

# **STRUCTURAL ANALYSIS AND BUILDING DESIGN** **WITH ETABS**

## **1. TARGET AUDIENCE:**

This course is designed for civil and structural engineers, BIM professionals, site engineers, and fresh graduates who want to build strong competency in structural modelling and analysis using ETABS.

You should understand:

- Basic structural mechanics (bending, shear, axial force)
- RCC components (beam, column, slab, footing)
- Basic structural drawings

No prior ETABS experience is required.

The ideal learner:

- Works on residential or commercial building projects
- Wants to transition from site/drafting to structural design
- Preparing for structural design interviews
- Planning higher studies in structural engineering
- A practicing structural engineer aiming for consultancy growth

## **2. COURSE OBJECTIVE:**

Learn to model, analyse, and design multi-storey RCC buildings using ETABS in accordance with standard codes.

By the end of this course, you will:

- Model complete building systems from scratch
- Apply gravity, wind, and seismic loads correctly
- Perform structural analysis
- Interpret results professionally
- Design slabs, beams, and columns
- Generate structural design reports

This course builds practical competency required in structural consultancy firms.

### 3. COURSE OUTLINE:

The course comprises **40 hours of theory + live modelling + practical assignments**, divided into **5 progressive modules**.

Each module includes:

- Concept explanation
- Live ETABS modelling
- Code reference discussion
- Design validation
- Practical exercise

#### **MODULE 1: STRUCTURAL FUNDAMENTALS & SCHEMING (8 Hours)**

- Session 1.1: Structural Basics & Structural Role
- Session 1.2: Load Path & Structural Behaviour
- Session 1.3: Structural Planning & Framing System Selection
- Session 1.4: Structural Scheming of Residential & Commercial Buildings

#### **MODULE 2: ETABS MODELLING & LOAD APPLICATION (10 Hours)**

- Session 2.1: ETABS Interface & Model Setup
- Session 2.2: Grid & Storey Definition
- Session 2.3: Material & Section Properties
- Session 2.4: Modelling Beams, Columns & Slabs
- Session 2.5: Load Calculation (Dead, Live, Floor Finish)
- Session 2.6: Wind Load Application
- Session 2.7: Seismic Load Application
- Session 2.8: Load Combinations

#### **MODULE 3: ANALYSIS CONCEPTS & RESULT INTERPRETATION (8 Hours)**

- Session 3.1: Analysis Types (Linear Static, Response Spectrum – Basics)
- Session 3.2: Understanding Structural Stability
- Session 3.3: Story Drift & Displacement Check
- Session 3.4: Bending Moment, Shear Force & Axial Force Interpretation
- Session 3.5: Torsion & Irregularity Check
- Session 3.6: Model Validation & Error Checking

## **MODULE 4: RCC DESIGN & PRACTICAL APPLICATION (10 Hours)**

### **Session 4.1: Slab Design**

- One-way & Two-way slab behaviour
- ETABS slab design process
- Manual verification basics

### **Session 4.2: Beam Design**

- Flexure & shear design
- Detailing requirements
- Torsion consideration

### **Session 4.3: Column Design**

- Axial load & biaxial bending
- Interaction diagrams
- Slenderness considerations

## **MODULE 5: TUTORIALS (4 Hours)**

- Modelling
- Load calculation
- Code-based load combinations
- Analysis verification
- Beam, column & slab design
- Result documentation