing of heat elements such as furnaces and ovens. * To know how to utilize the electrical energy for production of heat and welding process. * To gain knowledge on principles and characteristics of storage batteries. |
| **IV** | **IT 404/A Software Engineering** | * Basic concepts on Software Engineering methods and practices. * Software Process Models and Software Development Life Cycle. * Requirements analysis and design of software development. * Software Development life cycle for Web app. | * Identify, formulate, and solve Software Engineering problems. * Elicit, analyze and specify software requirements for various stakeholders. * Familiar with Design, development, deployment and maintenance of a software project. * Familiar with Architecture design and User Interface design * Apply software engineering paradigms to web apps. |
| **IV** | **IT 404/B Web Technologies** | * Basic technologies to develop web documents. * Design web pages with css and apply scripting to web documents. * Design dynamic web pages with javascript. * Concepts of xml. * Concepts of php and database access. | * Apply technologies to develop web documents. * Design web pages with css and apply scripting to web documents. * Create dynamic web pages with javascript. * Create valid and well-formed xml documents. * Write server side scripts with php and database access. |
| **IV** | **ME 404/A Robotics** | * To provide an introduction to Robotics and Automation including robot classification, design and selection, analysis and applications in industry. * To provide information on various types of end effectors, their design, interfacing and selection. * To provide the details of operations for a variety of sensory devices that are used on robot , the meaning of sensing, classification of sensor, that measure position, velocity & acceleration of robot joint. * The goal of the course is to familiarize the students with the basic concepts of transformations performed by robot. * Familiarize students to perform kinematics and to gain knowledge on programming of robots. | * Basic components of robotics, classification of robots and their applications. * They will have knowledge on types of robot grippers, their usage and design considerations. * They attain knowledge on various types of sensory devices their working and applications. * Students will apply basic transformations related to the movement of manipulator. * An ability to design a robot mechanism to meet kinematics requirements and to write simple programs. |
| **IV** | **ME 404/B Operations Research** | * Grasp the methodology of OR problem solving and formulate linear programming problem. * Develop formulation skills in transportation models and finding solutions * Understand the basics in the field of game theory and assignment problems * Be able to know how project management techniques help in planning and scheduling a project * Be able to know the basics of dynamic programming and simulation | * Recognize the importance and value of Operations Research and linear programming in solving practical problems in industry * Interpret the transportation models' solutions and infer solutions to the real-world problems. * Recognize and solve game theory and assignment problems. * Gain knowledge of drawing project networks for quantitative analysis of projects * Know when simulation and dynamic programming can be applied in real world problems. |
| **IV** | **CE 405/A Economics And Management Accounting For Engineers** | * Engineering Economics: It provides the students with knowledge of basic economic problems and the relationship between engineering technology and economics. * Demand Theory: It alerts the students to understand the demand determinats and the methods of demand forecasting of a product. * Accounting: It guides the students about accounting concepts, proformas, and accounting for the depreciation and providing the funds for replacement of necessary and depreciated machinery and equipment. * Cost: It gives knowledge to the students about various costs for determining the manufacturing of a product. * Indian Economy: It is to sensitize the students to the changing environment of banking scenario and to understand the functions of RBI and about GATT,WTO,TRIPs etc. | * The course helps the students to understand the decision making objective of a firm. * The course helps the students to get knowledge about overall functions of Demand, Supply, Price, Income of the firms. * The course helps the students to get knowledge about how to use Accounting and Financial concepts in the changing society. * The course helps to linkage various cost concepts and to understand how to maintain break evenscenario for a business. * The course helps the students to know the overview of Liberalization, Privatization and Globalization and the impact of them on economy. |
