PO (PROGRAM OUTCOMES)

POs for B.E. in Civil Engineering

1. PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, and engineering & technology fundamentals, applying to the engineering specialization. To create new products and processes applying engineering knowledge.

PO 2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. Identifying symptoms of the problem, the overriding problem establishing the root causes and effects related to that problem, are identified and subsequently addressed in the project design. Learner must be able to identify problems, analysing them- root & cause effect, data and information gathering, generating ideas towards solution, evaluating the ideas for feasibility, understand all stakeholders and users' needs, scope of problem, solution boundary and constraints imposed to achieve solution with countermeasure plan.

PO 3: Design and 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. Possess exceptional design abilities to come up with new solutions and create highly effective products. Design abilities include creating technical drawings, product plans, protocols and guidelines.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. Series of observations and informed decisions used to find and implement a solution to the problem. Beyond finding and implementing a chosen most optimal solution. Complex problem solving also involves considering future changes to circumstance, resources and capabilities that may affect the trajectory of the product or process and success of the solution, considering the impact of the solution on the surrounding environment and individuals. It includes the method of measuring solution success.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. Also ICT tools knowledge to enable engineers to enhance their design and simulation capabilities, with more efficient and accurate planning and analysis. To facilitate platforms

for sharing and accessing project data and information, to automate leading to increased productivity, cost savings, and improved decision-making.

PO 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. Engineers need to understand in the context of their role in society, and engineer must be understood in the context of work done within society.

PO 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 sustainable development. Promote saving energy, use of sustainable items among learners, making learners aware about reduce, reuse, recycle.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. To recognize ethical and professional responsibilities in engineering states & situations to make informed judgments, leading to engineering solutions in global, economic, environmental, and societal contexts.

PO 9: Individual and team work: To transform a group into an effective, cohesive and collaborative unit. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. Enable learns to understand the stages of team development- Forming stage, Storming stage, Norming stage, Performing stage, and Adjourning stage. To setteam norms set a standard for behaviour, attitude, and performance that all the learning group team members are expected to follow.

PO 10: Soft skills & Communication: Able to communicate with others. 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. To communicate effectively with a range of audiences. Other soft skills that include Empathy, Adaptability, Creative thinking, Dependability, Critical Thinking, Creative thinking, Conflict resolution, Negotiation, Time management must be practised.

PO 11: Project development, management and finance: Demonstrate knowledge and understanding of the engineering development and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. To impart the

development of the product or process as well as controlling the parameters like planning, human resource, budget, scope, risk, quality and schedule or time period from managerial perspective also. Promote industry academia project development that involves collaboration between industry and academia to undertake engineering development projects that aim to address real-world challenges and create innovative solutions for the society, making learner industry and job fit.

PO 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. To incubate the culture of lifelong learning that is, self-initiated education focused on personal development. As natural learners to inculcate natural drive to explore natural curiosity, learn and grow and encourage us improve quality of life and sense of self-worth by paying attention to the contemporary ideas and goals. Encourage learners to self-learn giving rise to Renewed self-motivation, Recognition of personal interests and goals, Improvement in other personal and professional skills, Improved self-confidence, Stronger soft skills, Better cognitive health, Confidence, Networking opportunities.

PO 13: Industry and corporate skills: To align the curriculum to the job market. A graduate must be able to capable of performing as an engineer in the field of the company for which you are applying. Student must have skills that are most relevant to contemporary engineering industry domain. The student must be skilled to abridge the industry academia gap while studying. To develop proper corporate working environment in education. Curriculum must be aligned as per the industry standards, To facilitate industrial exposure to faculties. To fulfil skill gap or performance gap or employability gap.Pursue academia and Industry to form strong relationships with one another and serve the needs of society at large.

PO 14: Entrepreneurship & Startupreneurship: Practiceprocess of planning, starting and operating a business venture. Making learners to get educated from the knowledge & skills perspectives, awareness and culture for entrepreneurship. This includes - training & education, business mentoring & coaching, financing (debt or equity), networking initiatives, framework conditions and policies. Inculcate startupreneurship to create and launch innovative products or services, Building a sustainable business model for long-term success.

Semester - I

Course Code/ Name	Course Outcomes
MA110T Mathematics – I	• Understand the fundamentals of the mathematics to apply while designing technology and creating innovations • Compute limits and derivatives of functions of two and three variables, develops skill of higher derivative, expansion of functions in ascending power of variable & value of the function in neighborhood of some points. • Analyze multidimensional functions to find derivatives, tangent lines to level curves, and to solve optimization problems using extreme value of a given function related to engineering application • Find integrals, arc length, double and triple integrals for finding area, volume, centre of mass and various other engineering applications • Compute and simplify expressions involving beta and gamma function. Apply the beta and gamma functions to solve problems in calculus. • Develops the ability to understand basics of geometry, find radius of curvature & torsion of given curve which is helpful to trace the curve for a given equation of a curve & its nature.
CY110T Chemistry	• Analyze molecular structures and bonding theories using the VSEPR model, Valence-Bond Theory, and Molecular Orbital Theory • Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life. • Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs. • Understand the principles of electrochemistry, including the Arrhenius theory, transport numbers, and solubility products, and apply them to redox reactions and electrochemical cells. • Equipped with basic knowledge of polymer reinforced composites, applications of semiconductor photochemistry in energy harnessing and optical sensors. • Understand the fundamental concepts of thermo chemistry, including the first law of thermodynamics, work, heat, energy, and enthalpies, and their applications.
CY110P Chemistry	• Enhance the thinking capabilities in the modern trends in Engineering & Technology. • Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification. • Employ the basic techniques used in chemistry laboratory for analyzes such as volumetric titrations, conductometric, and Pensky-Martens apparatus. • Learn about the experiments related to water analysis, including

