B. TECH – CIVILENGINEERING

Department Vision

To Lead Academics and Research in Civil Engineering Globally.

Department Mission

- To provide high quality education and make the students as ethical, world class professionals.
- To improve the skills of both staff and students with opportunities to innovate and explore knowledge through research projects and consultancy.
- To inculcate the feeling of present needs in students and evoke in them a responsibility to serve the society better.

Program Educational Objectives (PEOs):

PEO1	Graduate will be able to succeed in diversified fields of industry/higher studies by acquiring technical knowledge and contribute to the sustainable development of infrastructure.
PEO2	Graduate will be able to exhibit professionalism and ethics and show ability to accept modern trends by engaging in lifelong learning.
PEO3	Graduate will be able to apply innovative ideas and succeed as a researcher/entrepreneur to serve societal needs.

Program Specific Outcomes (PSO's):

PSO1:	Develop critical aptitude skills and become professional to address any problem of the society.
PSO2:	Acquire practical knowledge by field visits and function effectively with the training of software by means of curriculum.
PSO3:	Effectively communicate with the stakeholders and execute engineering projects with high proficiency.

Program Outcomes(POs):

Engineering Graduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problemanalysis:**Identify,formulate,reviewresearchliterature,andanalyzecomplex engineering problems reaching substantiated conclusions using first principlesofmathematics,naturalsciences,andengineeringsciences.
3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems:** Use research-based knowledgeandresearchmethodsincludingdesignofexperiments,analysisand interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustain able development.
8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:** Demonstrate knowledge and understandingoftheengineeringandmanagementprinciplesandapplythese to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course

Course Code: B20HS1101	
Course Title: ENGLISH	
CO-1	Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.
CO-2	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information.
CO-3	Build confidence and adapt themselves to the social and public discourses, discussions and presentations.
CO-4	Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication.
CO-5	Construct sentences using proper grammatical structures and correct word forms.
Course Code: B20BS1101	
Course Title: MATHEMATICS – I	
CO-1	Solve a given system of linear algebraic equations
CO-2	Determine Eigen values and Eigen vectors of a system represented by a matrix.
CO-3	Solve ordinary differential equations of first order and first degree.
CO-4	Apply the knowledge in simple applications such as Newton‘s law of cooling, orthogonal trajectories and simple electrical circuits
CO-5	Solve linear ordinary differential equations of second order and higher order.
CO-6	Determine Laplace transform, inverse Laplace transform and solve linear ODE
Course Code: B20BS1102	
Course Title: APPLIED PHYSICS	
CO-1	**Interpret** the behavior of light radiation in interference and diffraction Phenomena and their applications.
CO-2	**Explain** the classification and properties of dielectric and magnetic materials suitable for engineering applications.
CO-3	**Understand** the basics of modern optical technologies like lasers and optical fibers and their utility in various fields.
CO-4	**Explain** the important aspects of semiconductors and electrical conductivity in them.
CO-5	**Understand** the basics of technology of Ultrasonics in various fields and demonstrate the synthesis and applications of nanomaterials.
Course Code: B20ME1101	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to Construct polygons and engineering curves.
CO-2	Apply principles of Orthographic projections to draw the projections of points and lines.
CO-3	Apply principles of drawing to draw the projections of planes.
CO-4	Apply principles of drawing to draw projections of solids and their sectional views.
CO-5	Apply principles of drawing to draw developments and pictorial view of solids.
Course Code: B20CE1101	

