KOMMURI PRATAP REDDY INSTITUTE OF TECHNOLOGY

COURSE OUTCOMES

Year/Sem: II/I	
SPECIFIC LEARNING OUTCOMES – SURVEYING AND GEOMATICS (C.Code:211)	
C211.1	Understand the basic principles, classifications, and techniques of surveying including linear and angular measurements, use of various instruments, and field procedures.
C211.2	Apply appropriate methods for measurement of relative elevations, areas, and volumes, including correction techniques and the use of leveling and contouring in topographic analysis.
C211.3	Conduct theodolite surveying and traverse computations, including angle measurement, adjustments, and trigonometric leveling for both accessible and inaccessible bases.
C211.4	Designing and setting of curves different types of curves (horizontal and vertical) and apply advanced methods like tachometer and modern instruments (Total Station, GPS) for precise surveying applications.
C211.5	Interpret aerial photographs and apply photogrammetric methods including flight planning, stereoscopy, and aerial triangulation for map making and ground control.
SPECIFIC LEARNING OUTCOMES – ENGINEERING GEOLOGY (C.Code:212)	
C212.1	Understand the significance of geology in civil engineering, including the impact of geological conditions on site selection, construction failures, and major structures like dams, tunnels, and reservoirs.
C212.2	Identify and classify common rock-forming and economic minerals using physical properties, and explain the geological classification, texture, and structure of igneous, sedimentary, and metamorphic rocks.
C212.3	Interpret structural geological features such as folds, faults, joints, and unconformities, and assess their influence on civil engineering projects, including the role of soil types and groundwater conditions in construction and stabilization.
C212.4	Identify the earthquake prone or seismic region, landslides etc by interpreting the results of geophysical method and geological formations.
C212.5	Evaluate geological considerations in the planning and construction of dams, reservoirs, and tunnels, including site selection, structural integrity, water tightness, and the effects of tunneling on surrounding rock and groundwater.
SPECIFIC LEARNING OUTCOMES – STRENGTH OF MATERIALS – I (C.Code:213)	
C213.1	Characterizing the elastic properties of mild steel and its behaviour in plastic state is studies
C213.2	Analyse shear force and bending moment diagrams for various types of beams (cantilever, simply supported, overhanging) subjected to point loads, uniformly distributed loads (UDL), and other combinations of forces.
C213.3	Apply the theory of bending to determine the flexural stresses in different beam sections (rectangular, circular, I, T, angle, channel)
C213.4	Analyse the deflection and slope of beams subjected to different load types using methods such as double integration, Macaulay's method, and Mohr's theorems.
C213.5	Understand and analyze the concept of principal stresses and stresses on oblique planes under different loading conditions, including compound and biaxial stresses
SPECIFIC LEARNING OUTCOMES – PROBABILITY AND STATISTICS (C.Code:214)	

C214.1	Understand and apply the foundational concepts of probability theory, including conditional probability, independence, Bayes' theorem, and properties of random variables such as expectation, variance, and Chebyshev's inequality.
C214.2	Analyze and compute statistical measures for discrete probability distributions such as Binomial and Poisson distributions, and apply Poisson approximation where appropriate.
C214.3	Evaluate and interpret continuous probability distributions including Normal, Exponential, and Gamma distributions, and determine associated statistical parameters.
C214.4	Apply statistical tools such as curve fitting (least squares method), correlation, and regression analysis to model relationships between variables and interpret their strength and form.
C214.5	Perform hypothesis testing using both large and small sample tests for means, proportions, and variances, enabling sound decision-making based on statistical inference.
SPECIFIC LEARNING OUTCOMES – FLUID MECHANICS (C.Code:215)	
C215.1	Understand the basic properties of fluids and the principles of fluid statics, including pressure measurement, hydrostatic forces, buoyancy, and stability of submerged and floating bodies.
C215.2	Analyze different types of fluid flow patterns and kinematics, and apply fundamental equations like Euler's and Bernoulli's equations to study ideal and real fluid behavior in motion.
C215.3	Apply the Bernoulli's and Momentum equations to measure flow parameters using venturimeters, orifice meters, pitot tubes, and analyze flow over notches and weirs.
C215.4	Evaluate flow through pipes by applying the Darcy-Weisbach equation and analyze pipe networks, including power transmission, siphons, branching, and water hammer effects using the Hardy Cross method.
C215.5	Understand the concepts of laminar and turbulent flow, and perform boundary layer analysis to evaluate thickness parameters, drag and lift forces, and flow separation and control mechanisms.
SPECIFIC LEARNING OUTCOMES - SURVEYING LABORATORY - I (C.Code:216)	
C216.1	Demonstrate proficiency in conducting chain and compass surveying (closed traverse), and apply plotting techniques to determine relative positions of points on the ground.
C216.2	Perform plane table surveying using radiation and intersection methods, and determine distances and elevations using compass and theodolite in various field scenarios.
C216.3	Carry out levelling operations including longitudinal and cross-sectional levelling and generate profiles for engineering projects.
C216.4	Apply principles of trigonometric and tachometric surveying to calculate horizontal distances, heights, and elevations, especially for inaccessible points.
C216.5	Operate and utilize a total station for advanced surveying tasks such as remote measurements, area computation, contour mapping, curve setting, and stake-out procedures.
SPECIFIC LEARNING OUTCOMES – STRENGTH OF MATERIALS LABORATORY (C.Code:217)	
C217.1	Perform and interpret results from tension, compression, bending, torsion, and shear tests on different materials to determine their mechanical properties such as strength, ductility, stiffness, and toughness.
C217.2	Evaluate the hardness and impact resistance of materials using standard testing procedures to understand material behavior under sudden or localized loads.
C217.3	Analyze the behavior of springs and structural members under static and dynamic loading

