## B.E. 3rd Sem

**Course: Engineering Mathematics- III** **Course Code: (3CE01)**

At the end of Engineering Mathematics-III course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Apply the fundamental concepts of Ordinary Linear Differential Equation by different methods. | L3 |
| 2 | Apply Laplace Transform to special functions & solve Differential Equation with constant coefficients. | L3 |
| 3 | Solve first, higher order Homogeneous Partial Differential Equations with constant coefficients. | L3 |
| 4 | Apply numerical methods to obtain approximate solutions of mathematical problems. | L3 |
| 5 | Apply CR equations, Harmonic functions, Milne's method & conformal mapping. | L3 |
| 6 | Apply conditional probability, Baye's Theorem, Probability distribution & Curve fitting for Line & Parabola. | L3 |

**Course: Strength of Materials** **Course Code: (3CE02)**

At the end of Strength of Materials course, the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Analyse the stress, strain, deformation and material behaviour under different types of loading. | L4 |
| 2 | Calculate Shear force and Bending Moment in Beams. | L4 |
| 3 | Calculate Bending and shear stresses in beams. | L4 |
| 4 | Describe the principles of torsion and thin cylinder pressure. | L2 |
| 5 | Calculate principle stresses and strains. | L4 |
| 6 | Analyse the elastic stability of columns and struts. | L4 |

**Course: Building Construction & Engineering Geology Course Code: (3CE03)**

At the end of Building Construction & Engineering Geology course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Identify load bearing and Frame structure | L2 |
| 2 | Recognize various types of construction material | L2 |
| 3 | Predict various levels in building and its needs. | L3 |
| 4 | Classify types of Staircases, door, windows and other related fixtures. | L2 |
| 5 | Identify types of rocks and minerals and its construction properties. | L2 |
| 6 | Summarize reasons for earthquake and seismic waves. | L3 |

**Course: Transportation Engineering Course Code: (3CE04)**

At the end of Transportation Engineering course, the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Identify the type of roads and its utility. | L2 |
| 2 | Demonstrate various road studies at the time of survey and actual construction. | L3 |
| 3 | Design the various types of road pavements. | L5 |
| 4 | Discuss rules, regulations, signals, type of gauges and railway sleepers' density. | L2 |
| 5 | Describe the Airport features and design concept of components for Aero plains movement. | L2 |
| 6 | Classify the types and components of Tunnels and bridges and its design components. | L2 |

**Course: – Concrete Technology & RCC** **Course Code: (3CE05)**

At the end of Concrete Technology & RCC course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Discuss the need and composition of binding material, cement. | L2 |
| 2 | Discuss concrete and RCC and tests for suitability. | L2 |
| 3 | Analyse RCC Components like slab and lintels. | L4 |
| 4 | Classify the admixtures as per the need of Concrete. | L2 |
| 5 | Design the mix design. | L5 |
| 6 | Discuss mix design by IS 10262-2019 & Ambuja Method. | L2 |

**Course: Strength of Materials-Lab** **Course Code: (3CE07)**

At the end of Strength of Materials lab Practical's student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Describe the basic concepts of strength of materials. | L2 |
| 2 | Interpret properties of different materials through experimentation. | L3 |
| 3 | Predict behaviour of materials under various types of loads | L3 |

**Course: Building Construction & Engineering Geology-Lab Course Code: (3CE08)**

At the end of Building Construction & Engineering Geology lab Practical's student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Recognize the good materials to be used for the construction work and different types of masonry | L2 |
| 2 | Examine various door and window styles, paint jobs, plastering, damp proofing, scaffolding, shoring, and underpinning techniques, and implement the necessary engineering steps. | L4 |
| 3 | Analyze internal structure and composition of the earth. | L4 |
| 4 | Examine geo-morphological agents such as river, wind, sea waves, and their implications in implementing civil engineering projects | L4 |

**Course: Transportation Engineering-Lab Course Code: (3CE09)**

At the end of Transportation Engineering lab Practical's student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Compute mechanical properties of aggregate to make sure the design requirements are met. | L3 |
| 2 | Demonstrate the abrasion resistance of aggregates by subjecting them to wear. | L3 |
| 3 | Demonstrate the viscosity of bitumen at various temperatures. | L3 |

**Course: – Concrete Technology & RCC- Lab.** **Course Code: (3CE10)**

At the end of Concrete Technology & RCC lab Practical's the student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Demonstrate properties of Aggregate, sand and cement used in concrete mix. | L3 |
| 2 | Compute the ability of concrete by the performing of tests such as compressive, Durability workability etc. | L3 |
| 3 | Verify theoretical concepts through analytical, experimental methods. | L2 |

