Course Outcome Statement for session 2024-25

Course Code	Course Name	CO Statement	
11241101	Civil Engineering Materials & Construction	CO1	Classify rocks, stones and bricks understand their properties, uses, and preservation techniques.
		CO2	Describe the characteristics, seasoning, preservation, and applications of timber and wood products and understand the manufacturing, properties, and applications of ferrous and non-ferrous metals, alloys, ceramics, and paints
		CO3	Explain the properties and preparation of mortar, cement & Lime including the function and testing of mortar, cement & lime.
		CO4	Compare stone and brick masonry, and the construction techniques, bonds, and jointing methods.
		CO5	Determine the causes and prevention techniques for dampness, including anti-termite and waterproofing treatments.
11241102	Computer Programming	CO1	Define basic programming terms, syntax, algorithm and flow chart
		CO2	Solve computational problems using decision control and loops.
		CO3	Design a program using the concept of Array, pointer and functions.
		CO4	Explore file handling operations to work efficiently with files.
		CO5	Apply programming concept to implement, debug and test any C program.
11241103	Engineering Mechanics	CO1	Apply basic laws of Mechanics for different types of force systems.
		CO2	Apply the Laws of friction in engineering problems.
		CO3	Apply the concept of equilibrium in statically determinate beams and trusses.
		CO4	Determine the properties of areas for different shapes.
		CO5	Apply the concepts of Kinematics and Kinetics for engineering problems.
11241104	Building Design & Drawing	CO1	Apply the skill of engineering drawing & drawing of various building elements.
		CO2	Implement the rules & regulations according by-laws & NBC provision.
		CO3	Apply various techniques of perspective drawing
		CO4	Develop planning insight and make acquaintance with various town planning related exercises.
11241105	Basic Electrical & Electronics Engineering	CO1	Solve dc & ac circuits by applying fundamental laws & theorems
		CO2	Analyze magnetic circuits and resonance characteristics of ac electric circuits

		CO3	Describe the working principle, construction, applications of single phase transformer & rotating electrical machines
		CO4	Select the logic gates for various applications in digital electronic circuits.
		CO5	Explain the characteristics and parameters of Diode and Transistor.
11241106	Computer Programming Lab	CO1	Write computer program in C language
		CO2	Apply knowledge of programming to solve real-world problems
		CO3	Apply programming syntax to implement program.
		CO4	Acquire teamwork skill for working effectively in groups
		CO5	Prepare an organized practical file on experiments conducted in the laboratory.
11241107	Electrical & Electronics Engineering Lab	CO1	Verify circuit theorems.
		CO2	Perform tests on transformer for determination of losses, efficiency & polarity
		CO3	Acquire teamwork skills for working effectively in groups
		CO4	Prepare an organized technical report on experiments conducted in the laboratory
11241109	Micro Project-I	CO1	Identify the characteristics of various building materials.
		CO2	Develop plan and model of buildings.
		CO3	Analyze the friction forces, shear force, bending moment and single degree of freedom system.
		CO4	Cooperate to work within group.
		CO5	Develop the writing skills to prepare reports.
		CO6	Display lifelong learning.
11241110	Engineering Chemistry Lab	CO1	Select the best technique for Industrial and domestic water treatment.
		CO2	Describe the types, properties and application of lubricants.
		CO3	Distinguish the chemistry of various fuels and their combustion.
		CO4	Describe types, classification properties and applications of polymers and mechanisms of polymerization
		CO5	Explain the concept of chromatography and spectroscopy for various engineering application
11241111	Universal Human Values & Professional Ethics	CO1	Become more aware of their surroundings, society, social problems and their sustainable solutions.
		CO2	Become sensitive to their commitment towards what they believe in (humane values. humane relationships and humane society).
		CO3	Apply what they have learnt to their own self in different day-to-day settings in real life.
		CO4	Sustain human relationships and human nature in mind.