	hardness determination, alkalinity and relevant chemical experiments.
HU110T English	• Identify and differentiate between the various parts of speech, including nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, and interjections. • Use verb tenses (present, past, future, perfect, progressive, etc.) correctly and consistently. • Convert direct speech (quoting) to indirect speech (reported speech) and vice versa. • Demonstrate the ability to understand and analyze a variety of written texts, including literature, non-fiction, and academic articles. • Develop effective writing skills by composing coherent and well-structured essays, reports, and other written assignments. • Understand and use advanced vocabulary in context.
HU110P English	• Expand and enrich vocabulary through reading and writing. • Deliver oral presentations with clarity and confidence. • Engage in effective verbal communication in both formal and informal settings. • Participate in class discussions, debates, and group activities. • Demonstrate effective listening skills when engaging in discussions and presentations.
CE110T Engineering Mechanics	• Apply the fundamental laws of statics to analyze and solve problems related to the equilibrium of forces. • Apply the principles of resolution and composition of forces to solve practical engineering problems. • Create free body diagrams to represent and analyze forces acting on objects. • Determine resultant and equilibrant forces using various laws and theorems. • Analyze equilibrium in bodies subjected to two, three, or more than three forces. • Analyze coplanar non-concurrent forces and their effects.
CE110P Engineering Mechanics	• Creates free body diagrams and solve real world engineering problems. • Measure and analyze moments of forces in actual systems. • Determine support reactions for real-world structures. • Apply practical truss analysis techniques to real structures. • Measure area moment of inertia for various shapes and objects.

ME111T Engineering Graphics	• Learn more about the essential engineering drawing tools. This will give student basic knowledge of technical drawings professions and means of communications to others. • Learning the necessary drawing skills, which are necessary for engineers, such as lines, angles, and shapes. • Recognize the fundamentals of utilizing dimensions in engineering drawings and clarify the concepts of projection and sectioning. • Become familiar with the various drawing tools, technical requirements, and assembly techniques for geometric shapes. Student will be able to sketch realistic drawings and three-dimensional objects on paper as a result. • Recognize how the body's surface develops, identify intersections, and learn the essential concept from assembly and detail drawings.
ME111P Engineering Graphics	• Developing basic drawing skills, which are necessary for engineers, such as lines, angles, and shapes. • Develop student's imagination and ability to represent the shape size and specifications of physical objects. • Use the details to identify engineering objects. • Understand the specifics of orthographic and isometric 3D projections. • Developing the ability to sketch forms, lines, angels, and other things is important for engineers.
ML110P Environmental Sciences*	• Develop critical thinking skills in relation to environmental affairs • Acquire knowledge about natural resources and their effective management • Expand awareness of self in a global society and effectively engage diverse perspectives, values, and cultures, ranging from local to global, in dealing with environmental and social issues • Interpret and propose solutions to various environmental pollution • Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives • Analyze the major environmental laws in India, including the Water act, the Air act, the Environmental protection act, and their enforcement.
CE111P Introduction to Civil Engineering*	• Student will understand about types of infrastructures their effect on economy , environment and their emerging trends like PPP models. • Knowledge of stages in the life of construction. • Knowledge of types of roads and bridges. • Able to understand properties and classification of common building materials. • Student will study about IRC, NHAI, ASCE and new technologies in civil engineering.

HU111P Communication*	• Develop how to write book review. • Develop clear and concise written communication skills for various purposes such as emails, reports, and essays. • Express ideas and information clearly and confidently through spoken language. • Develop active listening skills to understand and respond effectively to others. • Resolve conflicts and communicate assertively in personal and professional contexts.

Semester-II

Course Code/ Name	Course Outcomes
MA111T Mathematics – II	• Apply the fundamental concepts of Ordinary Differential Equations and Partial Differential Equations and the basic numerical methods for their resolution. • Developing the skills to solve higher-order homogeneous linear differential equation through characteristic equations and finding the general solution. • Understand the difficulty of solving problems analytically and the need to use numerical approximations for their resolution. • Use computational tools to solve problems and applications of Ordinary Differential Equations and Partial Differential Equations. • Formulate and solve differential equation problems in the field of Industrial Organization Engineering. • Developing problem solving skill in graph theory, including finding paths cycles and connectivity.
PH110T Physics	• Understand the importance of Applied Physics in describing physical phenomena. • Implement the concept of Theory of relativity and Quantum mechanics for research applications. • Recognize the use of Laser, Magnetic materials, Superconductors and optical fibers in various fields. • Can express nuclear binding energy and nuclear masses • Understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
PH110P Physics	• Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations. • Design new experiments/instruments with practical knowledge • Understand measurement technology, usage of new instruments and real

