



**Department of Civil Engineering**

**Course Outcomes (COs)**

**Semester III**

**3CE01 ENGINEERING MATHEMATICS-III**

After successfully completing the course, the students will be able to:

- CO 1. Solve higher order Differential Equation.
- CO 2. Find Laplace Transform of function and how to solve differential equation using Laplace transform
- CO 3. Get the knowledge for Solving First order and first degree differential equation.
- CO 4. Get the skilled to find Numerical method problem
- CO 5. Get the knowledge to solve complex integration along given curve
- CO 6. Get the skilled to find Probability.

**3CE02 STRENGTH OF MATERIALS**

After successfully completing the course, the students will be able to:

- CO 1. Gain knowledge about mechanical properties of materials and will understand the concept of different stresses and strains under biaxial and triaxial loading in accordance to different elastic constants.
- CO 2. Draw AFD, SFD and BMD for different loading conditions and different types of beams.
- CO 3. Analyze bending stresses shear stresses and strains every beam.
- CO 4. Understand the concept of torsion theory and power transmitted by shaft and analysis the numerical problem also able to understand the concept of closed coil helical spring with axial load and Analysis of thin cylinder subjected to internal pressures.



CO 5. Understand the basic concept of principal stresses and strains and the analysis of combined direct and bending stresses its applications to short column with eccentric loads, retaining wall with horizontal Lateral forces.

CO 6. Analyze the numerical problems based on slope and deflections of beams by:  
1) Macaulay's method 2) Moment Area method 3) Conjugate beam method and theory of long columns by Euler's and Rankine's formula.

### **3CE03 BUILDING CONSTRUCTION & ENGINEERING GEOLOGY**

After successfully completing the course, the students will be able to:

CO 1. To understand Load bearing and Frame structure.

CO 2. To recognize various types of construction material and its suitability

CO 3. To recognize the various levels in building and its need.

CO 4. To know types of staircase, doors, windows and other related fixtures

CO 5. To recognize types of rock and minerals and its construction properties.

CO 6. To know reason for earthquake and seismic waves

### **3CE04 TRANSPORTATION ENGINEERING**

After successfully completing the course, the students will be able to:

CO 1. To identify type of roads and its utility.

CO 2. To understand the application of various road studies at time of survey and actual construction.

CO 3. To design the various types of road pavements.

CO 4. To understand rules regulations, signals, type of gauges and railway sleeper's density.

CO 5. To recognize the Airport features and design concept of components for Aero plains movement.

CO 6. To identify types and components of Tunnels and bridges and its design components.



### **3CE05 CONCRETE TECHNOLOGY & REINFORCED CEMENT CONCRETE**

After successfully completing the course, the students will be able to:

- CO 1. To know need and composition of binding material, cement.
- CO 2. To recognize concrete and RCC.
- CO 3. To perform desired test for suitability, and lintels.
- CO 4. To analyze RCC Components like slab
- CO 5. To decide and utilize the admixtures as per the need of Concrete
- CO 6. To understand importance of mix design



### Semester IV

#### **4CE01 BUILDING PLANNING DESIGNING & COMPUTER AIDED DESIGN**

After successfully completing the course, the students will be able to:

- CO 1. To make engineering drawings by First angle and Third angle method.
- CO 2. To apply building planning principles practically while developing projects.
- CO 3. To study the climatic conditions and decide the corresponding provision in structure.
- CO 4. To know about Bylaws, Town development authority rules and terms.
- CO 5. To draw various plans manually and computationally.
- CO 6. To draw detailed drawing of residential building

#### **4CE02 HYDROLOGY & WATER RESOURCE ENGINEERING**

After successfully completing the course, the students will be able to:

- CO 1. To Explain the hydrology and hydrological data.
- CO 2. To analyse the hydrological methods for runoff.
- CO 3. To Evaluate the ground water hydrological problems.
- CO 4. To Explain the need of irrigation systems and its alternatives.
- CO 5. To Explain the Distribution system and Design of channels.
- CO 6. To Explain Dam ,its classification, design site selection , estimation& also Explain Spillway And its component.



#### **4CE03 SURVEYING**

After successfully completing the course, the students will be able to:

- CO 1. To define principles of Surveying, Remote Sensing and Geomatics.
- CO 2. To describe different instruments, tools, applications and techniques to determine the positions on the surface of the earth, change detection.
- CO 3. To perform Linear measurement methods of surveying.
- CO 4. To differentiate the techniques for setting out alignments, curves, other layouts, modern survey systems etc.
- CO 5. To perform survey at elevation and conduct Plane Table survey.
- CO 6. To perform survey at elevation and conduct Plane Table survey.