		CO5	Have better critical ability.
		CO6	Negotiate living in harmony with self and others.
11241201	Surveying	CO1	Explain the techniques used for linear and angular measurements in surveying.
		CO2	Explain the various concepts of levelling, contours and its application.
		CO3	Apply various methods of surveying.
		CO4	Analyze various techniques of controlling points.
		CO5	Evaluate various methods for curve setting.
11241202	Strength of Material	CO1	Apply the concepts of simple stress and strain.
		CO2	Apply the concepts of complex stress and strain.
		CO3	Apply theory of simple bending in beams.
		CO4	Apply the concept of pure torsion in shaft and determine the stresses in pressure vessels.
		CO5	Evaluate columns & struts with different end conditions.
11241203	Concrete Technology	CO1	Explain the basic components of concrete.
		CO2	Analyze properties of fresh and hardened concrete.
		CO3	Apply quality control measures in concrete construction.
		CO4	Design concrete mixes using standard guidelines.
		CO5	Evaluate the use of special concretes for advanced applications.
11241204	Fluid Mechanics-I	CO1	Explain fundamental fluid properties & concepts of fluid statics.
		CO2	Apply principles of fluid flow & dimensional analysis.
		CO3	Solve fluid flow problems.
		CO4	Analyze characteristics of fluid at rest, fluid at motion & dimensionless numbers.
		CO5	Discriminate different types of fluid flow, measurement techniques & principles.
11241205	Matrices & Calculus	CO1	Solve the problem of matrix.
		CO2	Application of various matrix in engineering problems.
		CO3	Use of differential calculus.
		CO4	Apply differential calculus in basic engineering problems.
		CO5	Use integration techniques to determine the solution of various complex problems.
11241206	Building Materials & Construction Lab	CO1	Analyze the properties of fine and coarse aggregates
		CO2	Evaluate concrete workability and strength
		CO3	Assess the quality of bricks and blocks for construction.
		CO4	Understand the durability and performance of building materials
		CO5	Apply testing knowledge to construction practices
11241207	Problem Solving	CO1	Implement Python built-in functions and control statements.

	through Python Programming	CO2	Implement Python user-defined functions and classes.
		CO3	Create Python GUI.
11241209	Micro Project-II	CO1	Develop proficiency in surveying techniques for Infrastructure Layout and Analysis
		CO2	Analyze the properties and performance of various concrete types and design sustainable concrete mixes to meet specific construction requirements.
		CO3	Evaluate the properties of different materials.
		CO4	Analyze fluid properties and flow behavior for engineering systems
		CO5	Develop the writing skills to prepare reports
11241210	Engineering Physics Lab-II	CO1	Develop experimental skill required for application of physics in engineering.
		CO2	Operate different instruments specified in course safely and efficiently.
		CO3	Demonstrate the working principles in optics, semiconductors, Quantum Physics.
		CO4	Function as a member of a team for problem solving.
11241211	Language Lab	CO1	Speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes. (LOT1)
		CO2	Prepare oral dialogues and arguments within the Engineering Profession effectively. (LOT2)
		CO3	Demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context. (LOT3)
		CO4	Read a variety of Text analytically to demonstrate in writing and/or speech the interpretation of texts. (HOT4)
11241212	Sustainability & Environmental Science	CO1	Explain the fundamental concepts of environmental science, including ecosystems and the causes of environmental degradation.
		CO2	Analyze the sources, causes, and impacts of air, water, and solid waste pollution and propose appropriate mitigation strategies.
		CO3	Evaluate the effectiveness of environmental policies and global frameworks in addressing environmental challenges.
		CO4	Explain the concepts of sustainability and sustainable development goals.
		CO5	Apply various solutions for achieving sustainable development.
3110321	Fluid Mechanics-I	CO1	Define various fluid properties & states of fluid.
		CO2	Apply principles of fluid flow & dimensional analysis.
		CO3	Solve fluid flow problems.
		CO4	Analyze characteristics of fluid at rest, fluid at motion & dimensionless numbers.
		CO5	Discriminate different types of fluid flow, measurement techniques & principles.