Course Title: ENGINEERING GEOLOGY	
CO-1	Understand the basic knowledge on the most central part of engineering geology
CO-2	Develop an appreciation of geologic processes and their influence in civil engineering works.
CO-3	Demonstrate the engineering properties of rock and soil materials.
CO-4	Apply basic knowledge of engineering geology and the importance of engineering geology related to technical issues during construction.
CO-5	Analyze the relevance of engineering geology in complex projects in and on solid rock.
Course Code: B20CE1102	
Course Title: ENGINEERING GEOLOGY LAB	
CO-1	Elucidate the mega-scopic identification of minerals
CO-2	Categorize the rocks according to mega-scopic description
CO-3	Interpret geological knowledge in various sectors
CO-4	Know the occurrence of materials using the strike & dip problems.
Course Code: B20BS1107	
Course Title: APPLIED PHYSICS LAB	
CO-1	Get hands on experience in setting up experiments and using the instruments / equipment individually.
CO-2	Get introduced to using new / advanced technologies and understand their significance.
Course Code: B20CE1103	
Course Title: BASICS OF CIVIL ENGINEERING WORK SHOP	
CO-1	Identify various components of a building and give lump-sum estimate
CO-2	Determine distances and irregular areas using conventional survey instruments like chain, tape and cross-staff.
CO-3	Identify different soils
CO-4	Determine centre of gravity and moment of inertia of channel and I-sections
CO-5	Prepare a single room building plan as per the building byelaws
CO-6	Select simple sanitary fitting
CO-7	Illustrate the process of making cement mortar / concrete for nominal mix

Course Outcomes for First Year Second Semester Course	
Course Code: B20BS1201	
Course Title: MATHEMATICS – II	
CO-1	Determine Fourier series and half range series of functions
CO-2	Determine Fourier transforms of non-periodic functions and also use them to evaluate integrals.
CO-3	Compute partial derivatives, total derivative and Jacobians.
CO-4	Find maxima/minima of functions of two variables and evaluate some real definite integrals.
CO-5	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.
CO-6	Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation
Course Code: B20BS1203	
Course Title: APPLIED CHEMISTRY	
CO-1	Develop polymer composites, synthetic polymers and formulation of polymers and their use in design
CO-2	Apply the knowledge about quality of water and its treatment methods for domesticand industrial applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control.
CO-3	Develop the knowledge of fuels and their economics, advantages and limitations.Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.
CO-4	Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to designenergy storage
Course Code: B20CS1201	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C	
CO-1	Apply Precedence and Associativity rules to evaluate Expressions.
CO-2	Make use of Decision Making and Looping statements to solve various problems in C
CO-3	Illustrate the importance of Arrays and Strings and to apply various operations on them.
CO-4	Solve various problems by making use of Structure and Union concepts

CO-5	Design and implement programs to analyze the different pointer applications
CO-6	Develop programs using Functions and Pointers.
Course Code: B20CE1201	
Course Title: ENGINEERING MECHANICS	
CO-1	Apply laws of mechanics for various force conditions and properties of bodies
CO-2	Calculate Centroid and moment of inertia of plane figures
CO-3	Apply laws of mechanics for general case of forces in plane
CO-4	Apply laws of kinematics and kinetics to particles
CO-5	Apply laws of kinematics and kinetics to rigid bodies
Course Code: B20CE1202	
Course Title: BUILDING MATERIALS AND CONCRETE TECHNOLOGY	
CO-1	Identify various engineering properties of building construction materials and suggest their suitability
CO-2	Describe the functional role of various ingredients of concrete
CO-3	Use the workability and durability requirements of fresh concrete to design the concrete mix as per IS code
CO-4	Use the fundamental knowledge to know and test the hardened properties of concrete
Course Code: B20BS1208	
Course Title: APPLIED CHEMISTRY LAB	
CO-1	Gain technical knowledge of measuring, operating and testing of chemical instrumentsand equipments. Carrying out different types of chemical reactions for analyzing different materials in micro level quantities.
CO-2	Analyze and generate experimental skills to enhance the analytical thinking capabilities in the modern trends in engineering and technology.
Course Code: B20HS1202	
Course Title: COMMUNICATION SKILLS LAB	
CO-1	Apply their linguistic competence in all LSRW skills to professional and personalsettings.
CO-2	Apply communication skills learnt through various language learning activities to their advancement in academics and competitive examinations.
CO-3	Draft job application letters, E-Mail messages and other writing discourses.
CO-4	Adopt professional etiquette consistent with formal settings.
CO-5	Improve fluency and clarity in both spoken and written English.
Course Code: B20CS1205	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	
CO-1	Write, Trace and Debug the programs and correct syntax and logical errors.
CO-2	Solve various Problems by making use of Arrays, Strings, Structures, Unions andPointers
CO-3	Solve a complex problem by decomposing into several modules by using Functions