#### **4CE04 GEOTECHNICAL ENGINEERING-I**

After successfully completing the course, the students will be able to:

- CO 1. To determine the Index properties and Atterberg limits for soil classification.
- CO 2. To understand the mechanics of compaction and quality control in field.
- CO 3. To explain permeability of soil and methods of dewatering.
- CO 4. To calculate the seepage discharge and design the graded filter.
- CO 5. To understand the concept of consolidation and stress distribution in soil mass. To calculate the shear strength of different soil.
- CO 6. To understand state of stress at a point, Terzaghi's theory of consolidation

#### **4CE05 STRUCTURAL ANALYSIS-I**

After successfully completing the course, the students will be able to:

- CO 1. To decide what is required to be analyzed depending upon type of structural element.
- CO 2. To know about degree of freedom, Condition of equilibrium and determinacy of element
- CO 3. To understand reason for failure and permissible limits for safety.
- CO 4. To apply the knowledge of beam analysis for practical analysis and design purpose.
- CO 5. To make application of various analysis methods for actual structural member analysis and design.
- CO 6. To know merits for utilization of suspension, 2 hinged and 3 hinged arches.



#### **4ES06 ENVIRONMENTAL STUDIES**

After successfully completing the course, the students will be able to:

- CO 1. To study the Multidisciplinary nature of environmental studies
- CO 2. To learn Social Issues and the Environment
- CO 3. To understand the human Population and the Environment
- CO 4. To understand the importance about Renewable and non-renewable resources
- CO 5. To study of Ecosystem & Biodiversity and its conservation
- CO 6. To understand Environmental Pollution



### Semester V

#### **5CE01 DESIGN OF REINFORCED & PRESTRESSED CONCRETE STRUCTURES**

After successfully completing the course, the students will be able to:

- CO 1. To analyze and design of rectangular section.
- CO 2. To analyze and design of slab.
- CO 3. To analyze and design of staircase and retaining wall.
- CO 4. To analyze and design of column and footing.
- CO 5. To understand grid slab and ductile detailing.
- CO 6. To Explain the general behavior of PC sections under external load.

#### **5CE02 SURVEYING & GEOMATICS**

After successfully completing the course, the students will be able to:

- CO 1. To understand the use of different types of covers and their field implication.
- CO 2. To understand the triangulation adjustment.
- CO 3. To understand the hydrographic survey.
- CO 4. To acquire skill in handling spatial data base warehousing and mining.
- CO 5. Knowledge of understand the surveying with advance instruments like remote sensing, GPS.
- CO 6. To gain the knowledge of GIS.



### **5CE03 NUMERICAL METHOD & COMPUTER PROGRAMMING**

After successfully completing the course, the students will be able to:

- CO 1. To define computer programming related terms
- CO 2. To explain computer programming related concepts
- CO 3. To write demonstration programs to show working of I/O statements, control structures, arrays, library functions and subprograms
- CO 4. To analyze programs related to numerical methods, civil and structural engineering problems
- CO 5. To write programs to demonstrate the application of programming to numerical methods, civil and structural engineering problems
- CO 6. To develop own program for automating/ solving Civil Engineering problems

### **5CE04 HIGHWAY CONSTRUCTION MANAGEMENT (PE-I)**

After successfully completing the course, the students will be able to:

- CO 1. To explain the basic concepts about highway engineering
- CO 2. To design geometric elements of the highway.
- CO 3. To design the various types of road pavements with construction and Maintenance of highway.
- CO 4. To carry out traffic studies and implement traffic regulation and control measures and intersection design.
- CO 5. To apply the knowledge to prevent the road accidents.
- CO 6. To use appropriate equipment's for road construction.





### **5CE05 BASIC OF BUILDING CONSTRUCTION (OE-I)**

After successfully completing the course, the students will be able to:

CO 1. To understand Load bearing and Frame structure with their foundations.

CO 2. To recognize various types of construction material and its suitability

CO 3. To recognize the various levels in building and its need.

CO 4. To know types of openings, doors, windows and other related fixtures.

CO 5. To recognize types of rock and minerals and its construction properties.