	conditions to determine stiffness and energy absorption characteristics.
C217.4	Apply strain measurement techniques using electrical resistance strain gauges and verify classical theories like Maxwell's Reciprocal Theorem through experimental validation.
C217.5	Determine deflection and deformation in cantilever, simply supported, and continuous beams under various loading conditions to assess structural performance and validate theoretical predictions.
SPECIFIC LEARNING OUTCOMES – ENGINEERING GEOLOGY LABORATORY (C.Code:218)	
C218.1	Identify and classify common rock-forming and economic minerals based on their physical properties, crystal systems, and group classifications.
C218.2	Recognize and distinguish between various igneous, sedimentary, and metamorphic rocks through megascopic examination and understand their geological and engineering significance.
C218.3	Interpret topographical and geological maps, including identification of key features, symbols, and terrain forms essential for civil engineering applications.
C218.4	Analyze structural geological features such as folds, faults, and unconformities through map-based problem-solving and simple geological cross-sections.
C218.5	Apply geological knowledge in identifying materials and formations that influence site investigation, construction, and foundation engineering.
SPECIFIC LEARNING OUTCOMES – CONSTITUTION OF INDIA (C.Code:219)	
C219.1	Understand the meaning and principles of constitutional law and constitutionalism, and examine the historical background and salient features of the Indian Constitution.
C219.2	Explain the scheme and significance of Fundamental Rights, Fundamental Duties, and the Directive Principles of State Policy in the Indian constitutional framework.
C219.3	Analyze the federal structure of India, including the distribution of powers between the Union and States, and understand the role of the President in a parliamentary form of government.
C219.4	Understand the constitutional amendment process and evaluate the historical development and importance of constitutional amendments, especially in the context of democratic governance.
C219.5	Interpret key provisions related to emergencies, local self-governments, and core fundamental rights under Articles 14, 19, and 21, including the Right to Equality, Freedom, and Personal Liberty.

Year/Sem: II/II	
S.NO.	**COURSE OUTCOMES**
SPECIFIC LEARNING OUTCOMES – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (C.Code:221)	
C221.1	To analyze and solve AC and DC electrical circuits using network laws and theorems
C221.2	To introduce components of Low Voltage Electrical Installations
C221.3	To study the working principles of Electrical Machines and analyze magnetic circuits

C221.4	Identify and characterize diodes and various types of rectifiers and filters
C221.5	Identify and characterize various types of transistors.
SPECIFIC LEARNING OUTCOMES – BASIC MECHANICAL CIVIL ENGINEERING (C.Code:222)	
C222.1	Explain the basic concepts of mechanical system,machine elements,and engineering materials relevant to civil engineering applications.
C222.2	Analyze the working principle of power transmission system, materials handling equipment, and their applications in civil engineering projects.
C222.3	Demonstrate knowledge of energy system, refrigeration, and heat transfer mechanisms used in construction and building services.
C222.4	Illustrate various manufacturing processes like welding ,casting,sheet metal work, and machine tools applicable to civil engineering components.
C222.5	Evaluate and select suitable mechanical equipment and tools required for construction,production, and project execution in civil engineering.
SPECIFIC LEARNING OUTCOMES – BUILDING MATERIALS, CONSTRUCTION AND PLANNING (C.Code:223)	
C223.1	Identify and classify various building materials such as stones, bricks, timber, and modern materials based on their properties and applications.
C223.2	Explain the manufacturing processes and functional roles of cement, admixtures, and mortars in construction.
C223.3	Analyze different structural components of buildings and interpret their functions in relation to building services like ventilation, plumbing, and fire safety.
C223.4	Demonstrate knowledge of construction techniques such as masonry, formwork, scaffolding, and finishing practices used in civil engineering.
C223.5	Apply the principles of building planning and assess building bye-laws for effective architectural layout and sustainable design.
SPECIFIC LEARNING OUTCOMES – STRENGTH OF MATERIALS – II (C.Code:224)	
C224.1	Understanding the concepts and principles of theory of torsion and springs subjected to direct

