



Department of Civil Engineering

SE Semester I

| Program Outcomes (PO) | | |
|---|-------------------------------------|--------------------------------------|
| PO1: Engineering Knowledge | PO5: Modern Tool Usage | PO9: Individual and team work |
| PO2: Problem Analysis | PO6: The engineer and Society | PO10: Communication |
| PO3: Design/Development of solutions | PO7: Environment and Sustainability | PO11: Project Management and Finance |
| PO4: Conduct Investigations of Complex Problems | PO8: Ethics | PO12: Life-long learning |

| Program Specific Outcomes (PSO) | |
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| PSO1 | Carry out projects in the field of real estate and infrastructural engineering |
| PSO2 | Provide solution for environmental and social issues through sustainable approach |
| PSO3 | Substantiate professionalism through leadership qualities and moral values |

Subject: Building Technology and Architectural Planning

Course Outcomes: On completion of the course, learner will be able to:

1. Identify types of building and basic requirements of building components.
2. Make use of Architectural Principles and Building byelaws for building construction.
3. Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code.
4. Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
5. Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
6. Understand different services and safety aspects



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Subject: Mechanics of Structures

Course Outcomes: On completion of the course, learner will be able to:

1. Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
2. Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
3. Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
4. Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.
5. Analyse axially loaded and eccentrically loaded column.
6. Determine the slopes and deflection of determinate beams and trusses.



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Subject: Fluid Mechanics

Course Outcomes: At the end of the course, the learners will be able to

1. Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practical problems.
2. Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow
3. Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.
4. Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.
5. Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section.
6. Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.



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Subject: Engineering Mathematics III

Course Outcomes: At the end of the course, the learners will be able to

1. Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.
2. Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.
3. Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.
4. Perform Vector differentiation & integration, analyze the vector fields and apply to fluid flow problems.
5. Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations



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Subject: Engineering Geology

Course Outcomes: At the end of the course, the learners will be able to

1. Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.
2. Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.
3. Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
4. Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.
5. Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.
6. Explain geological hazards and importance of ground water and uses of common building stones.



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Subject: Geotechnical Engineering

Course Outcomes: At the end of the course, the learners will be able to

1. Identify and classify the soil based on the index properties and its formation process
2. Explain permeability and seepage analysis of soil by construction of flow net.
3. Illustrate the effect of compaction on soil and understand the basics of stress distribution.
4. Express shear strength of soil and its measurement under various drainage conditions.
5. Evaluate the earth pressure due to backfill on retaining structures by using different theories.
6. Analysis of stability of slopes for different types of soils.



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Subject: Surveying

Course Outcomes: At the end of the course, the learners will be able to

1. Define and Explain basics of plane surveying and differentiate the instruments used for it.
2. Express proficiency in handling surveying equipment and analyse the surveying data from this equipment.
3. Describe different methods of surveying and find relative positions of points on the surface of earth.
4. Execute curve setting for civil engineering projects such as roads, railways etc.
5. Articulate advancements in surveying such as space-based positioning systems
6. Differentiate map and aerial photographs, also interpret aerial photographs



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Subject: Concrete Technology

Course Outcomes: At the end of the course, the learners will be able to

1. Understand chemistry, properties and classification of cement fly ash, aggregates and admixtures, and hydration of cement
2. Check the properties of concrete in fresh state.
3. Check the properties of hardened concrete with destructive and nondestructive testing instruments
4. Design concrete mix of desired grade.
5. Get acquainted to concrete handling equipment and different special concrete types.
6. Predict deterioration in concrete and repair it with appropriate methods and techniques.



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Subject: Structural Analysis

Course Outcomes: At the end of the course, the learners will be able to

1. Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.
2. Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
3. Implement application of the slope deflection method to beams and portal frames.
4. Analyze beams and portal frames using moment distribution method.
5. Determine response of beams and portal frames using structure approach of stiffness matrix method.
6. Apply the concepts of plastic analysis in the analysis of steel structures.



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Subject: Project Management

Course Outcomes: On completion of the course, learner will be able to

1. Describe the various concepts involved in Project Management.
2. Explain and apply scientific methods of planning and management
3. Segregate the materials as per their annual usage and explain process to find production rate of construction equipment
4. Demonstrates methods of manpower planning and Use various project monitoring methods
5. Discuss engineering economics and different laws associated with project management
6. Differentiate the methods of project selection and recommend the best economical project.



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Subject: Project Based Learning

Course Outcomes: On completion of the course, learner will be able to

1. Identify the community/ practical/ societal needs and convert the idea into a product/ process/service.
2. Analyse and design the physical/ mathematical/ ICT model in order to solve identified problem/project.
3. Create, work in team and applying the solution in practical way to specific problem.