	time applications in engineering studies. • Understanding and analysis of the applications of Optical fibers and Lasers. • Solve problems with various optical phenomena.
CE112T Introduction to Surveying	• Gain knowledge of various types of surveys including land surveys, topographical surveys, construction surveys, and boundary surveys. • Understand the techniques for measuring distances, using chain, tape and their corrections. • Learn to identify sources of errors in survey measurements and techniques for minimizing and correcting them. • Student will determine area and volume by different measurement methods. • Student will understand the techniques for measuring angles and elevations by using different techniques.
CE112P Introduction to Surveying	• Create survey maps with the ability to interpret and use conventional symbols for objects on map. • Perform the fundamental operations of chaining, ranging, and laying offsets during field surveys. • Gain practical experience with theodolites for angular measurements. • Execute different types of leveling data, such as simple, differential, and profile leveling. • Apply surveying principles to compute the capacity of reservoirs and analyze elevation-capacity curves.
EC110T Fundamentals of Electronics Engineering	• Understand the fundamentals of electronics within the field of electrical engineering. • Understand diode circuits and models. • Understand BJT and FET transistor circuits and models. • Perform small-signal analysis for transistor circuits. • Know how to use and analyze operational amplifiers.
EC110P Fundamentals of Electronics Engineering	• Analyze amplifier circuits with feedback. • Design electronic circuits for sensors. • Know how to design, debug, solder, and build electronic circuits. • Take advanced courses in the area of circuits and electronics.
ME112T Concepts in Engineering Design	• Understand the broad scope of design engineering. • Describe how human variation impacts on design engineering. • Apply some basic concepts and methods from design engineering to explore creative solutions to clearly defined real world problems. • Understand the manner in which design thinking process. • Develop a solution for an engineering issue. • Determine the system's requirements and limitations for product development.

	• Make a model prototype.
ME113P Manufacturing Practices*	• Understand Practice in filing. Making V Joints, Square, Dovetail joints and Key making - plumbing. Suggested Mini project – Assembly of simple I.C. engines. • Understand tools and equipments– practice. Making rectangular tray, hopper, scoop, etc. Tools and equipment's – Arc welding of butt joint, Lap joint, Tee fillet. Demonstration of gas welding, TIG & MIG welding. • An ability to use the methods, abilities, and cutting-edge engineering instruments required for engineering practice. • An ability to design and carry out experiments.
CS110P Computer Programming*	• Understand the basic principles of programming, including variables, data types, operators, and control structures. • Create and analyze algorithms for various computational tasks. • Understand the program development life cycle using various tools like flowcharts and algorithms and pseudo-code. • Classify operators, expressions, character set, data types and control structures. • Understand the concept of modular programming and code reusability using library functions. • Write programs using object oriented concepts like classes and objects, file handling.
HU112P Rural Outreach*	• Understand the demographics of rural areas, including population distribution, age groups, and gender ratios, related these to the social and cultural context of the village. • Analyze the literacy rates in rural regions and correlate them with socio-cultural factors to gain insights into the educational landscape. • Examine the geographical parameters of the village, such as location, topography, and climate, and understand their impact on the local community and environment. • Synthesize collected information and observations to create reports or presentations that highlight the socio-cultural richness and challenges of the rural areas studied. • Reflect on the importance of rural outreach and its role in fostering social awareness and cultural appreciation among Student.

Semester-III

Course Code/ Name	Course Outcomes
ES-220 Material Science	• The learner will be able to recognise different building materials and comprehend the material science behind them. • The ability to comprehend the characteristics and limitations of the materials used in civil engineering • Learners will be able to: Examine appropriate kinds of brick, tile, stone, and wood used in construction. • The ability to characterise aggregate, cement, lime, and other building materials will be possessed by the student. • The ability to demonstrate how different materials, such as steel, wood, and polymers, are used in construction and repair projects.
CE-301 T Building planning and architecture	• Recognize the fundamentals of drawing characteristics of buildings. • Give an overview of different parts of planning concepts and make use of local bylaws and National Building Code (NBC) requirements. • Examine the structures in light of modern demands, such as sustainability and environmental friendliness. • Explain the different facets of the fundamentals of architectural design. • Draw plans for various architectural components and be able to comprehend the design principle.
CE-301 P Building planning and architecture	• Students will be able to sketch different construction elements. • The student will be able to sketch a variety of building elements, such as foundations, arches, doors, windows, ventilators and lintels. • Students will be able to comprehend drawings of building interiors and services. • Plans for institutional and residential buildings. • Drawings are prepared using AutoCAD.
CE-302 T Strength of Materials	• The learner will be able to explain the concepts and hypotheses behind stresses and strains. • Students will be able to use bending moment and shear force to analyse the strength of material challenges. • The ability to analyse structural members under combined stresses will be obtained by the student. • After applying a variety of loads to a beam, students will be able to compute the slope and deflections at any point on the beam. • The ability to comprehend how solid and hollow shafts behave under torsion.