	loading
C224.2	Analyzing the behaviour of long and short columns subjected to various end conditions
C224.3	Analyze strength and stability of structural members subjected to Direct and Bending stresses.
C224.4	Determining the behaviour of thin cylinders and thick cylinder
C224.5	Illustrate the un-symmetrical bending and shear centre for various channel sections
SPECIFIC LEARNING OUTCOMES – HYDRAULICS AND HYDRAULICS MACHINERY (C.Code:225)	
C225.1	Explain the fundamentals of open channel flow, including uniform,non-uniform,and critical flow concepts, and analyze problem using appropriate formulas.
C225.2	Analyze the characteristic of gradually varied and rapidly varied flows such as hydraulic jumps and surges, and apply suitable method for computing water surface profiles.
C225.3	Apply the principles of dimensional analysis and hydraulic similitude to design and interpret models, and evaluate performance parameters in fluid flow problem.
C225.4	Illustrate the working principles, velocity diagrams,efficiency and selection criteria hydraulics turbines and pumps and evaluate their performance characteristic.
C225.5	Integrate the knowledge of hydraulic machines and hydro-power principles to select appropriate machinery and estimate hydro-power potential for civil engineering applications.
SPECIFIC LEARNING OUTCOMES – STRUCTURAL ANALYSIS – I (C.Code:226)	
C226.1	Analyze determinate pin-jointed plane frames using method of joints, sections and tension coefficient method to determine tension force under various loading conditions.
C226.2	Compute deflection of beam and pin jointed frame using strain-energy methods and interpret results or serviceability.
C226.3	Analyze propped cantilever and fixed beams subjected to various types of loads by determining statics and kinematics indeterminacy.
C226.4	Solve statically indeterminate beams (propped cantilevers, fixed and contentious beams) using three moment and slope deflection methods, including effects of variable EI, support settlement and rotation.

C226.5	Construct influence line diagram for beams and truss members and determine critical positions of moving loads to obtain maximum shear force and bending moment.
SPECIFIC LEARNING OUTCOMES –COMPUTER AIDED CIVIL ENGINEERING DRAWING (C.CODE:227)	
C227.1	Understand the fundamentals of computer-aided drafting and apply different coordinate systems for creating 2D drawings.
C227.2	Develop 2D drawings of regular shapes and building components using both command-line (Editor mode) and GUI-based tools.
C227.3	Use various drawing and modification tools effectively to create and edit technical drawings with layers, dimensions, and annotations.
C227.4	Create detailed plans of residential buildings, including floor plans, elevations, and sections using appropriate CAD standards.
C227.5	Demonstrate the ability to convert 2D plans into 3D models and apply AutoCAD skills in interdisciplinary fields like surveying and mechanical drafting.
SPECIFIC LEARNING OUTCOMES – HYDRAULICS AND HYDRAULIC MACHINERY LAB (C.Code:228)	
C228.1	Using principles of Continuity energy and momentum for various flow measuring devices are designed and calibrated.
C228.2	Using Darcy Weishbach equation for friction factors of various pipes are estimated.
C228.3	The rate of flow in open channels is estimated with the help of notches, Weirs and Venturi flue.
C228.4	Demonstrate the experiments on various hydraulic turbines and evaluate their performances under various conditions.
C228.5	Demonstrate the experiments on various hydraulic pumps and evaluate their performances under various conditions.
SPECIFIC LEARNING OUTCOMES – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY (C.Code:229)	
C229.1	To analyze and solve AC and DC electrical circuits using network laws and theorems.

