

DEPARTMENT OF CIVIL ENGINEERING (2023-2024)

Course Code/Name	CO	CO Statement
3100011/Engineering Mathematics	CO1	Apply differential calculus in basic engineering problems
	CO2	Use integration techniques to determine the solution of various complex problems.
	CO3	Solve the differential equations by various methods.
	CO4	Solve the problem of matrix.
	CO5	Concept of Boolean algebra and graph theory.
3110121/Computer Programming	CO1	Identify situations where computational methods and computers would be useful.
	CO2	Develop algorithms and flowchart for a given problem.
	CO3	Understand the concepts of procedural programming.
	CO4	Explain the concepts of object oriented programming and its significance in the real world.
	CO5	Analyze the problems and choose suitable programming techniques to develop solutions.
	CO6	Develop computer programs to solve real world problems.
3100014/Engineering Graphics	CO1	Visualize the geometric details of engineering objects.
	CO2	Translate the geometric information of engineering objects into engineering drawings.
	CO3	Draw orthographic projections and sections.
	CO4	Develop knowledge to read, understand and explain drawing.
	CO5	Improve their skills so that they can apply these skills in developing new products.
	CO6	Prepare simple layout of factory, machine and buildings.
3110122/Building Material & Construction (T)	CO1	Explain the basic elements of buildings, engineering materials & construction
	CO2	Evaluate the properties of various materials like cement, aggregate, concrete, admixture, brick, stone etc.
	CO3	Distinguish the suitability of building materials in the construction of elements of buildings.
	CO4	Evaluate various types of concrete in building construction accordingly.

	CO5	Apply various techniques for finishing & protection works of various elements of building.
3110122/Building Material & Construction (P)	CO1	Determine the properties of cement, sand & aggregate as per IS code.
	CO2	Determine the workability of concrete for suitability of concrete mix in different construction works.
	CO3	Evaluate compressive strength of various concrete mixes.
	CO4	Determine physical properties of brick by experiment and practice accordingly.
	CO5	Examine the properties of the cement mortar for various elements of the buildings.
3110123/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 basics of kinematics and kinetics of particles in motion and undamped free vibration.
3000005/Environmental Engineering	CO1	Explain the fundamental concepts of energy, ecosystems & environment.
	CO2	Recognize various environmental problems and their effects.
	CO3	Apply various air & water remediation methods.
	CO4	Apply waste management techniques.
	CO5	Apply the concepts of sustainability.
3110221/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	Analyse various techniques of controlling points.
	CO5	Evaluate various methods for curve testing.
3110222/Strength of Materials (T)	CO1	Apply the concepts of stress and strain
	CO2	Apply theory of simple bending in beams.
	CO3	Apply the concept of pure torsion in shaft and determine the stresses in pressure vessels.
	CO4	Evaluate columns & struts with different end conditions.
	CO5	Analyse the structure using geometrical methods and virtual work to determine the deflection.
3110222/Strength of Materials (P)	CO1	Evaluate properties of material by impact test.
	CO2	Evaluate properties of materials by hardness test.
	CO3	Evaluate properties of material by tensile test.