CO-4	Apply various File I/O operations
Course Code: B20MC1201	
Course Title: ENVIRONMENTAL SCIENCE	
CO-1	Bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Constitutional provisions for the protection of natural resources
CO-5	Green technologies and its applications

Course Name: **STRENGTH OF MATERIALS**	Course code: **B20CE2101**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Summarize the behavior of basic materials under the influence of different external loading conditions and support conditions.	
CO-2	Determine shear Force and Bending moments in statically determinate Beams and draw the Diagrams.	
CO-3	Calculate the bending stresses & shear stresses in structural Members.	
CO-4	Determine the Principal Stresses & strains under different loadings and also examine the basic methods to find slope and deflection of beams subjected to different Loads.	
CO-5	Determine the crippling load for columns with different end conditions.	

Course Name: **ENVIRONMENTAL ENGINEERING**	Course code: **B20CE2102**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Select a source based on quality and quantity and Estimate design population and water demand	
CO-2	Apply the principles of water treatment methods and design unit operations	
CO-3	Explain the collection, conveyance and distribution aspects of water	
CO-4	Explain sewerage, house plumbing, preliminary and primary treatment concepts	

	of wastewater
CO-5	Make use of sewage treatment methods and design secondary treatment unit operations

Course Name: **FLUID MECHANICS**	Course code: **B20CE2103**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Determine the physical properties of fluids and different types of forces acting on a fluid element extended to forces on various gates.	
CO-2	Determine the forces that are acting on immersed bodies in static fluids through Application of buoyancy and floatation	
CO-3	Apply conservation principles of mass, momentum and energy on fluids using Control volume approaches.	
CO-4	Calculate the force exerted by the fluid on bends, nozzles using impulse momentum principle	
CO-5	Determine the shear stress, Velocity, loss of head in Laminar flow through circular Pipes and Turbulent flow for rough and smooth pipes	

Course Name: **SURVEYING**	Course code: **B20CE2104**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Measure distances and angles using instruments	
CO-2	Measure levels and plotting of levels in tables, Interpret survey data and compute areas and volumes	
CO-3	Understand the working principles of Theodolite, measurement of horizontal and vertical angles using Theodolite	
CO-4	Calculate distance between points indirectly by using Theodolite (Tacheometric Surveying) and also learns plotting of simple curves	
CO-5	Use modern surveying techniques and instruments	

Course Name: **STRENGTH OF MATERIALS LAB**	Course code: **B20CE2105**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Conduct test and find Physical properties of steel and wood	
CO-2	Design the specimens for assessing particular property of the materials with Available machines	

CO-3	Decide the range of machine and set the machine accordingly by suitable modifications
CO-4	Design experiments making use of various techniques of load measuring or deformation measuring instruments

Course Name: **SURVEYING FIELD WORK**	Course code: **B20CE2106**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Apply the linear measurement in simple Boundary Surveys.	
CO-2	Identify direction of any line using compass survey	
CO-3	Relate the importance of Theodolite in Surveying	
CO-4	Apply Concepts of Tachometry in Surveying	
CO-5	Use the Total Station in Surveying	

Course Name: **COMPUTER AIDED DRAWING**	Course code: **B20CE2107**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Perform basic sketching techniques will improve.	
CO-2	Use architectural and engineering scales	
CO-3	Produce engineered drawings will improve.	
CO-4	Convert sketches to engineered drawings	
CO-5	Familiar with office practice and standards.	
CO-6	Familiar with Auto CAD two dimensional drawings.	
CO-7	Develop good communication skills and team work.	