CE-302 P Strength of Materials	• The learner will examine the Universal Testing Machine. • Students will be able to calculate a material's tensile and compressive strengths. • Learners will be able to calculate a material's Brinell Hardness. • Students will be able to assess a material's toughness. • Learners will be able to gauge a stiffness of spring.
CE-303 T Advance Surveying & Remote Sensing	• The student will be able to explain the purpose of surveying, use survey tools, take observations, create plans, profiles, and cross-sections, as well as carry out simulations. • In addition to trigonometric levelling, the student will be able to identify other types of levelling and their applications. • The student will be able to compute elevation differences and measure distance, angles, and other parameters using a theodolite and total station. • The learner will be able to connect and utilise survey adjustment and control surveying concepts. • The learner will be competent in applying digital image processing, GPS, and remote sensing concepts to civil engineering challenges.
CE-303 P Advance Surveying & Remote Sensing	• The student will understand how to measure distance using ranging and chaining. • The ability to locate different objects using chain or cross-staff surveying will be understood by the student. • The student will be able to comprehend how to measure the bearings of sides of traverse using a prismatic compass. • Students will be able to fix benchmarks at different locations with dumpy levels and determine elevation. • Using a theodolite to locate a specific building and measure its horizontal and vertical angles.
CE-304 T Geology	• The student will comprehend the physical geology and introduction. • Give an overview of the characteristics and behaviour of the available crystals and minerals. • Categorise the rocks that are available for use in construction sites and India's geology • Explain the various geological features, remote sensing methods, and the significance of each for engineering. • Use geological information in projects involving civil engineering.
CE-304 P Geology	• The student will identify basic rock forming minerals. • The student will be able to identify significant ores. • The student will comprehend how to identify rocks. • The student will be able to sketch basic map exercises. • Field visits will allow students to gain knowledge.
HU-220 T Communication Skills	• Able to understand the meaning of communication process i.e. sharing message from source to receiver

	• One should be able to develop good business growth and customer satisfaction • Able to understand from intrapersonal to mass communication • Able to communicate effectively with the aid of nonverbal communication expression • Able to aid in better understanding the speaker's intention, emotion and attitude
HU-220 P Communication Skills	• Being able to read with thinking, learning and expanding a reader's knowledge and horizons • Practice to resume writing on your continuous thoughts • Able to perform leadership quality and enforcing new ideas and challenges • Able to face interview with confidence and respond the query effectively • Will be able to exhibit his non-verbal communication skills in its better manner (i.e. tone, pitch, poster, gesture etc.)
HU221P Idea Generation*	• Develop solutions to workplace problems through applying appropriate problem solving techniques • Incorporate whole brain thinking strategies into personal approach to solving problems in the workplace. • Recognize and overcome barriers to using creative problem solving in management practices and decisions. • Develop a strategic plan for incorporating creative problem solving into an organization.
HU222P Learning Through Experts*	• Communicate effectively in the language of the target country and read appropriate vernacular materials in our field. • Apply research methods in psychology, including design, data analysis, and interpretation to a research project. • Demonstrate the ability to read, evaluate and interpret general economic information.
HU-223P NSS/NCC*	• Evoke social consciousness among students through various activities. • Develop youth leadership in the students • Create awareness of the students in Attention, saluting, March shooting etc. • Develop skill of the students regarding Hockey, Khokho, track events, field events and various asanas as well as physical Fitness and Health Education

Semester-IV

Course Code/ Name	Course Outcomes
CE 401 T Concrete Technology	• Understand the properties of constituent material of concrete. • Explain and use the basic understanding of both fresh and hardened properties in the production of environmentally friendly concrete. • Use different techniques to design the concrete mix for different strengths. • Recognise how concrete is made and how to manage its quality. • Employ advanced concrete varieties in the construction sector.
CE 401 P Concrete Technology	• Student will able to determine the normal consistency of cement, the initial and final setting time of cement, soundness, compressive strength of cement. • Student will able to determine fineness modulus, impact value, water absorption test, crushing strength, flakiness and elongation index of aggregate. • Student will learn about Mix design of concrete by IS code Method. • Student will learn about the workability of concrete by slump test, compacting factor apparatus and vee bee consistometer. • Students will demonstrate non-destructive testing using Rebound hammer & Ultrasonic Pulse Velocity along with flexural strength and compressive strength of concrete.
CE 402 T Water Supply & Waste Water Engineering-I	• Recognise the need for water supply, parameters indicating water quality, and the fundamentals of population forecasting. • The student will be able to understand the pump, intake structure, and water contaminants. • Students will be able to evaluate the reservoir's capacity and lay out the distribution system and maintain it. • The sewerage system and their importance will be understood by the students. • The ability to describe, analyse, and methods of waste water disposal will be demonstrated by the student.
CE 402P Water Supply & Waste Water Engineering-I	• Student will study the various standards, sampling techniques and measurement of turbidity for water and waste water. • Student will determine the coagulant dose required to treat and concentration of chlorides in given water sample. • Student will able to determine the hardness and residual chlorine of the given sample. • Student will able to determine the Alkalinity and Acidity in a water sample. • Determination of Dissolve Oxygen (DO) in the water sample.

CE 403 T Structural Analysis-I	• Describe, evaluate, and discuss various approaches for various kinds of indeterminate structures. • Determine the slope and deflection in determinate structures using various techniques. • Use the moment distribution approach to analyse statically indeterminate structures. • Examine the concepts around arches as structural shapes. • Compute the shear force and bending moment at various sections by using the idea of influence lines and moving loads.
CE 403 P Structural Analysis-I	• Student will determine the deflection in simply supported beam and cantilever beam & verify it from theoretical values. • Student will determine the deflection in portal frame. • Student will determine the deflection in three hinged arch and in two hinged arch. • Student will able to draw the ILD for various parameters in simply supported beam, in cantilever beam, in three hinged arch, in two hinged arch and in portal frame. • Student will verify the Maxwell reciprocal theorem.
CE 404 Structural Mechanics	• Evaluate columns & struts with different end conditions. • To assess the unsymmetrical bending in beams sections and stresses in curved beams. • Students will be able to classify different stresses on Spring and Pressure Vessels. • After completion of unit students will able to Analysis of beams and frames by slope Deflection method, Strain Energy Method, Castiglione method and Unit load method. • After completion of unit students will able to Analysis of Fixed and continuous beams and sketching of SFD & BMD.
CE 405 T Fluid Mechanics	• The definitions of fundamental terms used in fluid mechanics and the general ideas of fluid statics will be understandable to the student. • The core concepts of fluid kinematics and dynamics will be clear to the student. • The learner will be able to comprehend the concepts of boundary layer theory, flow separation, and laminar and turbulent flow through pipes and parallel plates. • The student will be able to use the concepts of energy in open channels and will be able to solve problems involving uniform, gradually varied flows and rapid varied flow under steady state conditions. • Assess the Forces on submerged bodies and hydraulic turbines' performance attributes.
CE 405 P Fluid	• Student will understand Bernoulli’s equation, will verify Impulse momentum equation and enable to find out the terminal velocity of a