| **IV** | **CE 405/B Advanced Surveying** | * To develop the fundamental concepts of Photogrammetry including Aerial Photographs. * To make the student to understand the various Civil engineering applications of Photogrammetry and Map Projections. * To familiarize the students in the GIS based analytical and problem solving techniques for * Sustainable planning and management of civil Engineering projects. | * Students will be Familiar with Photogrammetry by overlapping Aerial Photographs. * Understand the importance of Remote sensing and GIS application in civil engineering. * Students can layout Triangulation figures for large countries. |
| **IV** | **CE 405/C Remote Sensing And GIS** | * To develop the fundamental concepts of GIS and remote sensing including the electromagnetic Spectrum, and nature of geospatial data. * To know about satellites, types of remote sensing and digital image processing * To make the student to understand the various Civil engineering applications of remote sensing. * To familiarize the students in the GIS based analytical and problem solving techniques for Sustainable planning and management of civil Engineering projects. * To know about applications of GIS in various services. | * Demonstrate the concepts of Electro Magnetic energy, spectrum and spectral signature curves * Apply the concepts of satellite and sensor parameters and characteristics of different platforms * Compute an image visually and digitally with digital image processing techniques. * Analyze raster and vector data and modelling in GIS * Understand the importance of remote sensing and GIS application in civil engineering. |
| **IV** | **CE 405/D Environmental Impact Analysis** | * To understand material properties and performances and limits of various tests. * Introduction to the design concepts, vehicle loading criteria and to demonstrate how they are combined to design and construct road pavements. * To understand construction of various pavements like gravel, WBM, Cement concrete roads. * To emphasize on failures of rigid and flexible pavements | * Selecting the appropriate materials for use in different road layers for different types of pavements. * Perform road pavement design and analysis by various IRC and other methods. * Understand and implement various construction methodologies for various types of pavements. * For development of various maintenance principles and helps in planning of various routine maintenance programs and special repairs. |
| **IV** | **CE 406/A Prestressed Concrete** | * To introduce pre-stressed concrete and its materials * To explain the various pre-stressing techniques * To analyse a pre-stressed concrete beam * To study the losses in pre-stress * To determine the deflection of a pre-stressed concrete beams * To design pre-stressed concrete beam for bending moment and shear force * To determine bond and anchorage stresses and to design end block | * Learn the basic concept of pre-stressing of concrete and various pre-stressing systems * Able to analyse and design pre-stressed concrete beams * Able to estimate the losses in pre-stressing * Able to design pre-stressed concrete beams including the end block |
| **IV** | **CE 406/B Water Resources Systems Analysis** | * To study types of systems and systems approach to water resources planning and management. * To understand role of optimization in water resource planning, economy and management. * To study various linear programming models and their applications in water resources. * To study the concept of dynamic programming and its applications in water resources problems. * To understand various simulation techniques and to develop simulation models for various water resources problems. * To study techniques for operation and management of available water resources. | * Understand concept of systems approach to water resources planning and management. * Formulate and solve LP models various water resources optimization problems. * Develop and solve forward and backward recursive dynamic programming models. * Apply simulation techniques in water resources problems * Plan for optimal operation of a single reservoir system. * Able to develop models for allocation of water resource for optimal crop yields. |
| **IV** | **CE 406/C Urban Transportation Planning** | * Imparting knowledge and understanding of urban transportation problems in planners’ perspective, definition of the problem, setting clear goals and objectives to serve as guiding factors in the planning process, identification of the causal factors influencing the demand for urban travel and development of relationship between the factors and the travel demand. * Provides adequate exposure to travel demand forecasting and application of the results of the forecasting to identify the right type of the transportation system needed to cater to the future demand and quantify the same. * Knowledge of methodologies for planning multi-modal transportation systems, and developing feasible alternatives. Emphasis is placed on developing insight into the transportation phenomena and the planning process as well as solving specific problems of limited scope. | * Validate and source of information that comes from a sequence of travel. * Forecast models. * Knowledge of data required for transportation planning. * Able to make tradeoffs with multiple factors in project planning and design. |