C229.2	To introduce components of Low Voltage Electrical Installations.
C229.3	To study the working principles of Electrical Machines and analyze magnetic circuits.
C229.4	Identify and characterize diodes and various types of rectifiers and filters.
C229.5	Identify and characterize various types of transistors.
SPECIFIC LEARNING OUTCOMES – GENDER SENSITIZATION LABORATORY(C.Code:22A)	
C22A.1	To develop students' sensibility with regard to issues of gender in contemporary India.
C22A.2	To provide a critical perspective on the socialization of men and women.
C22A.3	To introduce students to information about some key biological aspects of genders.
C22A.4	To expose the students to debates on the politics and economics of work.
C22A.5	To help students reflect critically on gender violence.
C22A.6	To expose students to more egalitarian interactions between men and women.

Year/Sem: III/I	
S.NO.	**COURSE OUTCOMES**
SPECIFIC LEARNING OUTCOMES – STRUCTURAL ANALYSIS – II (C.Code:311)	
C311.1	Analyze two-hinged arches and indeterminate beams/frames using moment distribution method.
C311.2	Apply Kani's method for the analysis of continuous beam and portal frames with and without side sway, and analyze cables and suspension brides under point and uniformly distributed loads.
C311.3	Use approximate analysis method such as the portal method, cantilever method, factor method, substitute frame methods or evaluating multi-storey frames under lateral and gravity loads.
C311.4	Formulate and solve structural problems using matrix method (flexibility and stiffness approaches) for continuous beams.
C311.5	Construct influence line diagram for indeterminate beams and propped cantilevers to determine maximum shear forces and bending moment due to moving loads.
SPECIFIC LEARNING OUTCOMES – GEOTECHNICAL ENGINEERING (C.Code:312)	

C312.1	Understand and classify soils based on their physical and index properties using laboratory and filed test, and apply soil classifications systems for engineering purposes.
C312.2	Analyze soil permeability and seepage characteristics using Darcy's law flow-net concepts and effective stress principles to predict groundwater behavior in soil structures.
C312.3	Evaluate stress distribution within soil masses using Boussines and westergaard's theories, apply New mark's chart for estimating verticals stresses and understand soil compaction behavior for field applications.
C312.4	Determine consolidation parameters and estimate primary and secondary settlement of clay soil using Terzaghi's theory and laboratory test results.
C312.5	Assess the shear strength of soils under different drainage conditions using laboratory testing methods and failure theories to analyze the stability of soil structures
SPECIFIC LEARNING OUTCOMES – STRUCTURAL ENGINEERING -I (RCC) (C.Code:313)	
C313.1	Recall the fundamental concepts of limit state design and code provisions for design of concrete members, Design and detail beams
C313.2	Analyze reinforced concrete sections to determine the ultimate capacity in bending, shear and compression
C313.3	Analyze and design various types of slabs (One-way, Two-way, and Continuous Slabs).
C313.4	Design and detail columns using IS code and SP 16 design charts
C313.5	Design and detailing of footings
SPECIFIC LEARNING OUTCOMES – TRANSPORTATION ENGINEERING (C.Code:314)	
C314.1	Understand the importance of transportation system,highway planning, alignment, and preparation of project reports for effective road networks development.
C314.2	Apply principles of geometries design to determine sight distance, curves, gradients, and other highway components according to IRC Standards.
C314.3	Analyze traffic characteristic and design traffic control measures including signals intersection, parking facilities and evaluate roadway safety.
C314.4	Evaluate the engineering properties of highway materials such as soil, aggregate, and bitumen and

	perform tests for quality control in pavement construction.
C314.5	Design flexible and rigid pavement us standard method and assess the suitability of different pavement types for various traffic and soil conditions.
SPECIFIC LEARNING OUTCOMES –CONCRETE TECHNOLOGY (C.Code:315)	
C315.1	Understand the chemical composition, hydration process, properties, types, and uses of different grades of cement, including mineral and chemical admixtures.
C315.2	Analyze the classification, properties, grading, and quality of aggregates, including fine and coarse aggregates, and evaluate their influence on the strength and durability of concrete.
C315.3	Examine the properties of fresh concrete, its work-ability, factors affecting it, and various testing methods, including setting times, mixing techniques, and steps in concrete manufacturing.
C315.4	Evaluate the properties of hardened concrete, including compressive, tensile, and flexural strength, and apply different destructive and non-destructive testing methods to assess concrete performance and quality.
C315.5	Understand the principles of concrete mix design and special concretes, including factors influencing mix proportions, quality control methods, and the applications of advanced concretes like lightweight, fiber-reinforced, polymer, high-performance, and self-compacting concrete.
SPECIFIC LEARNING OUTCOMES – ENGINEERING ECONOMICS AND ACCOUNTANCY (C.Code:316)	
C316.1	Understand basic economic concepts, demand-supply analysis, and cost estimation in engineering project
C316.2	Apply principles of financial management, including profit and loss analysis, for decision-making in engineering projects
C316.3	Analyze the feasibility of engineering projects using economic tools such as Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period.
C316.4	Demonstrate the ability to prepare and interpret financial statements, including balance sheets and income statements.
C316.5	Evaluate the economic and societal impact of engineering solutions, including sustainable practices.