Mechanics	spherical body in water. • Calibrate experimentally the given Venturimeter, Nozzle meter, Mouth Piece and Orifice meter and determine experimentally Metacentric height of the given body; and Cd, Cv & Cc of the given orifice. • Student will able to draw characteristics curves of Pelton Wheel Turbine, Francis Turbine and Kaplan Turbine. • Student will understand Reynolds experiment for demonstration of stream line and turbulent flow and determination of Friction Factor of a pipe • Student will able to determine coefficient of discharge for a broad crested weir and to plot water surface profile over weir.
MA 220 Mathematics III	• The learner will be able to recognize functions of complex variables. • The ability to comprehend the Numerical Solution of Algebraic and Transcendental Equations • Learners will be able to examine Interpolation, Numerical differentiation & Integration. • The ability to characterize Functions of Complex Variables. • The ability to demonstrate different Transformations.
HU-223P NSS/NCC*	• Evoke social consciousness among students through various activities. • Develop youth leadership in the students • Create awareness of the students in Attention, saluting, March shooting etc. • Develop skill of the students regarding Hockey, Khokho, track events, field events and various asanas as well as physical Fitness and Health Education

Semester-V

Course Code/ Name	Course Outcomes
CE-501 T Quantity Surveying & Costing	• Use the basic principles of quantity surveying to establish a preliminary estimation. • Recognise how to use the existing rate schedule and quantitative resource allocation to rate analysis. • Establish the building's detailed estimate and its component costs. • Assess and calculate the expenses and create a thorough project report rate. • Recognise the concepts, utility, and goal of building valuation.
CE-501 P Quantity Surveying & Costing	• Student will able to prepare the detailed estimate. • Student will know detailed estimate for services of plumbing and water supply or Electrification work. • Student will able to do detailed estimate for earth work for the road construction or arched culvert. • Student will know the Rate analysis for at least 8 items of construction. • Student will able to prepare DPR of Civil Engineering Project.
CE-502 T Construction Materials &Techniques	• The learner will be able to recognise different building materials and comprehend the basic applications for them. • The learner will be able to comprehend the application of non-conventional materials in civil engineering. • The student will be able to explore the most appropriate type of foundation for the construction procedure. • The ability to characterise walls, masonry, and other building services will be possessed by the student. • The student will be able to study appropriate roofing and flooring used in construction.
CE-502 P Construction Materials &Techniques	• Student will understand Non-destructive testing of concrete by rebound hammer test and ultrasonic method. • Student will familiar with Test for the effect of admixtures on the concrete compressive strength • Student will learn about Testing of micro-concrete • Student will know about Design of concrete mix. • Student will be able draw different types of building elements.
CE-503 Structural Analysis-II	• Use Kani's approach to analyse beams and frames (with and without sway). • Use the column analogy method to analyse beams and frames, both with and without sway.

	• Examining indeterminate structures with several techniques • Use Plastic Analysis and approximation methods to analyse multi-story frames. • The learner will be competent in suspension cable analysis.
CE-504T Water resources & Irrigation	• Students should be able to explain various components use in hydrology that affect the movement of water in the earth and will be able to derive Hydrographs. • Apply the various methods to assess the floods and Ground water. • Understand the concept of Water resources planning and management. • Students should be able to explain the basic requirements of irrigation water, various irrigation techniques, requirements of the crops and soil-water-crop relationship. • Describe the concept of well irrigation and Canal irrigation in irrigation system.
CE-504P Water resources & Irrigation	• Student will know about determine precipitation for a given period using rain gauge • Student will know about determine evaporation by evaporimeter. • Student will know about infiltration index. • Student will know how to design a canal section. • Student will analysis flood data & will able to draw a flood hydrograph.
CE-505 Dynamics of structures	• Identify and define key concepts related to structural dynamics, such as natural frequencies, modeshapes, damping and vibration characteristics of structures, by introducing SDOF systems. • Solve the problems of free vibration of damped and undamped structures. • The student will learn to understand the response to periodic loading and response to impulsive loads. • Formulate the equation of motion for dynamic analysis of different MDOF systems and solve engineering problems in the context of structural dynamics. • The student will learn to understand the continuous parameter systems and practical vibration analysis by different methods.
CE-506P Computer aided drawing	• Understand computer aided drafting and different coordinate system • Drawing of Regular shapes using Editor Mode and Exercise on Draw tools and Modify tools • Drawing of building components like walls, lintels, Doors, and Windows. Using CAD software • Drawing a plan of Building and dimensioning. Developing a 3-D plan from a given 2-D plan • Developing sections and elevations for given a) Single storied buildings b) multi storied buildings
CE-507P Soft Skill –I	• The learner will be able to develop Proficiency in English. • The ability to comprehend the Microsoft office