Course Name: **COMPUTER FUNDAMENTALS AND MS – OFFICE**	Course code: **B20CE2108**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Know the fundamentals of computer hardware and software	
CO-2	Apply the MS Word for practical applications	
CO-3	Apply the MS Excel for practical applications	

CO-4	Apply the MS Power point for practical applications

Course Name: **PROFESSIONAL ETHICS AND HUMAN VALUES**	Course code: **B20MC2102**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.	
CO-2	Identify the multiple ethical interests at stake in a real-world situation or practice.	
CO-3	Articulate what makes a particular course of action ethically defensible.	
CO-4	Assess their own ethical values and the social context of problems.	
CO-5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects.	
CO-6	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.	
CO-7	Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.	

Course Name: **COMPLEX VARIABLES AND STATISTICAL METHODS**	Course code: **B20BS2204**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics	
CO-2	Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals.	
CO-3	Formulate and solve linear difference equations.	
CO-4	Use Z-transforms to solve linear difference equations with constant coefficients.	
CO-5	Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution.	
CO-6	Decide the test applicable and apply it for giving inference about Population	

	Parameter based on sample statistic for some large samples and small samples.

Course Name: **HIGHWAY ENGINEERING**	Course code: **B20CE2201**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Plan the alignment of highway network for the given area.	
CO-2	Design the highway geometrical elements.	
CO-3	Design intersections and prepare traffic management plans.	
CO-4	Identify the suitability of pavement materials and design flexible & rigid pavements.	
CO-5	Understand the principles of construction and maintenance of highways.	

Course Name: **STRUCTURAL ANALYSIS**	Course code: **B20CE2202**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Determine deflections indeterminate beams ,frames & trusses by different methods and apply strain energy concept	
CO-2	Analyze statically indeterminate beams by method of consistent deformation	
CO-3	Analyze Statically indeterminate continuous beams by theorem of three moments and rigid frames by force method	
CO-4	Analyze Statically indeterminate continuous beams and rigid frames by slope deflection method.	
CO-5	Determine reactions, BM&SF in beams subjected to moving loads using ILD	

Course Name: **HYDRAULICS AND HYDRAULIC MACHINERY**	Course code: **B20CE2203**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Apply the principles of dimensional homogeneity and Similarity laws for irrigation structures and fluid Machinery.	
CO-2	Determine the Drag and Lift force for fully submerged bodies.	
CO-3	Use momentum and energy principles for design of turbines	
CO-4	Use momentum and energy principles for design of pumps	

CO-5	Determine the discharge of most economical channel section for uniform flow in open Channels and Specific Energy, Critical flow, critical depth and critical velocity.

Course Name: **DESIGN OF REINFORCED CONCRETE STRUCTURES**	Course code: **B20CE2204**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Understand the various design methodologies for the design of RC elements. Analyze and design the flexural members.	
CO-2	Design the reinforced concrete beams subjected to shear only and also combined action of shear and torsion.	
CO-3	Distinguish between the behavior of one way and two way actions in slab and familiarize to design of two way slabs whose corners restrained and not restrained from lifting up	
CO-4	Design compression members.	
CO-5	Design stair case and footing.	

Course Name: **GEOGRAPHIC INFORMATION SYSTEMS LABORATORY**	Course code: **B20CE2205**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Choose the datum and projection systems that suits the data	
CO-2	Handle the raw data	
CO-3	Create thematic layer by using on-screen digitization techniques and attaching attribute data	
CO-4	Visualize and Interpret digital elevation model	

Course Name: **ENVIRONMENTAL ENGINEERING LAB**	Course code: **B20CE2206**	Course Year: **Second year**
Items	Academic Year : **2021-22**	

CO-1	Determine physical properties of water
CO-2	Determine hardness, acidity and alkalinity of water
CO-3	Estimate chloride, available chlorine, BOD and COD
CO-4	Estimate solids present in water sample