		CO6	Apply the concepts of laminar flow in solving various fluid flow problems.
3110322	Theory of Structures-I	CO1	Determine the deflection of beam using energy methods and the principle of virtual work.
		CO2	Explain various methods & principles for analysis of structures.
		CO3	Apply various methods & principles for structural analysis.
		CO4	Analyse various structures using various methods, principles & theorems.
		CO5	Evaluate different methods of structural analysis.
3110323	Geo-Technical Engineering-I	CO1	Evaluate different properties of rocks & soil and its classification.
		CO2	Examine the flow and shear parameters & their effects on various types of soil.
		CO3	Determine the stress distribution & shear failure by various methods.
		CO4	Evaluate the shear strength parameter of soil by various methods.
		CO5	Analyse the stability of slopes using various methods.
3110324	Transportation Engineering	CO1	Explain the principles of highway planning & their geometrical design.
		CO2	Evaluate physical properties of suitable highway engineering materials with drainage provisions.
		CO3	Apply the concepts of traffic engineering in transportation planning.
		CO4	Design pavements as per regulations.
		CO5	Formulate the layers of pavement along with provisions of its drainage & maintenance.
3110325	Self Learning/Presentation	CO1	Analyze contemporary issues in civil engineering & its allied areas through literature survey.
		CO2	Distinguish state of art & relevance of the topic in national & international arena.
		CO3	Demonstrate good oral & written communication skills.
		CO4	Develop poster and power point presentations for effective communication.
		CO5	Display lifelong learning.
1000005	Project Management & Financing	CO1	Know the attributes of project and its different phases.
		CO2	Develop the project network based on work breakdown structure and esimation of activity durations
		CO3	Analyze the project network and make decide the various alternates.
		CO4	Evaluate the optimum cost of project for assigned deadlines.
		CO5	Understand the different options to arrange the finances to complete it within stipulated time
3110421	Fluid Mechanics-II	CO1	Differentiate different types of fluid flow & fluid machinery.

		CO2	Describe principles of analysis of fluid flow problem.
		CO3	Explain basic principles for measurement of different forces acting on fluid body.
		CO4	Analyze pipe flow, open channel flow problems & various characteristics of hydraulic machines
		CO5	Design open & closed conduit systems.
3110422	Theory of Structures-II	CO1	Explain various methods for analysis of structures and frames.
		CO2	Analyse various loads on framed structures using codal provisions.
		CO3	Analyse different type of structures for various load conditions by different methods.
		CO4	Draw influence line diagrams for statically determinate & indeterminate structure.
		CO5	Analyse beams & frames using plastic analysis.
3110423	Water Supply Engineering	CO1	Explain the concepts of water supply engineering.
		CO2	Apply suitable water treatment technique.
		CO3	Analyze a given water supply scheme.
		CO4	Design a water supply and distribution system based upon the needs of society.
3110424	Water Resource Engineering	CO1	Apply the concept of hydrology for measurement & forecasting of rainfall & runoff.
		CO2	Analyse runoff hydrograph by various methods.
		CO3	Analyse various requirements for an efficient irrigation project.
		CO4	Design different components of irrigation system using different theories.
		CO5	Plan an efficient, economical & safe irrigation system.
3110425	Civil Drawing Lab	CO1	Attempt to draw different components of a building.
		CO2	Produce plan, elevation & section of various components of a residential and institutional building.
		CO3	Use AutoCAD software in civil engineering drawing.
		CO4	Prepare drawing sheets of various types of buildings like residential, institutional, commercial etc
3110426	Cyber Security	CO1	Analyze cyber-attacks, types of cybercrimes and cyber laws
		CO2	Interpret and forensically investigate security incidents
		CO3	Apply policies and procedures to manage Privacy issues
		CO4	Design and develop secure software modules
2110520	Data Science	CO1	define different Data Science techniques.
		CO2	illustrate various tools used for Data Science technique.
		CO3	apply data visualization techniques to solve real world problems.
		CO4	build exploratory data analysis for Data Science methods.
		CO5	apply Data Science techniques for solving real world