	• Learners will be able to expert in Communication skills • The ability to characterize functions of Communication skills Visual, nonverbal and aural communication. • The ability to demonstrate concept of 4 method for presentation.
CE-508P Seminar/Group Discussion	• Able to introduce oneself and family and work on Nonverbal Communication. • Learn to work on oral skills like conversational practices, extempore and role play. • Capable of improving self-assurance and technical knowledge
HU-223P NSS/NCC*	• Evoke social consciousness among students through various activities. • Develop youth leadership in the students • Create awareness of the students in Attention, saluting, March shooting etc. • Develop skill of the students regarding Hockey, Khokho, track events, field events and various asanas as well as physical Fitness and Health Education

Semester-VI

Course Code/ Name	Course Outcomes
CE 601 T Water Supply & Waste Water Engineering-II	• The learner will know the idea drainage systems, sanitary appliances, funding and project management for water supply initiatives. • Students will learn about different water purification techniques. • Students will learn about sewage treatment systems such as flotation tanks, grit chambers, etc. • Students will learn about several biological treatment techniques for disposing of sludge and sewage. • Recognise the principles of advanced water treatment.
CE 601 P Water Supply & Waste Water Engineering-II	• Student will study the various standards for waste water and the sampling techniques for waste water. • Student will determine the alkalinity in water sample and the acidity in water sample. • Student will able for determination of Dissolved Oxygen in the water and waste water sample, Biological Oxygen demand of waste water sample. • Student will able to determine Chemical Oxygen demand and solids in the waste water sample. • Student will able to determine bacterial colonies by membrane filter Technique and standard plat count method.
CE 602 T Geotechnical Engineering-I	• Students will comprehend how soil is classified and identify its key characteristics. • The student will be able to comprehend and identify the soil's index qualities. • Student will be able to assess the soil's permeability and seepage characteristics. • Interpret the significance of the properties of soil consolidation and compaction. • The student will be able to interpret earth pressure and associated slope failures, as well as comprehend the effective stress concept of soil.
CE 602 P Geotechnical Engineering-I	• Student will able to determine the hygroscopic moisture content of soil and specific gravity of soil. • Student will able to deterfield density by sand replacement method and by core cutter method. • Student will learn Grain size analysis of soil by: a) Sieve analysis b) Sedimentation analysis • Student will determine the Liquid limit of soil by Casagrande method and by Cone penetrometer. • Student will be able to determine of Plastic limit of soil, Shrinkage limit of soil and free swell of soil

CE 603 T Transportation Engineering-I	• Students will comprehend the significance of highways and the global history of road construction. • Students will explore the geometrical design of common road cross sections in rural as well as urban areas. • Recognise the characteristics of traffic, the elements that influence traffic design, and the design of traffic signals. • Various types of docks and harbours, as well as different transit and intelligent transportation systems, will be studied by the students. • The components of airports, taxiways, runways, and aprons will be studied by the students.
CE 603 P Transportation Engineering-I	• Student will determine spot velocity of a vehicle • Student will Study & analysis of signal. • Student will Study & analysis of parking. • Student will determine capacity of a rotary. • Student will determine the traffic volume at a road section.
CE 604 T Structural Design –I (R.C.C.)	• The student will learn about the fundamentals of structural design as well as various techniques like WSM and LSM. • Students will be able to compute beam loads under various loading scenarios as well as their moments. • The ability to analyse and create any kind of slab will be available to the student. • Students will be able to design structural elements such footings and columns. • Students will be able to design a staircase with a waist slab that has variable support conditions and equal and unequal flights.
CE 604 P Structural Design –I (R.C.C.)	• Student will able to design beam section for given load • Student will able to design column section & footing for given load. • Student will able to design a one way slab • Student will able to design two way slabs. • Student will able to design a dog-legged staircase.
CE 605 Construction Planning & Management	• The importance of units of measurement, preliminary and comprehensive investigation methods, administrative project approval procedures, and novel approaches like CPM/PERT with network analysis will be understood by the students. • The cost of operating various construction equipment will be studied by the students. • The student will comprehend construction project contracts and tender documentation. • The curriculum will cover specifications, different forms, bills, publications, etc. that are used in civil engineering projects. • Students will be competent in analysing and selecting the most

	economical course of action for civil engineering projects.
CE 606P Soft Skill –II	• The learner will be able to develop essential and vocational skills: survival strategies. • The ability to comprehend the Written Communication Skill Practice. • Learners will be able to expert in Team Building / Coordination Skills. • The ability to characterize Self-Management. • The ability to demonstrate Team Management Technique.
CE-607P Seminar/Group Discussion	• Students will be able to judge when to speak and how much to say, speak clearly and audibly in a manner appropriate to the subject. • Ask appropriate questions, use evidence to support claims, respond to a range of questions, take part in meaningful discussion to reach a shared understanding, speak with or without notes. • Show depth of understanding, demonstrate breadth of reading, and use primary and secondary sources, show independence and flexibility of thought, help discussions to move forward, show intellectual leadership and effective time management.
HU-223P NSS/NCC*	• Evoke social consciousness among students through various activities. • Develop youth leadership in the students • Create awareness of the students in Attention, saluting, March shooting etc. • Develop skill of the students regarding Hockey, Khokho, track events, field events and various asanas as well as physical Fitness and Health Education