## B.E. 4th Sem

**Course: Building Planning Designing & CAD** **Course Code: (4CE01)**

At the end of Building Planning Designing & CAD course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Apply First angle and Third angle method in engineering Drawings. | L3 |
| 2 | Apply building planning principles practically while developing projects. | L3 |
| 3 | Describe the climatic conditions and decide the corresponding provision in structure. | L2 |
| 4 | Describe the Bylaws, Town development authority rules and terms. | L2 |
| 5 | Prepare various Drawing plans manually | L5 |
| 6 | Prepare various Drawing plans computationally using AutoCAD | L5 |

**Course: Hydrology & Water Resource Engineering** **Course Code: (4CE02)**

At the end of Hydrology & Water Resource Engineering course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Explain the hydrology and hydrological data. | L2 |
| 2 | Analyse the hydrological methods for runoff. | L4 |
| 3 | Compute the groundwater hydrological problems | L3 |
| 4 | Explain the need of irrigation systems and its alternatives | L2 |
| 5 | Describe the distribution system like canal system. | L2 |
| 6 | Discuss about Dams & Spillways. | L2 |

**Course: Surveying** **Course Code: (4CE03)**

At the end of surveying the student will be able to:

| CO No. | Course Outcome | Level of Learning (As per Bloom's Taxonomy) |
|---|---|---|
| 1 | Discuss principles of Surveying, Remote Sensing and Geometrics. | L2 |
| 2 | Describe different instruments, tools, applications and Techniques to determine the positions on the surface of the earth, change detection. | L2 |
| 3 | Describe Liner measurement methods of surveying. | L2 |
| 4 | Demonstrate the techniques for setting out alignments, curves, other layouts, modern survey systems etc. | L3 |
| 5 | Explain survey at elevation and conduct Plane Table survey. | L2 |
| 6 | Explain Plane Table survey & Specifications. | L2 |

**Course: Geotechnical Engineering –I** **Course Code: (4CE04)**

At the end of Geotechnical Engineering –I course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Calculate the Index properties and Atterberg limits for soil classification. | L4 |
| 2 | Discuss the mechanics of compaction and quality control in the field. | L2 |
| 3 | Explain permeability of soil and methods of dewatering. | L2 |
| 4 | Calculate the seepage discharge and design the graded filter. | L4 |
| 5 | Discuss the concept of consolidation and stress distribution in soil mass. | L2 |
| 6 | Calculate the shear strength of different soil. | L4 |

**Course: Structural Analysis- I** **Course Code: (4CE05)**

At the end of Structural Analysis- I course the student will be able to:

| CO No. | Course Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Choose the type of analysis based on the type of structural Element. | L3 |
| 2 | Explain degree of freedom, equilibrium condition, and Elemental determinacy. | L2 |
| 3 | Identify reasons for failure and permissible limits for safety. | L2 |
| 4 | Apply the knowledge of beam analysis for practical analysis and design purposes. | L3 |
| 5 | Analyse the structural members using a variety of analysis techniques | L4 |
| 6 | Explain the benefits of using suspended, two, or three hinged arches. | L2 |

## Laboratory Outcome

**Course: Building Planning Designing & CAD-Lab** **Course Code: (4CE07)**

At the end of Building Planning & CAD lab. Course the student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Sketch the details of construction of different building elements. | L3 |
| 2 | Differentiate the completed form of the building and the intricacies of construction based on the engineering drawings. | L4 |
| 3 | Prepare computer aided engineering drawings. | L5 |

**Course: Hydrology & Water Resource Engineering Lab Course Code: (4CE08)**

At the end of Hydrology & Water Resource Engineering Lab practical's the student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Analyse gravity dams and provide basic and useful profiles that demonstrate your grasp of the fundamentals of dam design. | L4 |
| 2 | Explain Ogee spillways with energy dissipaters, emphasizing effective water release and dissipation of energy to stop erosion and preserve dam safety. | L2 |
| 3 | Describe diversion weirs on permeable foundations taking into account foundation stability, silt control, and water flow. | L2 |

**Course: Surveying- Lab Course Code: (4CE09)**

At the end of Surveying Lab, the student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Comprehend calculating distance using chain tape and EDM, as well as RL of a given point. | L2 |
| 2 | Demonstrate a cross-section and profile levelling experiment for theodolite, road, and compass navigating. | L3 |
| 3 | Schedule engineering project surveys and plane table surveys. | L3 |

**Course: Geotechnical Engineering -1 Lab** **Course Code: (4CE10)**

At the end of Geotechnical Engineering-1 Lab the student will be able to:

| LO No. | Laboratory Outcome | Level of Learning (as per Bloom's Taxonomy) |
|---|---|---|
| 1 | Examine soil properties like specific gravity, moisture content relative density and grain size distribution. | L4 |
| 2 | compute out Atterberg's limits for a soil sample | L3 |
| 3 | Examine soil shear strength by different methods like direct shear test and triaxial tests. | L4 |