CO 6. To understand the basic concepts of DPC, fireproof, soundproof and expansion joints in structure.



## Semester VI

### **6CE01 DESIGN OF STEEL STRUCTURE**

After successfully completing the course, the students will be able to:

- CO 1. To explain the methods of design of steel structure.
- CO 2. To design bolted and welded connection.
- CO 3. To identify the different failure modes of bolted and welded connections, and determine their design strengths.
- CO 4. To design the Tension and compression member.
- CO 5. To identify and compute the design loads on a typical steel roof trusses.
- CO 6. To design basic elements of steel structure like beams, column and bases.

### **6CE02 ENVIRONMENT ENGINEERING-I**

After successfully completing the course, the students will be able to:

- CO 1. To define and explain the significance of terms and parameters frequently used in water supply engineering.
- CO 2. To evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
- CO 3. To basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
- CO 4. To an understanding of water quality criteria and standards, and their relation to public health.
- CO 5. To know the details of disinfection and chlorination of water.
- CO 6. To understand the distribution system of supply.



### **6CE03 FLUID MECHANICS**

After successfully completing the course, the students will be able to:

CO 1. To understand the physical properties of fluid and able to perform various calculations related to fluid statics as well as dynamics.

CO 2. To deal with the problems related to forces on immersed bodies.

CO 3. To formulate the total energy of flowing fluid by understanding the concept of Bernoulli's theorem.

CO 4. To measure the flow parameters of open channel as well as close conduits.

CO 5. To perform dimensional analysis by understanding Buckingham's pi theorem and dimension numbers also students will be able to do model analysis by using Reynolds and Froude's law with special reference to study of spillways

CO 6. Knowledge about hydraulic turbines with reference to their classification and calculation of work done, power and efficiency. also students will understand the concept of impact.

### **6CE04 ADVANCED CONSTRUCTION MATERIALS (PE-II)**

After successfully completing the course, the students will be able to:

CO 1. To understand special type of concrete and supplementary cementations materials.

CO 2. To recognize various types of metals and new alloy steels.

CO 3. To understand Thermal and Sound insulating materials.

CO 4. To know types of construction chemicals and wastes.

CO 5. To recognize types of shoring and formwork materials

CO 6. To understand the elementary concept of smart materials



### **6CE05 INTRODUCTION TO EARTHQUAKE ENGINEERING (OE-II)**

After successfully completing the course, the students will be able to:

- CO 1. To identify type of earthquake, its properties
- CO 2. To earthquake resistance planning
- CO 3. To apply knowledge of seismic bands in masonry structure construction
- CO 4. To solve engineering problems in the context of Earthquake Engineering.
- CO 5. To know the behavior and importance of flexible structures during earthquake.
- CO 6. To know about the concept of earthquake resistant design.

### Semester VII

#### **7CE01 STRUCTURAL ANALYSIS-II**

After successfully completing the course, the students will be able to:

- CO 1. To be analyzed depending upon type of structural element.
- CO 2. To know about degree of freedom, Condition of equilibrium and determinacy of element.
- CO 3. To understand reason for failure and permissible limits for safety.
- CO 4. To apply the knowledge of beam analysis for practical analysis and design purpose.
- CO 5. To make application of various analysis methods for actual structural member analysis and design.
- CO 6. Students will be able to understand how to analyses stiffness, kinematic redundancy, stiffness coefficient & single storey portal frame

#### **7CE02 GEOTECHNICAL ENGINEERING-II**

After successfully completing the course, the students will be able to:

- CO 1. To get knowledge of site specific field investigations including collection of soil samples for testing and observation of soil behavior
- CO 2. To understand the basic concept of ultimate bearing capacity of shallow foundations including modification of bearing capacity equations for water table, factor of safety.
- CO 3. To understand the concept of Lateral Earth Pressure and including Rankine theory of active and passive earth pressures with and without sloping backfill.
- CO 4. To explain in what circumstances pile is needed and how do analysis the pile and pile group under various soil conditions.
- CO 5. To Estimate the amount of consolidation and settlement and time required for settlement under a given load.
- CO 6. To explain overall stability analysis of well foundation.