Semester-VII

Course Code/ Name	Course Outcomes
CE 701 T Transportation Engineering- II	• Student will study about the application of different Highway materials and their selection in highway for any specific location. • Student will study about the factors which is used in pavement design, wheel load concept, contact pressure, ESWL concept, Deflection criteria and stress criteria. • Student will study about the different methods used for the design of flexible pavement as per IRC. • Student will study about the different methods used for the design of Rigid pavement as per IRC, different types of stresses, joints, and bars used in rigid pavement. • Student will study about the maintenance of pavement, measurement of unevenness, deflection and their remedial measures.
CE 701 P Transportation Engineering- II	• Student will demonstrate Aggregate Crushing Value Test, aggregate impact value, shape test, Los Angeles Abrasion value, and California Bearing Ratio values. • Student will demonstrate the penetration value of Bitumen. • Student will demonstrate the viscosity, softening point, flash point and fire point of bituminous material. • Student will determine the ductility of bitumen. • Student will learn Determination of stripping value of road aggregate and Marshall Stability value for Bituminous mix.
CE 702 T Geotechnical Engineering-II	• Student will be able to estimate lateral earth pressures on retaining walls and check the stability of retaining walls. • Student will be able to understand the stress distribution and settlement of soil. • Student will assess the bearing capacity of soils using different methods for shallow foundations. • Student will discuss the various types of deep foundations and their applications. • Student will interpret the knowledge of soil improvement, soil stabilization, soil exploration and foundation on expansive and collapsible soil.
CE 702 P Geotechnical Engineering-II	• Student will know Indian Standard Light Compaction Test/Std. Proctor Test, Heavy Compaction Test/Modified Proctor Test. • Student will perform unconfined Compression Test& Triaxial compressive strength test. • Student will perform vane shear test and consolidation test. • Student will perform CBR Test& direct shear test

	• Student will demonstration of undisturbed sampling, Plate Load Test, SPT & DCPT test.
CE 703T Structural Design –II (Steel)	• Students should be able to design riveted, bolted, pinned and welded connections for steel structures. • Students should be able to Design of compression steel members like columns, footing etc. • Students should be able to Design of tension steel members like beams, plate girders and gantry girders. • Student should be able to Design of Industrial building frames, multistorey frames, bracings for high rise structure and transmission towers. • Student will be able to predict the collapse load factor of Beams and truss structures by using plastic analysis method.
CE 703P Structural Design –II (Steel)	• Student will learn design & drawing of various connections. • Student will learn design & drawing of tension member. • Student will learn design & drawing of compression member. • Student will learn design & drawing of grillage foundation. • Student will learn design & drawing of lacing & bracing.
CE 704 Elective-1 CE- 7041 Computational Methods in Structural Engineering	• The concept of matrix formulation will be covered. • The direct stiffness approach will be taught to the student. • The student will gain knowledge of symmetry, bandwidth, and imposition of constraints. • The ability to analyse continuum structures in students • The student will gain knowledge of two-dimensional components.
CE- 7042 Traffic Engineering	• Student will have an overall knowledge of the traffic components and assess the traffic characteristics and related problems. • Student will develop a strong knowledge of traffic planning and its management by traffic studies in any transportation area. • Student will have an overall knowledge of traffic operation and traffic control devices and its techniques in transportation interaction. • Student will study about the different types of lights used in street their utilization and maintenance factors. • Student will be able to know the causes of accident by accident studies and problem in mass transportation and their remedial measures.
CE- 7043 Industrial Waste Treatment	• Recognize the properties of the basic industries, the environmental impact of waste generated and problem evolved from water pollution. • Student will be able to measure waste water volume. • Student will gain knowledge of conventional methods of treatment of waste water • Student will be able to do combined treatment of waste water sewage. • Student will be able to determine the appropriate treatment methods for

	textile, dairy, paper and pulp industry's wastewater.
CE- 7044 Cost Effective &Eco-Friendly Construction	• The notion of environmentally friendly and energy-efficient materials and products will be taught to the students. • Students will gain knowledge about low-cost construction methods and equipment. • Students will gain knowledge about economical sanitation. • Students will gain knowledge about inexpensive road construction. • Students will be able to evaluate and contrast costs.
CE- 7045 Environmental Impact Assessment	• Understanding the goal and function of EIA is one of the course's main objectives. • The learner will possess a general understanding of impact identification techniques. • Students will be able to evaluate the effects of the socioeconomic environment, noise, water, and air. • Students will be able to precisely prepare written documents with the use of EIA. • Learners will be able to evaluate how the public is involved in environmental decision-making.
CE 705 Minor Project	• The student will be able to demonstrate the knowledge, skills and attitudes of a professional engineer. • The student will be able to undertake problem identification, formulation and solution. • The student will be able to demonstrate a sound technical knowledge of their field. • The student will be able to demonstrate teamwork skills • Students are able to see themselves as individuals with various skills and abilities, some more developed than others, and understand that they can make choices about how they wish to move forward.
CE 706P Seminar/ Group Discussion	• Able to show competence in identifying relevant information, defining and explaining topics under discussion. • Demonstrate depth of understanding, use primary and secondary sources; they will demonstrate complexity, insight, cogency, independent thought, relevance, and persuasiveness. • Able to evaluate information and use and apply relevant theories. In terms of organization, students will be able to show competence in working with a methodology, structuring their oral work, and synthesizing information.
CE-707P Industrial Training	• Take part in the industrial training program's projects in the industry. • Explain how to employ sophisticated equipment and methods that you came across throughout your industry training and visit. • Communicate with employees of the industry and adhere to the engineering standards and discipline that are set out by them.