Course Name: **FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**	Course code: **B20CE2207**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Illustrate Flow Measuring Devices used in pipes, channels and Tanks	
CO-2	Analyze characteristics of broad crested notch	
CO-3	Determine the coefficient of impact on a flat plate and curved vane by comparing the theoretical and actual forces by impact.	
CO-4	Analyze the working of the reciprocating pump and centrifugal pump and develop the characteristics of power input, head and efficiency under various discharges And plot the characteristic curves.	
CO-5	Determine the performance characteristics of pelton wheel turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed	
CO-6	Determine the performance characteristics of Francis turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed	

Course Name: **ADVANCED SURVEYING LAB**	Course code: **B20CE2208**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Fully equipped with various surveying concepts and methods using advanced ground survey equipment's.	
CO-2	Carry out profiling and grid levelling, for generation of profiles, contour maps, and earth works computations.	
CO-3	Handle the Satellite images and interpret the satellite data.	
CO-4	The interpret data can be used to prepare plan for urban development/town planning.	
CO-5	Prepare the candidates with National Global employability.	

Course Name: **ENGLISH PROFICIENCY**	Course code: **B20MC2201**	Course Year: **Second year**
Items	Academic Year : **2021-22**	
CO-1	Improve speaking skills.	
CO-2	Enhance their listening capabilities	
CO-3	Learn and practice the skills of composition writing.	
CO-4	Enhance their reading and understanding of different texts.	
CO-5	Improve their communication both in formal and informal contexts.	
CO-6	Be confident in presentation skills.	

Course Name: **MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY**	Course code: **B20HS3101**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	To Study Managerial Economics and Demand Analysis	
CO-2	To familiarize about the Concepts of Cost and Break-Even Analysis.	
CO-3	To understand the nature of markets and to know the Pricing Policies	
CO-4	To learn about accounting cycle and preparation of Financial Statements.	
CO-5	To know the concept of Capital and sources of raising and Depreciation	

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Course Name: **DESIGN OF STEEL STRUCTURES**	Course code: **B20CE3101**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Design bolted connections.	
CO-2	Design Welded Connections.	
CO-3	Design Tension Members.	
CO-4	Design the Compression Members.	

CO-5	Design the Beams

Course Name: **SOIL MECHANICS**	Course code: **B20CE3102**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Know the fundamental relationships between different parameters of soil mass and classify different types of soils along with identifying their properties	
CO-2	Estimate Effective stresses and permeability of soils	
CO-3	Estimate stress distribution in soil for different Load conditions	
CO-4	Appreciate the processes of compaction and consolidation and apply them to field Problems	
CO-5	Identify shear strength parameters for different conditions	

Course Name: **DESIGN OF STEEL STRUCTURES**	Course code: **B19CE3201**	Course Year: **Third year**
Items	Academic Year : **2021-22**	
CO-1	Determine the number of bolts, pitch, gauge and strength of the joint by bolted connections.	
CO-2	Determine the size of weld, length of weld, and strength of the joint by welded connections.	
CO-3	Select suitable section as a tension member and determine the number of bolts, strength of the tension member.	
CO-4	Select suitable section as a compression member and determine the strength of the axially loaded compression members as built up compression column with lateral supporting system.	
CO-5	Select suitable rolled steel section as a flexural member and determine the flexural and shear strength and check the safety of the beam.	

Course Name: **ADVANCED STRUCTURAL ANALYSIS**	Course code: **B20CE3103**	Course Year: **Third year**
Items	Academic Year : **2022-23**	

CO-1	Analyze the axial forces in the statically indeterminate trusses by Force method and Energy Method.
CO-2	Analyze the member end moments and shears due to applied loads and yielding ofsupports for continuous beams and statically indeterminate rigid frames by Moment distribution method.
CO-3	Analyze the member end moments and shears due to applied loads and yielding ofsupports for continuous beams and statically indeterminate rigid frames by Kani's Method.
CO-4	analyze the horizontal thrust and the vertical reactions at the supports, the orthogonalcomponents axial thrust and radial shear and the resultant force at any point for three hinged and two hinged arches.
CO-5	Analyze the shape of the cable, horizontal component of the axial tension in the cableand length of the cable. To determine the shear force and bending moment for three hinged and two hinged stiffening girder.