	CO4	Determine compressive & flexural strength of materials.
3100022/Basic Electrical & Electronics Engineering	CO1	Solve dc & ac circuits by applying fundamental laws & theorems.
	CO2	Compare the behaviour of electrical and magnetic circuits for given input.
	CO3	Explain the working principle, construction, applications of rotating electrical machines.
	CO4	Explain the working principle, constructional details, losses & applications of single phase transformer.
	CO5	Select the logic gates for various applications in digital electronic circuits.
	CO6	Explain characteristics of Diode and Transistor.
3110223/Survey Practice Lab	CO1	Follow the guidelines for field surveying
	CO2	Follow the working principles of survey instruments for measurements.
	CO3	Measure horizontal & vertical angle by theodolite for traversing and levelling.
	CO4	Determine tachometric constants for linear measurements by tachometry.
	CO5	Create a simple circular curve by using Rankine's method for alignment.
	CO6	Develop contour map by using tachometer & total station.
3000004/Language	CO1	Speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes.
	CO2	Prepare oral dialogues and arguments within the Engineering Profession effectively.
	CO3	Demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context
	CO4	Read a variety of Text analytically so as to demonstrate in writing and/or speech the interpretation of texts.
	CO5	Interpret text written in English assessing the results in written and oral arguments using appropriate material for support.
3100021/Basic Mechanical Engineering	CO1	Define the essential concepts of thermal, design and production used in Mechanical Engineering
	CO2	Summarize fundamental techniques and process used in power generating machines.
	CO3	Solve the various problems based on basic concepts of Mechanical Engineering.
	CO4	Analyze the various gas, steam and air cycles.
	CO5	Evaluate the problems of steam generators, thermodynamics, steam and I.C engines.
	CO6	Generate the skills to demonstrate steam generator and reciprocating machine in depth.
2110321: 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
2110322: Theory of Structure-I	CO1	Classify different type of structures based on support conditions
	CO2	Explain various methods & principles for analysis of structures.
	CO3	Apply various methods & principles for structural analysis
	CO4	Analyse various structures using various methods, principle & theorems
	CO5	Evaluate different methods of structural analysis.
2110323: Geotechnical Engineering – I	CO1	Evaluate different properties of soil, types of foundations and its classifications
	CO2	Examine flow and shear parameters & their effects on various types of soil
	CO3	Determine the stress distribution & shear strength parameter of soil by various methods
	CO4	Analyse the stability of slopes, earth pressures & retaining walls using analytical methods
	CO5	Evaluate suitable foundation system for various site conditions.
2110321 (P): Fluid Mechanics – I	CO1	Differentiate between different flow measurement devices
	CO2	Notice flow through pipes & fall velocity of particle
	CO3	Correct the instrumental errors
	CO4	Apply Stoke’s law to calculate terminal velocity
2110323 (P): Geotechnical Engineering – I	CO1	Check physical properties of soil
	CO2	Check strength properties of soil
	CO3	Differentiate the flow properties and stresses of soil
	CO4	Check shear strength of soil
2110324: 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.
2110324: Transportation Engineering (P)	CO1	Select suitable aggregate material by testing the physical properties
	CO2	Determine properties of bitumen and its grade
	CO3	Determine CBR value of material for subgrade and subsequent layers of pavement.

	CO4	Design job mix formula for bituminous surface using Marshal Stability test.
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 estimation 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.
110520: 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
110621: Wastewater Engineering	CO1	Explain the concepts of waste water engineering
	CO2	Determine the requirements for safe disposal of sewage
	CO3	Apply suitable technique for sewage treatment & disposal based upon the available data.
	CO4	Analyse a given sewerage system.
	CO5	Design sewage system for safe disposal of sewage.
110623: Estimating 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
110513: Structural Design & Drawing (R.C.C.)	CO1	Apply the concepts of different design philosophies for deriving basic expressions used in RC design
	CO2	Determine the capacity of RC elements using IS456 guidelines.
	CO3	Analyze the RC elements for determining design variables as per IS456 & IS 875
	CO4	Design the RC elements as per IS 456 provisions.
	CO5	Develop the design sketches for RC elements as per IS456; IS13920 and SP34 provisions.
	CO1	Explain the elements of airport planning, bridges & tunnels.
	CO2	Design runway & taxiway system as per regulations.

110733: Railways, Airport & Tunnel Engineering	CO3	Explain various elements of railway tracks, signalling, yards, bridges & tunnels.
	CO4	Illustrate various gauge, signals, fasteners, turnouts, crossing etc.
	CO5	Apply construction methods of railway tunnels.
110515: 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.
110517: Summer Internship Project - 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.
110731: Hydraulic Structure	CO1	Identify different components of hydro project
	CO2	Explain basic principles of designing hydropower plant & cross drainage works.
	CO3	Solve problems of dam analysis, energy dissipators & cross drainage works.
	CO4	Evaluate suitability of types of hydraulic structures
	CO5	Design various elements of hydraulic structures.
110732: Advanced Structural Design- I (RCC)	CO1	Explain behaviour of RCC and Prestressed concrete structures under loads.
	CO2	Determine forces developed in RCC and Prestressed concrete structures under loads.
	CO3	Compare designs of RCC and Prestressed concrete structures for given loadings.
	CO4	Develop economic and safe designs of RCC and Prestressed concrete structures.
910211- Integrated Waste Management for Smart City (OC - 2)	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.