			problems.
		CO6	Evaluate the performance of algorithms in data science.
2110511	Waste Water Engineering	CO1	Explain the concepts of waste water engineering.
		CO2	Determine the requirements for safe disposal of sewage.
		CO3	Apply suitable techniques for sewage treatment & disposal based upon the available data.
		CO4	Analyse a given sewerage system.
		CO5	Design sewage system for safe disposal of sewage
2110512	Estimatin Costing & Contracting	CO1	Explain the fundamentals of quantity estimation, costing & contracting.
		CO2	Apply methods to estimate area, volume & cost.
		CO3	Evaluate mathematical & numerical models for rate & quantity estimation.
		CO4	Determine rates & value.
		CO5	Classify different rates of items, contracts & measurement techniques.
2110513	S.D.D (RCC)	CO1	Apply the concepts of different design philosophies for analysis and design of singly reinforced concrete beams using relevant IS Codes.
		CO2	Analyze and design singly, doubly and flanged sections for flexure, shear and bond using relevant IS Codes
		CO3	Design one way, two way and circular slabs using relevant IS Codes.
		CO4	Analyze and design compression members and design footings using relevant IS codes.
		CO5	Design different type of staircase using relevant IS codes
2110514	Railway, Airport & Tunnel Engineering	CO1	Explain various elements of railway tracks, signaling , yards, bridges & tunnels.
		CO2	Illustrate various gauges, signals, fasteners, turnouts, crossing & their deffects etc.
		CO3	Explain the elements of airport planning, & tunnels.
		CO4	Design runway & taxiway system as per regulations.
		CO5	Apply construction methods of railway tunnels.
2110515	Minor Project-I	CO1	Recognize various engineering problems and techniques to solve them.
		CO2	Reproduce the solution of the problems upon the need of society.
		CO3	Cooperate to work within group.
		CO4	Develop the writing and communication skills for various engineering problems.
		CO5	Display lifelong learning.
2110516	Self Learning/Presentation	CO1	Analyze contemporary issues in civil engineering & its allied areas through literature survey.
		CO2	Distinguish state of art & relevance of the topic in

			national & international arena.
		CO3	Demonstrate good oral & written communication skills.
		CO4	Develop poster and power point presentations for effective communication.
		CO5	Display lifelong learning
2110517	SIP-II	CO1	Develop the writing and communication skills for various engineering problems.
		CO2	Adapt lifelong learning for benefit of society.
1000006	Disaster Management	CO1	Identify disaster prevention and mitigation approaches.
		CO2	Classify global and national disasters, their trends and profiles.
		CO3	Determine the impacts of various disasters.
		CO4	Apply Disaster Risk Reduction in management.
		CO5	Infer the linkage between disasters, environment and development.
2110620	2110620 : Artificial Intelligence & Machine Learning	CO1	Define basic concepts of Artificial Intelligence & Machine Learning.
		CO2	Illustrate various techniques for search and processing.
		CO3	Identify various types of machine learning problems and techniques.
		CO4	Analysis various techniques in Artificial Intelligence, ANN & Machine Learning.
		CO5	Apply AI and ML techniques to solve real world problems.
2110621	2110621 : Solid & Hazardous Waste management	CO1	Explain the principles & concepts of waste management
		CO2	Apply various techniques of handling the waste.
		CO3	Apply various techniques of processing and energy recovery from waste.
		CO4	Apply various techniques to manage hazardous waste.
		CO5	Analyze the challenges and impacts of managing biomedical, e-waste, and plastic waste
2110622	2110622 : Structural Design & Drawing (Steel)	CO1	Design the steel connections using relevant IS codes.
		CO2	Design tension members using relevant IS codes.
		CO3	Design simple and built up compression member using relevant IS codes.
		CO4	Design flexural members using relevant IS codes.
		CO5	Design column bases and explain plate girders and composite construction.
910111	910111 : Building Maintenance & Services	CO1	Identify various services required in a building.
		CO2	Carry out planning of fire fighting system for a building.
		CO3	Develop a management strategy for maintenance of building services in a building.
		CO4	Design a sustainable building services plan for a building.