SPECIFIC LEARNING OUTCOMES - HIGHWAY ENGINEERING AND CONCRETE TECHNOLOGY LAB (C.Code:317)	
C317.1	Analyse the suitability of soil as a pavement sub grade material
C317.2	Assess the suitability of aggregates as a pavement construction material
C317.3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material
C317.4	Design Bituminous mixes for pavement layers
C317.5	Assess functional adequacy of pavements based on roughness of pavement surface.
SPECIFIC LEARNING OUTCOMES – GEOTECHNICAL ENGINEERING LABORATORY (C.Code:318)	
C318.1	Student will be able to Classify and evaluate the behavior of the soils subjected to various loads.
C318.2	Able to perform the soil tests for classification and understand the basic soil behavior
C318.3	Understand the strength testing procedure using Direct shear test
C318.4	Calculate the consolidation coefficient with time method
C318.5	Perform compaction test to understand the relation between density and OMC.
SPECIFIC LEARNING OUTCOMES – ADVANCED COMMUNICATION SKILLS LAB (C.Code:319)	
C319.1	Enable the development in sharing information about family and friends.
C319.2	Strengthen general comprehending skills and present lucid skills in free reading.
C319.3	Develop flair for any kind of writing with rich vocabulary and proper syntax.
C319.4	Proficiency in writing technical articles and presenting papers on any topic of any genre.
C319.5	Understand the basic grammar techniques and utilize it in enhancing language development.
SPECIFIC LEARNING OUTCOMES – INTELLECTUAL PROPERTY RIGHTS (C.Code:31A)	
C31A.1	Explain four types of intellectual property right and different international organizations.
C31A.2	Describe trademarks and can implement in trademark registration
C31A.3	Describe copyrights and can implement them in ownership rights

C31A.4	Judge the different types of patents and can use in ownership rights and transfer
C31A.5	Examine false advertising in the market and trade secret protection
C31A.5	Anticipate critical analysis arguments relating to the new development in intellectual property rights
C31A.6	Explain four types of intellectual property right and different international organizations.

Year/Sem: III/II	
S.NO.	**COURSE OUTCOMES**
SPECIFIC LEARNING OUTCOMES – HYDROLOGY AND WATER RESOURCES ENGINEERING (C.Code:321)	
C321.1	Explain the hydrologic cycle and analyze precipitation data using various methods for hydrologic design and water resource assessment
C321.2	Evaluate abstractions from precipitation such as evaporation, infiltration, and runoff using empirical and analytical methods, and apply them to estimate basin yield and flow characteristics.
C321.3	Construct and interpret hydrographs, unit hydrographs, and perform flood hydrograph analysis for hydrologic modeling and prediction.
C321.4	Analyze groundwater flow using Darcy's Law, evaluate aquifer properties, and assess crop water requirements based on soil-water-plant relationships for sustainable irrigation planning.
C321.5	Design canal systems and irrigation channels using Kennedy's and Lacey's theories, evaluate canal losses and outlet types, and propose appropriate measures to control water logging and enhance irrigation efficiency through canal lining.
SPECIFIC LEARNING OUTCOMES – ENVIRONMENTAL ENGINEERING (C.Code:322)	
C322.1	Explain the causes and control of waterborne diseases, analyze water demand, population forecasts, and evaluate various water sources and intake structures for protected water supply systems.
C22.2	Design and analyze the components of water treatment plants including sedimentation, coagulation, filtration, and disinfection units, and develop layouts for water distribution systems with appropriate pipe appurtenances