110716- Software Application for Solving Civil Engineering Problems	CO1	Design various beams, slabs & multistorey building's using various software's.
	CO2	Design water supply & sewer networks using various software's.
	CO3	Practice MS Excel in estimation works.
	CO4	Produce land use land cover maps and geo contour maps using various software's.
	CO5	Practice Primavera and MS-Project softwares.
110718 - Summer Internship Project – III	CO1	Observe various activities of civil construction works.
	CO2	Examine the utility of general and specific equipments for construction.
	CO3	Differentiate the construction projects individually and in team.
	CO4	Develop the writing and communication skills for various engineering problems.
	CO5	Adapt lifelong learning for benefit of society.
110717 - Creative Problem Solving	CO1	Identify various on field problems.
	CO2	Practice various methods to solve problems.
	CO3	Produce solutions to various problems.
	CO4	Demonstrate various problems solving skills.
2110424: Water Resource Engineering	CO1	Analyse various requirements for an efficient irrigation project
	CO2	Design different components of irrigation system using different theories
	CO3	Plan an efficient, economical & safe irrigation system
	CO4	Explain the concept of hydrology and hydrograph
	CO5	Apply basic principles for measurement & forecasting of rainfall & runoff
	CO6	Analyse runoff hydrograph by various methods
2110425: 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.
110511: Water Supply Engineering	CO1	Explain the concepts of water supply engineering.
	CO2	Determine the requirements for safe supply of water.
	CO3	Apply suitable water treatment technique based upon the available data.
	CO4	Analyse a given water supply scheme.

	CO5	Design a water supply system based upon the needs of society.
2110423: Water Supply Engineering	CO1	Explain the concepts of water supply engineering.
	CO2	Determine the requirements for safe supply of water.
	CO3	Apply suitable water treatment technique based upon the available data.
	CO4	Analyse a given water supply scheme.
	CO5	Design a water supply system based upon the needs of society.
110511: Water Supply Engineering (Lab)	CO1	Follow sampling procedure & other guidelines for sampling & analysis of water samples.
	CO2	Check various water quality parameters.
	CO3	Improve the water quality by suggesting suitable corrective measures.
	CO4	Train others on various ways of improving the quality of water.
2110423: Water Supply Engineering (Lab)	CO1	Follow sampling procedure & other guidelines for sampling & analysis of water samples.
	CO2	Check various water quality parameters.
	CO3	Improve the water quality by suggesting suitable corrective measures.
	CO4	Train others on various ways of improving the quality of water.
110512: 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.
2110422: 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.
110514: 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	Analyse pipe flow, open channel flow problems & various characteristics of hydraulic machines.

	CO5	Design open & closed conduit systems.
2110421: 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	Analyse pipe flow, open channel flow problems & various characteristics of hydraulic machines.
	CO5	Design open & closed conduit systems.
110516: 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
2110326: 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
110620: 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	Analyse various techniques in Artificial Intelligence, ANN & Machine Learning.
	CO5	Apply AI and ML techniques to solve real world problems
110622: S.D.D (Steel)	CO1	Explain the principles of steel structural design using relevant IS Codes
	CO2	Evaluate structural behaviour of different steel structural elements
	CO3	Analyse a given section of steel structural element using IS codes
	CO4	Design different elements of steel structure under various loading conditions using relevant IS codes
	CO5	Design a structure/ component to meet desired needs within realistic constraints such as economy, safety, viable construction & its sustainability as per codal provisions
	CO1	Recognize various engineering problems and techniques to solve them

110624: Minor Project-II	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
110821: Internship/Project	CO1	Observe various activities of civil engineering works.
	CO2	Recognize various engineering problems and techniques to solve them.
	CO3	Reproduce to solution of the problem upon the need of society
	CO4	Develop the writing and communication skills for various engineering problems
	CO5	Adapt lifelong learning for benefit of society