| **IV** | **CE 406/D Ground Water Development And Management** | * To provide knowledge on groundwater availability and distribution in different types of rocks * To demonstrate the groundwater movement and groundwater reservoir parameters * To develop the skills needed for ground water investigation * To study the concept of artificial recharge of ground water * To introduce groundwater management concepts | * Understand the location of ground water and the relationship with the rock type. * Assess the ground water movement and reservoir parameters * Use of the different techniques of ground water investigation * Apply RS & GIS techniques for artificial recharge of groundwater. * Apply conjunctive use technique for effective management of groundwater. |
| **IV** | **CE-451 Mini Project / Term** **Paper** | * To identify an area of project work * To collect and study the literature in the identified area of project work * To arrive at a problem which can be carried out as project work * To select a method to solve the problem * To give a seminar talk | * Collect and study the literature in the identified area of project work * Arrive at problem which can be carried out as project work * Selects a method to solve the problem * Gives a seminar talk |
| **IV** | **CE 452 Quantity Surveying And Project Management Lab** | * Enhance the students to learn * Quantity estimation for different civil engineering works like single storey residential building, BT road, canal etc. * Cost estimation for different civil engineering works like single storey residential building, BT road, canal etc. * Rate analysis for different items of work * Quantity estimation and preparing schedule of bars of different items of RC works using software like MS-Excel * To prepare project management report for different civil engineering projects like residential building, BT road, canal etc using software packages like Primavera/MS Project etc | * Estimate the quantities required for different civil engineering works like single storey residential building, BT road, canal etc. * Astract of Cost for different civil engineering works like single storey residential building, BT road, canal etc. * Prepare schedule of reinforcement bars. * Scheduling a project using software packages like Primavera/MS Project etc. * Analyzing a project and finding critical activities and hence allocate resources as per the schedule. |
| **IV** | **CE 453 Cad Lab - Analysis, Design of Structures** | * To analyse the structures like beams, frames for different loading combinations of dead, live and earthquake loading using softwares. * To design the structures like beams, columns, footings and slabs using softwares. * To learn the reinforcement and other details of various reinforced concrete and steel structural elements like beams, footings, steel structures connections, welded plate girder and steel and reinforced concrete buildings. | * Analysing and designing the structures using computer softwares like STAAD Pro/STRUDS/STRAP/MSEXCEL * Analysing and designing the structures like beams, frames for different loading combinations of dead, live and earthquake loading using computer software |
| **IV** | **CE 407 Construction Technology And Management** | * Can able to plan different stages in construction project, project duration and job layout * Using PERT and CPM able to determine critical path for projects. * Optimization of project cost using cost control techniques. * Learn importance of man power, materials and machinery in construction project. * Optimization of man power; total quality management, safety measures in construction projects, utilization of Management Information System. * Learn economic terms like assets, capital, annuity, project profitability useful for planning project | * Planning for any project and its duration. * Optimization of men, material and project cost. * Know the importance of machinery and its working conditions. * Implementation of quality management, safety measures and best utilization of Management Information system. * Assessing project profitability |
| **IV** | **CE 408/A Earthquake Resistant Design Of Structures** | * To teach the basic concepts of vibration of single degree of freedom systems * To explain the elements of earthquake ground motion characteristics * To calculate the lateral forces on a building using equivalent static method * To analyse and design single storey, single bay RC framed building subjected to an earthquake * To introduce architectural features of buildings to resist earthquakes * To introduce Geo-technical earthquake engineering | * Learn the fundamentals vibration of single degree freedom systems * Learn the earthquake ground motion characteristics * Able to calculate the lateral forces on a building using equivalent static method * Can analyse and design a single storey and single bay RC framed building * Know the architectural features of buildings to resist earthquakes * Understand the behavior of soil beneath a foundation during an earthquake |