### **7CE03 HYDRAULICS**

After successfully completing the course, the students will be able to:

- CO 1. To illustrate the flow pattern in the open channels, criteria for formation hydraulics jump.
- CO 2. To identify different types of GVF profiles and methods.
- CO 3. To compute of water hammer pressures in pipe.
- CO 4. To design penstocks and surge tanks, understand causes of water hammer.
- CO 5. To computation of water hammer pressure of frictionless flow in horizontal pipe for sudden and slow closer of valve, Application of Allievi's method and charts approximate pressure.
- CO 6. To analysis of flow in a simple surge tank system. Computation of maximum surges in surge tank system.

### **7CE04 ENVIRONMENT ENGINEERING-II**

After successfully completing the course, the students will be able to:

- CO 1. To understand layout of different sewerage systems and installation of sewers.
- CO 2. To develop conceptual schematics required for the treatment of wastewater and an ability to translate pertinent forcing criteria into physical treatment system and its design.
- CO 3. To understand the role of microbial metabolism in a wastewater treatment process and study of biological treatment system
- CO 4. To provide economical treatment to wastewater and selection of wastewater disposal methods.
- CO 5. To understand the characteristics of different types of solid wastes and the factors affecting variation and ability to define and explain important concepts in the field of solid waste management and suggest suitable technical solutions for treatment solid waste.
- CO 6. To suggest suitable air pollution prevention equipment's and techniques for various gaseous and particulate pollutants and will be able to understand the necessity to study the impacts and risks that will be caused by projects



### **7CE05 WATER POWER ENGINEERING (PE-III)**

After successfully completing the course, the students will be able to:

- CO 1. To know how to estimate the parameter of hydropower plant and gain knowledge about different types of power plants.
- CO 2. To solve the water hammer problems using different theory & design of the penstock and its accessories.
- CO 3. To analyses & design of surge tank & also gain the knowledge about of necessity, types, functions & location of surge tank.
- CO 4. To understand the physical properties of intake & its other components
- CO 5. To determine the specific speed of turbine and classify the turbine based on specific speed.
- CO 6. To gain the knowledge of power house and non-conventional source of energy.



### Semester VIII

#### **8CE01 CONSTRUCTION PROJECT MANAGEMENT**

After successfully completing the course, the students will be able to:

- CO 1. To understand meaning of Project, Project Management, phases of Project Life Cycle and process of developing it.
- CO 2. To use and apply various planning tools like BAR chart, Milestone Chart, Networking Methods like CPM, PERT and also compare and control the project at the time of execution.
- CO 3. To compare and control the project at the time of execution.
- CO 4. To update projects, review the status of work, optimize project using Network crashing method and understand the concept of Project Smoothing/ leveling.
- CO 5. To plan and develop the project using Project Planner software's.
- CO 6. To understand importance and application of various management like Quality, Safety, Risk handling, Inventory and to turn good manager at individual and organizational level.

#### **8CE02 CONSTRUCTION ECONOMICS & ESTIMATING COSTING**

After successfully completing the course, the students will be able to:

- CO 1. To determine the need of economics and specifications of particular project with respect to estimation.
- CO 2. To carry out rate analysis of basic construction material and apply calculation logic for other construction materials
- CO 3. To use CSR for Estimation work and carry out estimation of residential, Commercial building, Flexible and Rigid Roads, Water Tank, Septic tank etc.
- CO 4. To develop quantity estimates for infrastructural projects such as road pavement.
- CO 5. To understand the need, purpose and process of valuation.
- CO 6. To understand and carry out Bidding and tendering process.





### **8CE03 ADVANCED WATER TREATMENT (PE-IV)**

After successfully completing the course, the students will be able to:

- CO 1. To understand In-depth knowledge of physical chemical unit processes for advanced water treatment
- CO 2. To use the application of this in research projects, and to contribute to the development of new theories and methods in the field.
- CO 3. To understand Select or construct appropriate treatment schemes to remove certain pollutants present in water or waste water.
- CO 4. To understand Developed conceptual schematics required for the treatment of water.
- CO 5. To understand Translate pertinent forcing criteria into physical and chemical treatment system.
- CO 6. To understand. Provide recommendations of appropriate treatment processes for upgrading water and treatment efficiency

### **8CE04 ADVANCED DESIGN OF REINFORCED CEMENT CONCRETE**

After successfully completing the course, the students will be able to:

- CO 1. To understand the analyze and design of Flat slab.
- CO 2. To understand to analyze and design retaining wall.
- CO 3. To understand to analyze and design of combined footing.
- CO 4. To understand to analyze and design of simple structure.
- CO 5. To understand to analyze and design of portal frame.
- CO 6. To understand to analyze and design of water tank.