KOENIG
step forward

Structural Analysis & Design Masterclass using ETABS & SAP2000

Target Audience

This program is designed for:

- Civil Engineers
- Structural Engineers
- BIM Professionals
- Design Consultants
- Infrastructure Engineers
- Site Engineers transitioning into Structural Design
- Engineering Students & Fresh Graduates
- Professionals preparing for Structural Design Consultancy roles

Course Objectives

Upon completion of this course, participants will be able to:

- Understand structural behaviour and load transfer mechanisms.
- Model complete RCC and steel structures using ETABS and SAP2000.
- Apply gravity, wind, seismic, dynamic and nonlinear loading.
- Perform linear, nonlinear and dynamic structural analysis.
- Design structural members according to applicable design codes.
- Validate models using engineering checks.
- Generate professional reports and construction documentation.
- Import and export models between different engineering platforms.
- Automate repetitive tasks using SAP2000 API.

Course Outcomes

Participants will be able to:

- Design multistorey RCC buildings confidently.
- Perform advanced structural analysis.
- Analyse bridges, industrial structures and special structures.

- Carry out seismic and wind-resistant structural design.
- Interpret structural behaviour professionally.
- Produce consultancy-ready calculation reports.
- Improve modelling productivity using CSI software tools.

Course Outline: -

The course comprises **56**-hours of theory and labs and is divided into **8** different Modules. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

Table of Contents: -

- Columns
- Slabs
- Walls
- Foundations (Overview)
- Model Organization
- Templates

Module 3 – Building Load Calculation & Code Implementation (8 Hours)

- Dead Loads
- Live Loads
- Floor Finish Loads
- Wall Loads
- Wind Loads
- Seismic Loads
- Response Reduction Factors
- Load Combinations
- Code Settings
- Story Mass
- Diaphragm Assignment

Module 4 – Structural Analysis using ETABS (8 Hours)

- Linear Static Analysis
- Story Drift
- Displacement
- Base Shear
- Bending Moment
- Shear Force
- Axial Force
- Torsion
- Structural Irregularities
- Model Validation

- Error Detection
- Analysis Verification

Module 5 – RCC Design using ETABS (8 Hours)

- Slab Design
- Beam Design
- Column Design
- Manual Verification
- Reinforcement Interpretation
- Interaction Diagrams
- Slenderness
- Design Reports
- Quantity Review

Module 6 – SAP2000 Modelling Essentials (8 Hours)

- SAP2000 Interface
- Project Creation
- Selection Commands
- Drawing Commands
- Non-prismatic Sections
- Section Designer
- Cable Elements
- Tendons
- Gap Elements
- Area Constraints
- Cardinal Points
- Varying Mass Modelling

Module 7 – Advanced Structural Loading & Analysis (10 Hours)

- Automated Wind Loads
- Wave Loading
- Joint Patterns

- Mass & Modal Analysis
- P-Delta Analysis
- Response Spectrum
- Time History Analysis
- Buckling Analysis
- Static Pushover
- Nonlinear Staged Construction
- Nonlinear Shear Walls
- Power Spectral Density
- Beam-Column Joint Flexibility
- Fast Nonlinear Analysis
- Steady-State Vibration

Module 8 – Advanced Design, Reporting & Integration (8 Hours)

- Concrete Shell Reinforcement Design
- Load Optimizer
- Structural Optimization
- Report Generation
- Interactive Database Editing
- Display Tabular Results
- DXF Import
- Model Export
- SAP2000 API
- Workflow Automation
- Licensing
- BIM Workflow Integration