C322.3	Describe sewage characteristics and design sewer systems and appurtenances, including house drainage, and evaluate wastewater and storm-water collection and disposal methods.
C322.4	Develop flow diagrams and design units of wastewater treatment plants including biological treatment systems, sludge handling, septic tanks, and oxidation ponds.
C322.5	Identify sources and types of air pollutants, assess their effects and behavior in the atmosphere, and apply control technologies for particulate and gaseous emissions including automobile pollution.
SPECIFIC LEARNING OUTCOMES – FOUNDATION ENGINEERING (C.Code:323)	
C323.1	Explain the need for soil exploration and conduct field tests such as boring, sampling, penetrati tests, and prepare soil investigation reports with bore logs.
C323.2	Analyze the stability of infinite and finite earth slopes using various methods such as Swedish slip circle, Bishop's method, and Taylor's Stability Number under different slope conditions.
C323.3	Apply earth pressure theories (Rankine's and Coulomb's) to determine active, passive, and at-rest pressures, and evaluate the stability of different types of retaining walls.
C323.4	Determine the bearing capacity and settlement of shallow foundations using Terzaghi's and IS code methods, SPT, and plate load tests, and select suitable foundation types and depths.
C323.5	Calculate the load-carrying capacity of single and group piles using static, dynamic, and empirical methods, and analyze settlement and negative skin friction effects on pile foundations.
SPECIFIC LEARNING OUTCOMES – STRUCTURAL ENGINEERING –II (C.Code:324)	
C324.1	Explain the mechanical properties of structural steel and the principles of Limit State Design, and analyze the behaviour of steel members under various loading conditions, including local buckling and serviceability requirements. Design bolted and welded connections, including eccentric, beam-column, and framed connections, considering strength, prying action, and joint efficiency.
C324.2	Design tension and compression members, including built-up members, laced and battened columns, splices, and base connections, considering buckling and slenderness effects.
C324.3	Apply plastic analysis techniques to continuous beams and design laterally supported and unsupported beams, including built-up sections and beam splices, based on strength and buckling considerations.

C324.4	Design welded plate girders by considering economic depth, main section design, stiffeners, splices and connections between web and flange as per codal provisions.
C324.5	Design industrial structures such as roof trusses and gantry girders, including all structural components like stiffeners, splices, purling, and wind load considerations.
SPECIFIC LEARNING OUTCOMES – PRESTRESSED CONCRETE (C.Code:325)	
C325.1	Explain the historical development, principles, types, and advantages of prestressed concrete, and identify appropriate materials used in prestressed concrete such as high-strength steel and concrete.
C325.2	Describe and compare various prestressing systems and methods, and evaluate different types of prestress losses in pre-tensioned and post-tensioned members.
C325.3	Analyze prestressed concrete sections for flexure and shear, considering various tendon profiles, and design PSC beams and slabs as per IS code provisions.
C325.4	Analyze the transmission of prestressing forces and design reinforcement for anchorage zones in pretensioned and posttensioned members using standard code-based methods.
C325.5	Analyze stress distribution and deflection behavior in composite prestressed beams, and evaluate short- and long-term deflections in PSC members as per IS code guidelines.
SPECIFIC LEARNING OUTCOMES –ENTREPRENEURSHIP (C.Code:326)	
C326.1	Understand the evolution, types, and competencies of entrepreneurs, and describe the models and processes involved in entrepreneurial development.
C326.2	Evaluate business opportunities and develop a business plan by understanding startup procedures and support systems like T-Hub and national-level institutions.
C326.3	Analyze the challenges and causes of sickness in MSME's and propose effective management strategies for rehabilitation of sick enterprises.
C326.4	Apply marketing principles such as service marketing mix, branding, pricing, and explore growth strategies including international trade for small enterprises.
C326.5	Evaluating strategic growth, business valuation, and exit strategies, and evaluate support systems for women entrepreneurs including incubation and institutional support in India.
SPECIFIC LEARNING OUTCOMES –ENVIRONMENTAL ENGINEERING LAB (C.Code:327)	

C327.1	Determine fundamental physical and chemical parameters of water such as pH, electrical conductivity, total solids, acidity, and alkalinity using standard laboratory procedures.
C327.2	Analyze water hardness, chloride content, and residual chlorine to assess water suitability for domestic and industrial purposes.
C327.3	Conduct experiments to determine optimum coagulant dosage for water treatment and evaluate the effectiveness of coagulation and flocculation
C327.4	Estimate critical water quality indicators like BOD, COD, and Dissolved Oxygen (DO) using appropriate biochemical and chemical methods.
C327.5	Measure environmental pollution indicators such as microbial load (total count) and noise levels, and interpret the results for environmental health assessment.
SPECIFIC LEARNING OUTCOMES -- COMPUTER AIDED DESIGN LAB (C.Code:328)	
C328.1	Perform analysis and design of determinate and indeterminate structures including fixed and continuous beams using structural analysis software.
C328.2	Analyze and design plane frames and space frames subjected to various load combinations (dead, live, wind, earthquake) using appropriate software tools.
C328.3	Develop and apply spreadsheet-based programs for foundation design calculations to enhance automation and accuracy.
C328.4	Design and detail steel structural elements such as built-up beams and compression members, ensuring compliance with relevant codes.
C328.5	Prepare detailed drawings and reinforcement layouts for RCC beams and slabs, integrating structural design and detailing for construction.
SPECIFIC LEARNING OUTCOMES – ENVIRONMENTAL SCIENCE (C.Code:329)	
C329.1	Understanding the structure, function, and energy flow of ecosystems, and explain biogeochemical cycles along with ecological concepts such as bioaccumulation and biomagnification.
C329.2	Evaluate natural resources and evaluate the impacts of their utilization, including water, mineral, land, and energy resources, highlighting environmental concerns and sustainable use.
C329.3	Explain the importance of biodiversity, identify threats to biodiversity, and assess conservation