Course Name: **REMOTE SENSING AND GIS APPLICATIONS**	Course code: **B20CE3104**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Relate the scientific theories to the interaction of electromagnetic spectrum with terrestrial matter.	
CO-2	Identify different types of satellites, sensor platforms and choose appropriate remote sensing data products for mapping, monitoring, and management applications.	
CO-3	Interpret processed satellite images and outputs for extracting relevant information	
CO-4	Structure the concept of a spatial decision support system in its analog and digital forms.	
CO-5	Explain the applications of Geo informatics in various fields of human Endeavour	

Course Name: **ENVIRONMENTAL**	Course code: **B20CE3105**	Course Year: **Third year**

IMPACT ASSESSMENT		
Items	Academic Year : **2022-23**	
CO-1	Explain the importance of environmental clearance in regulating pollution	
CO-2	Relate the various steps in EIA process to the construction and operation of projects	
CO-3	Discuss the methods and methodologies appropriate for various project types	
CO-4	Identify appropriate models for assessment of attributes	
CO-5	Interpret the environmental clearances given by MOEFCC based on case studies.	

Course Name: **PAVEMENT MATERIALS**	Course code: **B20CE3106**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Characterize sub grade soil.	
CO-2	Characterize road aggregates.	
CO-3	Characterize paving grade bitumen.	
CO-4	Design bitumen mixes.	
CO-5	Characterize cement used in road construction.	

Course Name: **GROUND IMPROVEMENT TECHNIQUES**	Course code: **B19CE3106**	Course Year: **Third year**
Items	Academic Year : **2021-22**	
CO-1	Apply in-situdensification methods for improving cohesive and cohesion less Soil Deposits	
CO-2	Apply grouting technique For improving soils	
CO-3	Understand the purpose of geo textile and geo grid	
CO-4	Apply the concepts of reinforced soil to various structures	
CO-5	Understand various soil stabilization techniques	

Course Name: **HIGHWAY MATERIALS TESTING LAB**	Course code: **B20CE3107**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Characterize the highway aggregates.
CO-2	Evaluate the quality of Bitumen

Course Name: **COMPUTER APPLICATIONS IN CIVIL ENGINEERING (CACE) LAB**	Course code: **B20CE3108**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Develop a program which are necessary to classify and evaluate the values
CO-2	Develop an excel sheet for the design of structural elements.
CO-3	Model and analyze the beams and plane frames using STAAD

Course Name **DESIGN OF SPECIAL STRUCTURES**	Course code: **B20CE3109**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Design concrete Slab culvert, Grid Slab and Water Tanks
CO-2	Design Steel Girders, Grillage Foundation and Roof trusses

Course Name **EMPLOYABILITY SKILLS Part-A: Verbal Ability**	Course code: **B20MC3101**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/company specific tests and frame grammatically Correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary-based Exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, Syllogisms, and other reasoning-based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	

Course Name: **EMPLOYABILITY SKILLS PART B :Quantitative Aptitude -I**	Course code: **B20MC3101**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts
CO-2	The students will be able to solve problems on time and distance and units related solutions
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during thecourse as they are very important for any person to be placed in the Industry
CO-5	The students will earn to apply Logical thinking to the problems of Syllogisms and be able to effectively attempt competitive examinationslike CAT, GRE, GATE for further studies

Course Name: **WATER RESOURCES ENGINEERING**	Course code: **B20CE3201**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Choose major hydrologic components & apply key concepts to several practical areas of engineering hydrology & related design aspects.
CO-2	Calculate aquifer parameters & yield of wells.
CO-3	Carry out surface and Subsurface investigation to locate ground water
CO-4	Calculate storage capacity & life of reservoirs.
CO-5	Assess the irrigation needs of crops.