	• Gain knowledge of appropriate workplace conduct and strengthen your ability to work with others and as a team. • Create polished work reports and slideshows.
HU224P Yoga*	• Demonstrate basic skills associated with yoga activities including strength and flexibility, balance and coordination. • Demonstrate the ability to perform yoga movements in various combination and forms. • Understand and apply the knowledge of basic sequencing, and effective group management.

Semester-VIII

Course Code/ Name	Course Outcomes
CE 801 T Design of Hydraulic Structure	• Students will be able to explain earth dams and planning the capacity of reservoir. • Ability to perform stability analysis of concrete gravity dams • Student will be analyze and design spillways & the principle of energy dissipaters. • Student will be able to design pervious and impervious formations & able to design weir and barrages. • Student will be able to design canals, & will be able to understand canal structures and hydropower plants.
CE 801 P Design of Hydraulic Structure	• Student will know to prepare a drawing sheet on various types of spillway • Student have briefly knowledge of Stability analysis of gravity dam • Student will learn to Design & study of earthen dam. • Student will learn to Design & study of ogee spillway.
CE 802 Railway, Transportation Bridges & Tunnels	• After completion of unit student will able to describe mode of transportation specially railway and its function, they also can explain the various parts like railway car, rail, hauling capacity, traction, tractive resistance, ballast etc. • After completion of unit student will able to solve problem related to geometric design, super elevation, cant and cant deficiency etc. They also explain and describe various parts of geometric design like signal, interlocking, different yards. • After completion of unit student will able so understand about the bridge component, forces and load, alignment and many terms related to bridge stability and construction. • After completion of unit student will able to understand about the foundation used in the bridge and the related terms. They will also able to

	describe or discuss cofferdam and retrofitting of the bridge foundation. • After completion of unit student will able to understand about the tunnel and the terms related to tunnel engineering.
CE 803 T Structural Design –III	• After completion of unit students will able to Design of Water tank and also able to discuss many function of the water tank. • Student will be able to design intze tank and design of chimney by RCC and Steel. • After completion of unit students will able to know about bunker, silo & Retaining walls and they also can design all of them. • In this chapter student will able to understand minor and major things about the prestressing. • Student will be able to design steel tank and formwork by steel and timber.
CE 803 P Structural Design –III	• Student will learn to Design & drawing of Tanks Resting on ground and Underground Tanks. • Student will learn to Design & drawing of Overhead Tanks and Intze Tank. • Student will learn to Design & drawing of Bunker and silo. • Student will learn to Design & drawing of chimney (RCC). • Student will learn to Design & drawing of Retaining walls.
Elective-II CE -8041 Structural Dynamics & Earthquake Engineering	• analyze any single degree of freedom systems • analyze any multi degree freedom systems. • Ability to distinguish numerical evaluation of dynamic response of system for different inputs. • At the end of this unit the students will be able to understand the basic term related to earthquake and elements of seismology. • The student will able to Analyze the earthquake resistant structure and find the factors that affecting the stability of building due to earthquake.
CE- 8042 Air Quality Monitoring & Control	• Student will learn about economics and social aspects and effect of air pollution on health, animal, plants and materials. • Student will be able to decide the ambient air pollutants. • Student will be able to decide secondary pollutants and toxicity of pollutants. • Student should be able to take sample and analyze of air pollutants • Student should be able to design particulate and gaseous control measures and industrial hygiene for any industry.
CE- 8043 Energy Efficient & Green Building	• Student will know about energy efficient green buildings. • Student will know about energy conscious buildings in which climate factor includes. • Student will know about principles of energy conscious design of buildings in India. • Student will know about heat transfer, solar radiation and thermal

	performance of buildings. • Student will know about zero energy buildings.
CE 8044 Design of Prestressed Concrete Structures	• Understand the general behaviour of prestressed concrete. • Perform analysis and design flexural strength of prestressed concrete section. • Identify and interpret the appropriate relevant stress distribution. • Perform design of prestressed concrete members for flexure. • Perform design of tension and compression prestressed concrete members.
CE-8045 Advance Water Resources Engg	• To learn determination of flood and precipitation. • To learn determination of methods of flood routing and its management and student will know Introduction to stochastic models in Hydrology. • Student will know about system analysis which includes Optimization Techniques, Linear programming, etc. • Student will know about dynamic programming in brief. • Student will able to analysis of their optimality and updating of Networks.
CE 805P Major Project	• The student will be able to demonstrate the knowledge, skills and attitudes of a professional engineer. • The student will be able to undertake problem identification, formulation and solution. • The student will be able to demonstrate a sound technical knowledge of their field. • The student will be able to demonstrate teamwork skills. • Students are able to see themselves as individuals with various skills and abilities, some more developed than others, and understand that they can make choices about how they wish to move forward.
CE806P Seminar/ Group Discussion	• Demonstrate clarity, the strength of their thesis statement, and develop their topic with appropriate signposting. • Able to use appropriate registers and vocabulary, and will demonstrate command of voice modulation, voice projection, and pacing. • Able to make use of visual, audio and audio-visual material to support their presentation. • Able to speak cogently with or without notes. Students will present either in groups or as individuals.