	strategies including legal frameworks like the National Biodiversity Act.
C329.4	Analyzing various types of environmental pollution and analyze control technologies for air, water, soil, noise, and solid waste pollution, along with global environmental challenges and international protocols.
C329.5	Applying environmental policies, legislation, and environmental impact assessment (EIA) processes, and propose strategies for sustainable development and environmental management

Year/Sem: IV/I	
S. NO.	**COURSE OUTCOMES**
SPECIFIC LEARNING OUTCOMES – ESTIMATION, COSTING AND PROJECT MANAGEMENT (C.Code:411)	
C411.1	Calculate detailed and abstract estimates of buildings using standard units and approximate methods, and prepare quantity estimates for construction works.
C411.2	Applying reinforcement bar bending and bar requirement schedules, and estimate earthwork quantities for roads and canals accurately.
C411.3	Analyzing rate analysis for various construction items, including overhead and contingent charges, to determine realistic project costs.
C411.4	Explain types of contracts, contract documents, and conditions, and apply standard specifications for valuation and execution of building works.
C411.5	Creating construction project plans using work breakdown structures, bar charts, CPM and PERT networks, and analyze project schedules to identify critical paths and project completion probabilities.
SPECIFIC LEARNING OUTCOMES –GROUND IMPROVEMENT TECHNIQUES(C.Code:412)	
C412.1	Applying the need and objectives of ground modification and identify problematic soils using in-situ and laboratory tests.
C412.2	Applying mechanical ground modification techniques such as shallow and deep compaction, blasting, vibro-compaction, and compaction piles, and apply appropriate methods for soil

	improvement.
C412.3	Analyze hydraulic modification methods including dewatering techniques, electro-osmosis, filtration, and the use of geo-synthetics for seepage control.
C412.4	Discuss physical and chemical soil modification methods, including the use of admixtures, grouting, and thermal techniques like soil freezing.
C412.5	Applying ground reinforcement techniques include soil reinforcement with strips and grids, ground anchors, rock bolting, and soil nailing, and apply them for soil stabilization.
SPECIFIC LEARNING OUTCOMES – IRRIGATION AND HYDRAULIC STRUCTURES (C.Code:413)	
C413.1	Explain the types, selection criteria, and capacity estimation of reservoirs including reservoir sedimentation and lifespan analysis.
C413.2	Analyze the stability of gravity dams by evaluating forces acting on them, causes of failure, and foundation requirements.
C413.3	Describe earth dams, their types, failure causes, seepage control methods, and design of spillways including energy dissipation structure
C413.4	Understand the design principles and failure causes of diversion headworks such as weirs and barrages, and apply creep theories for weirs on permeable foundations
C413.5	Design canal falls, canal regulation works, and cross drainage structures, and select appropriate types based on hydraulic and site conditions.
SPECIFIC LEARNING OUTCOMES – UTILIZATION OF ELECTRICAL ENERGY(C.Code:414)	
C414.1	Explain the advantages and methods of electrical heating, including resistance, induction, and dielectric heating techniques.
C414.2	Applying electric welding processes, compare AC and DC welding systems, and apply principles of electrolysis in electroplating and metal processing.
C414.3	Analyzing the fundamentals of illumination, laws of lighting, and analyze various light sources and lighting designs for different applications such as factory, street, and flood lighting.
C414.4	Evaluate different systems of electric traction and analyze traction mechanics through speed–time curves, energy consumption, and braking performance.