Course Name: **FOUNDATION ENGINEERING**	Course code: **B20CE3202**	Course Year: **Third year**

Items	Academic Year : **2022-23**
CO-1	Plan a detailed soil exploration programme

CO-2	Apply various methods for estimating bearing capacity of different types of foundations.
CO-3	Estimate load capacity of single piles and groups of piles and know the theory aspects of well foundations
CO-4	Determine the stability of finite and infinite slopes.
CO-5	Calculate earth pressures on retaining walls using Rankine's and Coulomb's theories

Course Name: **UNIVERSAL HUMAN VALUES-2 : UNDERSTANDING HARMONY**	Course code: **B20HS3202**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)	
CO-2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.	
CO-3	They would have better critical ability.	
CO-4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).	
CO-5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.	

Course Name: **ADVANCED STEEL STRUCTURES**	Course code: **B20CE3203**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Determine the size and thickness of the slab base, gusset base and eccentric connections. Design of beam-column connections subjected to eccentric shear connections.	
CO-2	Design components of a plate girder with and without stiffeners by using IS: 800-2007 code	
CO-3	Design of circular water tank in working stress method.	
CO-4	Design of deck type Plate girder bridges	

CO-5	Design of end bearings

Course Name: **URBAN HYDROLOGY**	Course code: **B20CE3205**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Appreciate the impact of urbanization on catchment hydrology	
CO-2	Understand the importance of short duration rainfall runoff data for urban hydrology studies.	
CO-3	Learn the techniques for peak flow estimation for storm water drainage system design.	
CO-4	Understand the concepts in design of various components of urban drainage systems	
CO-5	Understand the concepts in design of various components of urban drainage systems	

Course Name: **GEOSYNTHETICS AND ITS APPLICATIONS**	Course code: **B20CE3206**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Identify the type of Geosynthetics and their relevance in geotechnical field	
CO-2	Select suitable material for manufacturing of various types of Geosynthetics	
CO-3	Utilize the properties of Geosynthetics effectively in designing sustainable solutions	
CO-4	Select the type of Geosynthetics based on their function for its effective utilization	
CO-5	Apply Geosynthetics in various civil engineering applications for safer and economical constructions.	

Course Name: **SOIL MECHANICS LAB**	Course code: **B20CE3207**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Identify the physical properties of soil and classify various types of soil.	
CO-2	Determine the permeability of soil	
CO-3	Determine compaction characteristics of soils and Estimate in-situ density of soil	

CO-4	Determine the shear strength parameters of soils by various methods
CO-5	Estimate the California Bearing Ratio (CBR)of a soil
CO-6	Determine the relative density of a coarse-grained soil

Course Name: **CONCRETE TECHNOLOGY LAB**	Course code: **B20CE3208**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Conduct test and find Physical properties of cement, fine aggregates and coarse aggregates	
CO-2	Determine the values of physical properties and recommend their suitability for concrete production	
CO-3	Understand and determine workability of concrete by slump, compaction factor, flow table and Vee – Bee tests.	
CO-4	Evaluate hardened properties of concrete like compressive strength, split tensile strength and flexural strength	

Course Name: **BUILDING PLANNING AND DRAWING LAB**	Course code: **B20CE3209**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Draw the load bearing walls including details of the doors and windows	
CO-2	Draw the two storied building including all MEP, Joinery and rebar details.	
CO-3	Draw the detailed floor plans and elevation for a building	
CO-4	Draw the reinforcement details of typical Beams, columns, slabs and footings	
CO-5	Draw the detailing of Trusses	
CO-6	Draw the perspective view of one and two storey buildings	

Course Name: **SOFT SKILLS**	Course code: **B20HS3203**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Apply soft skills in the work place and build better personal and professional	

	relationships making informed decisions.
CO-2	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.

Course Name: **GENDER SENSITIZATION**	Course code: **B20HS3204**	Course Year: **Third year**
Items	Academic Year : **2022-23**	
CO-1	Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics	
CO-2	Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals.	
CO-3	Formulate and solve linear difference equations.	
CO-4	Use Z-transforms to solve linear difference equations with constant coefficients.	
CO-5	Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution.	
CO-6	Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples.	