| **IV** | **CE 408/B Advanced Foundation Engineering** | * To determine bearing capacity of shallow foundations for special cases like layered soils, sloping ground, uplift etc. * To introduce settlements shallow foundations and determination of allowable bearing capacity. * To determine allowable bearing pressure of mat foundations. * To introduce design and construction of sheet pile walls, coffer dams and braced cuts. | * Equip the student with knowledge of how to determine bearing capacity of shallow foundations in special cases * Settlement analysis of shallow foundations & assessing allowable bearing capacity of shallow foundations * Design of sheet pile walls * Design of coffer dams * Design of braced cuts. |
| **IV** | **CE 408/C Disaster Management** | * To increase the knowledge and understanding capacity of the basic concepts of disaster management * To install an understanding of the disaster situations in India * To impart knowledge on problems associated with earthquakes in India. * To provide knowledge on problems associated with landslides. * To provide knowledge on problems associated with cyclones. | * Apply the basic concepts of disaster management * Analyze and manage disaster situations in India. * Distinguish problems associated with earthquakes and its effects on urban areas. * Analyze, manage and communicate information on landslide situations. * Analyze and manage cyclones in coastal areas. |
| **IV** | **CE 408/D Fibre Reinforced Concrete** | * To explain Interaction between fibres and matrix * To explain Interaction basic concepts of fibre reinforced concrete * To explain mechanical properties of fibre reinforced concrete * To explain properties of constituent materials * To explain Mixture Proportioning , Mixing and Casting procedures * To explain Properties of Hardened FRC | * Understand Interaction between fibres and matrix * Know basic concepts of fibre reinforced concrete * Learn mechanical properties of fibre reinforced concrete * Know the properties of constituent materials * Learn Mixture Proportioning , Mixing and Casting procedures * Know Properties of Hardened FRC |
| **IV** | **CE 409/A Design And Drawing Of Hydraulic Structures** | The main objective of the course is to study the theory, design and drawing of the following irrigation structures:   * Irrigation canal * Notch type canal drop * Canal regulator * Vertical drop weir on permeable foundations * Direct sluice * Surplus weir of a tank * Type III Aqueduct and * Ogee spillway profile | At the end of the course the student will be able to Design and draw the following irrigation structures with the given data:   * Irrigation canal * Notch type canal drop * Canal regulator * Vertical drop weir on permeable foundations * Direct sluice * Surplus weir of a tank * Type III Aqueduct and * Ogee spillway profile |
| **IV** | **CE 409/B Pavement Analysis And Design** | * To study about the types and components of pavements * To learn about the stresses in flexible pavements and design of flexible pavements * To learn about the stresses in rigid pavements * To study the design of rigid pavements | * Identify the pavement components and compare highway and airport pavements * Calculate and Analyze stresses in flexible and Rigid pavements * Design the flexible pavement using IRC & AASHO methods * Design rigid pavements by IRC method and evaluate the pavements |
| **IV** | **CE 409/C Advanced Environmental Engineering** | * To explain the importance of self-purification of streams and to derive Streeter- Phelps equation and to discuss the effects of various pollutants on receiving streams. * To introduce new concepts in biological treatment like nitrogen and phosphorous removal, anaerobic filters, RBC and U-tube aeration systems, their working principles and suitability. * To understand the characteristics and the treatment and disposal methods of liquid wastes produced in Dairy industry, Sugar industry and Pulp & paper industry. * To discuss sources, global effects and the effects on human health, plants and materials of air pollution. * To discuss the effects of various meteorological parameters on air pollution, and to explain various equipment for controlling particulate pollution and their suitability. * To introduce sources, effects and controlling measures of noise pollution and to discuss noise rating systems and acceptable noise levels for various zones. * To introduce various functional elements of urban solid waste management and to introduce various methods of solid waste disposal methods with special emphasis on recovery and reuse of solid waste. | * Understand the importance of self-purification and determine the critical D.O. deficit in a polluted stream and degree of treatment required. * Update his knowledge in biological treatment with new and more advanced treatment methods. * Suggest suitable methods for treatment and disposal of industrial wastewater of selected industries - Dairy industry, Sugar industry and Pulp & paper industry, based on their characteristics. * Asses global and local implications of air pollution and suggest suitable methods of control of particulate matter and design required stack height based on meteorological conditions. * Suggest suitable noise control techniques according to the situation and to calculate statistical parameters like LN and Leq. * Suggest suitable methods for collection, transport, recovery, reuse and disposal of urban solid waste. |