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Subject: Hydrology and Water Resources Engineering

Course Outcomes: On completion of the course, learner will be able to:

1. Understand government organizations, apply & analyze precipitation & its abstractions.
2. Understand, apply & analyze runoff, runoff hydrographs and gauging of streams
3. Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.
4. Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics
5. Understand water logging & water management, apply & analyze ground water hydrology
6. Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement



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Subject: Water Supply Engineering

Course Outcomes: On completion of the course, learner will be able to:

1. Define identify, describe reliability of water sources, estimate water requirement for various sectors
2. Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics
3. Design various components of water treatment plant and distribution system
4. Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
5. Design elevated service reservoir capacity and understand the rainwater harvesting

6. Understand the requirement of water treatment plant for infrastructure and Government scheme



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Subject: Design of Steel Structures

Course Outcomes: At the end of the course, the learners will be able to

1. Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force
2. Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening
3. Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending
4. Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section
5. Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load

6. Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections



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Subject: Engineering Economics and Financial Management

Course Outcomes: At the end of the course, the learners will be able to

1. Understand basics of construction economics
2. Develop an understanding of financial management in civil engineering projects.
3. Prepare and analyze the contract account.
4. Decide on right source of fund for construction projects
5. Understand working capital and its estimation for civil engineering projects
6. Illustrate the importance of tax planning & understand role of financial regulatory bodies



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Subject: Seminar

Course Outcomes: At the end of the course, the learners will be able to

1. Appraise the current civil engineering research / techniques / developments / interdisciplinary areas.
2. Review and organize literature survey utilizing technical resources, journals etc
3. Evaluate and draw conclusions related to technical content studied
4. Demonstrate the ability to perform critical writing by preparing a technical report
5. Develop technical writing and presentation skills



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Subject: Waste Water Engineering

Course Outcomes: At the end of the course, the learners will be able to

1. Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams
2. Design preliminary and primary unit operations in waste water treatment plant
3. Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process
4. Understand and design suspended and attached growth wastewater treatment systems
5. Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems
6. Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment



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Subject: Design of Reinforced Concrete Structures

Course Outcomes: At the end of the course, the learners will be able to

1. Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
2. Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
3. Design & detailing of rectangular one way and two-way slab with different boundary conditions
4. Design & detailing of dog legged and open well staircase
5. Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion
6. Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings



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Subject: Remote Sensing and Geographic Information System

Course Outcomes: At the end of the course, the learners will be able to

1. To comprehend fundamentals and principles of RS and GIS techniques.
2. To enhance students' capacity to interpret images and extract information of earth surface from multi-resolution imagery at multi-scale level
3. To develop skills of Image processing and GIS
4. To utilize RS and GIS techniques in Engineering Geology and civil engineering
5. To study satellite image processing, satellite image interpretation, digitization and generation of thematic maps in a GIS
6. To learn buffering and layer analysis for civil engineering applications



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Subject: Foundation Engineering

1. Perform subsurface investigations for foundations using different methods
2. Estimate the bearing capacity of shallow foundations
3. Calculate immediate and primary consolidation settlement of shallow foundations
4. Decide the capacity of a pile and pile group
5. Understand the steps in geotechnical design of shallow foundations and well foundations
6. Analyze problems related to expansive soil and overcome them using design principles, construction techniques in black cotton soil



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Subject: Transportation Engineering

Course Outcomes: On completion of the course, learner will be able to

1. Understand principles and practices of transportation planning
2. Demonstrate knowledge of traffic studies, analysis and their interpretation
3. Design Geometric Elements of road pavement
4. Evaluate properties of highway materials as a part of road pavement
5. Appraise different types of pavements and their design
6. Understand the fundamentals of Bridge Engineering and Railway Engineering



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Subject: Dams and Hydraulic Structures

Course Outcomes: At the end of the course, the learners will be able to

1. Understand types of dams and instrumentation working
2. Execute stability analysis of Gravity Dam
3. Understand types of spillways & Design of Ogee spillway
4. Illustrate the failures and analyze stability of earthen dam
5. Design Canals and understand the canal structures
6. Analysis of the Diversion headwork and Cross Drainage work



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| PO3: Design/Development of solutions | PO7: Environment and Sustainability | PO11: Project Management and Finance |
| PO4: Conduct Investigations of Complex Problems | PO8: Ethics | PO12: Life-long learning |

| Program Specific Outcomes (PSO) | |
|--|---|
| PSO1 | Carry out projects in the field of real estate and infrastructural engineering |
| PSO2 | Provide solution for environmental and social issues through sustainable approach |
| PSO3 | Substantiate professionalism through leadership qualities and moral values |

Subject: Quantity Surveying, Contracts and Tenders

Course Outcomes: At the end of the course, the learners will be able to

1. Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works
2. Describe tendering process, construction contracts, and aspects of Arbitration and prepare tender documents
3. Prepare detailed estimate of various items of work by different methods and calculate quantity of steel from Bar bending schedule
4. Apply engineering knowledge to prepare estimate for roads, culverts, and water tank (Elevated storage tank)
5. Apply concepts of specification to draft brief specification, detailed specification and prepare detailed rate analysis report
6. Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend



Department of Civil Engineering
BE Semester I & II

| Program Outcomes (PO) | | |
|---|-------------------------------------|--------------------------------------|
| PO1: Engineering Knowledge | PO5: Modern Tool Usage | PO9: Individual and team work |
| PO2: Problem Analysis | PO6: The engineer and Society | PO10: Communication |
| PO3: Design/Development of solutions | PO7: Environment and Sustainability | PO11: Project Management and Finance |
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| Program Specific Outcomes (PSO) | |
|--|---|
| PSO1 | Carry out projects in the field of real estate and infrastructural engineering |
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| PSO3 | Substantiate professionalism through leadership qualities and moral values |

Subject: Project Stage I & II

Course Outcomes: At the end of the course, the learners will be able to

1. Appraise the current Civil Engineering research/techniques/developments/interdisciplinary areas
2. Review and organize literature survey utilizing technical resources, journals etc.
3. Evaluate and draw conclusions related to technical content studied
4. Demonstrate the ability to perform critical writing by preparing a technical report
5. Develop technical writing and presentation skills