910110	910110 : Sustainable Materials & Green Buildings	CO1	Apply the concepts of sustainability in the context of building and conventional engineered building materials.
		CO2	Explain the Concepts of VOC and indoor air quality.
		CO3	Apply the concepts of embodied, Operational and Life Cycle Energy, Minimizing Energy consumption by optimal design, use of BIPV.
		CO4	Apply the guidelines of ECBC, LEED, GRIHA while planning a building.
		CO5	Use renewable energy sources in buildings.
2110623	2110623 : Minor Project - II	CO1	Recognize various engineering problems and techniques to solve them.
		CO2	Reproduce the solution of the problems upon the need of society.
		CO3	Cooperate to work within group.
		CO4	Develop the writing and communication skills for various engineering problems.
		CO5	Display lifelong learning.
1000007	1000007 : Intellectual Property Rights	CO1	Imbibe the knowledge of Intellectual Property and its protection through various laws
		CO2	Apply the knowledge of IPR for professional development
		CO3	Develop a platform for protection and compliance of Intellectual Property Rights & knowledge
		CO4	Create awareness amidst academia and industry of IPR and Copyright compliance
		CO5	Deliver the purpose and function of IPR and patenting.
110731	Hydraulic Structure	CO1	Analyze & Design Gravity Dams
		CO2	Analyze & Design Earth Dams
		CO3	Perform Canal Fluming & Design CD Works
		CO4	Solve problems of Spillways & Energy Dissipators
		CO5	Identify components of hydro project & assessment of power potential.
110732	Advanced Structural Design (RCC)	CO1	Design water retaining structures (resting on the ground and underground) as per IS Code Provisions.
		CO2	Design of overhead water tanks & its staging; and Flat slabs as per IS Code Provisions.
		CO3	Design the Cantilever and Counterfort type retaining walls as per IS Code Provisions.
		CO4	Design the solid slab and T-beam type bridges as per Indian Codal Provisions.
		CO5	Analyze and design Prestressed Concrete sections as per IS Code Provisions.
110734	Industrial Waste Management	CO1	Explain basic concepts of industrial waste management.
		CO2	Evaluate the effects of industrial waste on streams as per the standards.
		CO3	Determine the requirements for safe disposal of

			sewage.
		CO4	Apply suitable techniques for reduction & treatment of industrial waste & sludge.
		CO5	Explain waste management techniques of different industries.
910211	Integerated Waste Management for Smart City	CO1	Explain the principles & concepts of waste management.
		CO2	Apply various techniques of handling the waste.
		CO3	Apply various techniques of energy recovery from waste.
		CO4	Plan an effective & efficient waste management system.
910212	Safety & Quality Management	CO1	Explain the quality management systems and utilize the ISO 9000 family of standards.
		CO2	Improve the quality of the project through tools and techniques.
		CO3	Plan for quality assurance and safety of construction and other industrial projects.
		CO4	Analyse the quality control and quality improvement tools and Techniques.
		CO5	Identify and evaluate the quality and safety management practices in construction and other industries.
110821	Internship	CO1	Observe various activities of civil engineering works.
		CO2	Recognize various engineering problems and techniques to solve them.
		CO3	Reproduce to solution of the problems upon the need of society.
		CO4	Develop the writing and communication skills for various engineering problems.
		CO5	Adapt lifelong learning for benefit of society.