C414.5	Explain the requirements and systems of train lighting and describe wiring methods and lighting arrangements using 25 kV AC supply.
SPECIFIC LEARNING OUTCOMES – PROFESSIONAL PRACTICE LAW & ETHICS (C.Code:415)	
C415.1	Apply the principles of professional ethics and apply ethical reasoning in engineering practices, including whistle-blowing, code of conduct, and conflict of interest.
C415.2	Interpret and apply the basic principles of contract law, including elements like offer, acceptance, consideration, breach, and remedies.
C415.3	Analyze the knowledge of alternative dispute resolution (ADR) mechanisms such as arbitration, conciliation, mediation, and their legal framework.
C415.4	Apply labour laws and construction-related regulations, including labour engagement, compensation, and codes like the Building & Other Construction Workers Act and RERA.
C415.5	Identify different types of intellectual property rights (IPR) and explain the processes for protection and enforcement under Indian laws.
SPECIFIC LEARNING OUTCOMES – INDUSTRIAL ORIENTED MINI PROJECT/ SUMMER INTERNSHIP (C.Code:416)	
C416.1	Identification of basic Civil Engineering field problems and their relevance.
C416.2	Collection of field data and other historical data (if any) relevant to field problem identified.
C416.3	Analysis of the data to conclude solutions in multi-disciplinary environment
C416.4	Inference and interpretative the analyzed data to conclude useful solutions
C416.5	Documenting the entire report in an effective manner and presenting to the relevant stake holders.

Year/Sem: IV/II	
S.NO.	**COURSE OUTCOMES**
SPECIFIC LEARNING OUTCOMES – AIR POLLUTION (C.Code:421)	
C421.1	Define air pollution, classify air pollutants and their sources, and explain the effects of air

	pollution along with ambient air quality standards and monitoring techniques.
C421.2	Analyze meteorological factors affecting air pollution dispersion, including atmospheric stability, plume behaviour, and apply air quality prediction models such as the Box and Gaussian models.
C421.3	Describe particulate pollutants, their properties, and explain the working principles of particulate control devices like settling chambers, cyclones, scrubbers, fabric filters, and electrostatic precipitates.
C421.4	Explain methods and equipment used for controlling gaseous pollutants through chemical, absorption, adsorption, combustion, and condensation techniques.
C421.5	Discuss sources and effects of automobile and indoor air pollution, evaluate emission control strategies, and suggest measures to improve indoor air quality.
SPECIFIC LEARNING OUTCOMES – AIRPORTS, RAILWAYS AND WATERWAYS (C.Code:422)	
C422.1	Applying the characteristics of aircraft and design various components of an airport such as runway, taxiway, and apron, including computation and correction of runway length using wind rose diagrams.
C422.2	Analyzing the components of the railway permanent way, including types of rails, sleepers, fastenings, ballast, and sub-grade, and analyze their functions in different rail systems like LRT, Metro, and MRTS.
C422.3	Apply geometric design principles to railway tracks, including super-elevation, transition curves, grade compensation, and design curves and gradients to ensure safe train movement.
C422.4	Understand the operational aspects of railway systems, including track maintenance, stations, yards, crossings, signalling, and interlocking systems.
C422.5	Analyzing the components and classification of ports and harbors, describe harbour works and port facilities, and analyze dock systems and dredging methods used in water transportation.
SPECIFIC LEARNING OUTCOMES – MEASURING INSTRUMENTS (C.Code:423)	
C423.1	Understand the block schematic of a measurement system and analyze the performance characteristics such as accuracy, precision, resolution, and error handling
C423.2	Apply knowledge of basic analogy and digital instruments like PMMC, multimeters, ohmmeters,

	and RMS meters for various electrical measurements and understand their protective features.
C423.3	Analyze and interpret the functioning of signal analyzers (AF/HF, spectrum, power, CV meters) and signal generators (AF, RF, sweep, pulse, etc.) in practical measurement setups.
C423.4	Examine the working and usage of CROs and advanced oscilloscopes (DSO, dual beam, sampling) to measure electrical waveforms, time, frequency, and phase relationships using Lissajous patterns.
C423.5	Classify and evaluate transducers and measurement systems used for physical quantities (flow, temperature, pressure, etc.), and analyze bridge circuits (Wheatstone, Kelvin, Maxwell) for accurate signal detection.
SPECIFIC LEARNING OUTCOMES – PROJECT STAGE-II (C.Code:424)	
C424.1	Identification of basic Civil Engineering field problems and their relevance
C424.2	Collection of field data and other historical data (if any)
C424.3	Analysis of the data to conclude solutions in multidisciplinary environment.
C424.4	Influencing and Interpretative the analyzed data to conclude useful solutions
C424.5	Documenting the entire report in an effective manner and presenting to the relevant stake holders.