| **IV** | **CE 409/D Earth Retaining Structures** | * To understand lateral earth pressure theories and pressure theories and design of retaining walls. * To design anchored bulkheads by different methods. * To understand pressure envelops and design of various components in braced cuts and cofferdams. * To understand stability of earth dams and its protection and construction. | * Equip the student with knowledge of how to determine lateral earth pressure to design retaining walls * Design of sheet pile walls * Design of braced cuts. * Earth dams stability analysis * Earth dams protection and construction |
| **IV** | **CE 410/A Repair and Rehabilitation of Structures** | * To learn various distress and damages to concrete and masonry structures * To understand the importance of maintenance of structures * To study the various types and properties of repair materials * To assess the damage to structures using various tests * To learn the importance and methods of substrate preparation * To learn various repair techniques of damaged structures, corroded structures | * Various distress and damages to concrete and masonry structures * The importance of maintenance of structures, types and properties of repair materials etc * Assessing damage to structures and various repair techniques |
| **IV** | **CE 410/B Design of Tall Buildings** | * Ability to apply general considerations and wind effects of tall buildings. * Understand and distinguish between various lateral systems for steel buildings * Understand and distinguish between various lateral systems for concrete buildings * Understanding gravity systems of structural elements * To install knowledge on structural analysis techniques. | * Assess general considerations and wind effects of tall buildings. * Analyze and design various lateral systems for steel buildings * Analyze and design various lateral systems for concrete buildings * Analyze and design various gravity systems of structural elements * Implement structural analysis concepts |
| **IV** | **CE 410/C Green Buildings** | * Describe green building and the role of USGBC and LEED * Recognize the intents of each LEED credit category * Explain key sustainability terms and concepts * Identify green building best practices * Recognize cutting-edge examples * Discuss cost considerations of green building | * Describe the green building & sustainable design concepts. * Comprehend properties of green building construction materials and their qualitative input to design. * Begin to formulate a personal attitude toward green building design. * Describe the requirements for LEED |
| **IV** | **CE 410/D Ground Improvement Techniques** | * To introduce engineering properties of soft, weak and compressible deposits, principles of treatment for granular and cohesive soils and various stabilization techniques. * To bring out concepts of reinforced earth. * Applications of geotextiles in various civil engineering projects. | * Will gain competence in properly devising alternative solutions to difficult and earth construction problems and in evaluating their effectiveness before, during and after construction. * A study of the many different approaches to the ground modification by Mechanical modification like Dynamic compaction, deep compaction,hydromechanical compaction etc. * Hydraulic modification like dewatering methods, use of geosynthetics,preloading techniques etc. * Physical and chemical modification by use of cement,lime,emulsions,industrial wastes etc. * Modification by inclusions like metallic strips and geotextiles and In-situ Ground reinforcement by ground anchors, rock bolts and soil nailing. |
| **IV** | **CE 454 Computer Aided Detailing Of Structures Lab** | * To understand the various code requirements and provisions for reinforcement detailing * To draw the reinforcement and other details of various structural elements like beam, slab, footing, retaining wall etc using computer software packages like Auto CAD,RIVET etc. | * Reinforcement and other details of various structural elements like beam, slab, footing, retaining wall etc. Presenting various structural elements details for the purpose of field execution as per code requirements. * 2 Drawing each and every details of various structural elements using computer software packages |
| **IV** | **CE-455 Project and Viva - Voce** | * To carry out Project Work identified in the Term Paper * To use appropriate method, viz. theoretical, experimental, use of software package etc. * To analyse the results and arrive at conclusions * To design the problem if it involves design | * Project work will be carried out * Appropriate method will be used * Results will be analyzed and conclusions will be made * The problem will be designed if it involves design |