

## **Introductory Course on Fundamentals of Engineering Examination (FEE) in Civil Engineering – What You’ll Learn**

### **CE101 Mechanics of Materials**

- **Mechanics of Materials**  
Strength, stiffness and deformability; stress-strain relations; ductility and brittle fracture; time-dependent properties; creep, creep rupture; relaxation; cyclic load behaviour.
- **Concrete Technology**  
Concrete-making materials, properties of fresh and hardened concrete, mixing, placing, and curing, mix design, destructive and non-destructive tests, quality control, durability, and special concrete.
- **Steel**  
Basic metallurgy, mechanical properties and applications, welding technology and corrosion.

### **CE102 Structural Mechanics**

- **Structural Mechanics**  
Statics and kinetics of particles, equilibrium of rigid bodies, kinematics and plane motion of rigid bodies, analysis of simple trusses and beams, analysis of structural members subjected to tension, compression torsion, and bending, including such fundamental concepts as stress, strain, and elastic behaviour. Bar forces in compound and complex trusses. Bending moment, shear and axial forces of beams and frames.

### **CE103 Structural Analysis**

- **Structural Analysis**  
Displacements of elastic determinate structures: principle of virtual work and energy theorems. Analysis of indeterminate structures. Deformation of indeterminate structures and influence line method. Displacement techniques using slope-deflection and moment distribution methods. Plastic theory and analysis. Theory and applications of modern structural analysis. Concepts of equilibrium, compatibility, and force-displacement relationships. Direct stiffness method. Matrix formulation of trusses, beams and frames. Stability concepts and elastic stability analysis of frame structures.

### **CE104 Soil Mechanics**

- **Basic geology, unified soil classification system, mechanical properties, effective stress principle, shear strength, compressibility, and seepage and consolidation; Mohr-Coulomb failure criterion (drained and undrained), settlement calculations, rate of consolidation using classical Terzaghi theory.**

### **CE105 Fluid Mechanics**

- **Fluid Statics**  
Fluid properties; hydrostatic pressure and thrust; buoyancy; stability of floating bodies.
- **Fluid Motion**  
Continuity equations; Bernoulli’s equation; linear momentum equation.
- **Similitude**  
Dimensional analysis; design of hydraulic models.

### **CE201 Reinforced and Prestressed Concrete Structures**

- **RC Design**  
Basic structural members and structural systems. Loads and load effects. Section analysis and design for bending. Design for shear, torsion and bond. Corbels. Serviceability and durability requirements. Design of short and slender columns. Design of slab systems. Concentrated loads on slabs. Design of foundations. Retaining Walls. Reinforced concrete detailing.
- **Prestressed Concrete Design**  
Basic concepts of prestressing. Materials and prestressing systems. Prestressed losses and time dependent deformation. Behaviour and design of members subject to flexure, shear and combined axial and bending action.

### **CE202 Steel and Composite Structures**

- **Steel Design**  
Limit state design. Material properties and structural responses. Local buckling and section classifications. Design of fully restrained beams. Shear buckling and design of plate girder. Web bearing and buckling. Design of web stiffeners. Lateral-torsional buckling and design of laterally unrestrained beams. Tension and compression members. Axially loaded members with end moments. Design of steel connections. Plastic design of portal frames. Continuous multi-storey frames.
- **Composite (Steel-Concrete Design)**  
Structural modelling and design concepts. Moment capacity and shear resistance, full and partial connection of composite beams. Design of composite slab. Design of composite columns.

### **CE203 Geotechnical Engineering**

- **Slope Stability and Earth Retaining Structures**  
Introduction to slope stability and earth retaining structures; slopes and embankments; earth pressure and retaining structures; deep excavation; calculation of active and passive earth pressures; design considerations pertaining to deep excavations.
- **Foundation Engineering**  
Site investigation and interpretation of soil reports; shallow foundations and deep foundations; selection of appropriate foundation type; capacity and settlement requirements.

### **CE205 Hydraulics and Hydrology**

- **Hydraulics**  
Friction and minor losses in pipe flow; pipe and pump systems; pipe network analysis; open channel flow; uniform flow; Manning's equation; critical flow; energy and momentum principles; hydraulic jumps; gradually varied flows; backwater computation.
- **Hydrology**  
Processes in the hydrologic cycle: basic meteorology, rainfall precipitation, evaporation and transpiration, infiltration, sub-surface flow, surface runoff, streamflow measurement and hydrograph analysis; unit hydrograph principles and applications; frequency analysis of rainfall or flood data; reservoir and channel flood routing; urban storm drainage design, flood peak estimation.