Structural Simulation Software (ETABS / SAP2000) Training Course

Professional Development Training Course Outline

Category	Architectural Engineering	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Structural Simulation Software (ETABS & SAP2000) Training Course is designed to equip civil and structural engineers with advanced skills in structural analysis, building modeling, seismic design, finite element modeling (FEM), and performance-based engineering. With increasing demand for high-rise buildings, earthquake-resistant structures, and smart infrastructure design, mastery of tools like ETABS and SAP2000 has become essential for modern structural engineering practice. This course emphasizes real-world applications aligned with international building codes (ACI, Eurocode, IS codes) and integrates practical design workflows used in top engineering consultancies worldwide.

This training provides hands-on expertise in 3D structural modeling, load calculations, dynamic analysis, wind and seismic simulations, and nonlinear behavior assessment using ETABS and SAP2000. Participants will learn how to design safe, efficient, and cost-effective structures such as multistory buildings, industrial frames, bridges, and towers. The course bridges the gap between academic theory and professional engineering practice by integrating case-based learning, project simulations, and real structural failure analysis, ensuring learners gain job-ready skills in structural engineering software automation and BIM-integrated workflows.

Programme Curriculum

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Course Objectives

1. Master ETABS structural modeling and SAP2000 simulation workflows
2. Perform advanced seismic analysis and earthquake-resistant design
3. Apply finite element analysis (FEA) in structural engineering projects
4. Design high-rise buildings using performance-based engineering methods
5. Understand wind load analysis and lateral force distribution systems
6. Develop skills in nonlinear static and dynamic structural analysis
7. Implement building code compliance (ACI, Eurocode, IS 456, IS 1893)
8. Perform bridge and industrial structure modeling using SAP2000
9. Optimize structural design using load combinations and safety factors
10. Integrate BIM and structural analysis workflows
11. Evaluate structural stability and failure mechanism analysis
12. Improve engineering decision-making using simulation data
13. Build industry-ready expertise in structural design automation tools

Target Audience

- Civil Engineering Students
- Structural Engineers
- Construction Professionals
- BIM Engineers
- Design Consultants
- Project Engineers
- Architecture Professionals
- Government Infrastructure Engineers

Course Modules

Module 1: Introduction to Structural Engineering Software

- Overview of ETABS & SAP2000 interface
- Structural modeling fundamentals
- Units, grids, and coordinate systems
- Project setup workflow

- Software comparison analysis
- **Case Study:** Residential building modeling workflow

Module 2: Structural Modeling Techniques

- 3D frame modeling concepts
- Slab, beam, column definitions
- Geometry creation tools
- Structural meshing techniques
- Model validation checks
- **Case Study:** Commercial office structure model

Module 3: Load Calculation & Assignment

- Dead, live, and environmental loads
- Load patterns and combinations
- Auto-load generation
- Load transfer mechanisms
- Code-based load application
- **Case Study:** Multi-storey building load simulation

Module 4: Material Properties & Section Design

- Concrete and steel properties
- Section database creation
- Custom section modeling
- Stress-strain relationships
- Material nonlinear behaviour
- **Case Study:** Steel frame industrial shed design

Module 5: Static Structural Analysis

- Linear static analysis theory
- Deformation and displacement analysis
- Reaction force interpretation
- Structural stiffness evaluation
- Load path visualization
- **Case Study:** Warehouse structural stability analysis

Module 6: Dynamic Analysis

- Modal analysis fundamentals
- Time history analysis
- Response spectrum method
- Damping ratio applications
- Vibration control systems
- **Case Study:** Earthquake-resistant high-rise building

Module 7: Seismic Design & Earthquake Engineering

- Seismic zone definitions
- Base shear calculation

- Ductility and drift control
- Earthquake load combinations
- Structural irregularity handling
- **Case Study:** Seismic retrofitting of mid-rise structure

Module 8: Wind Load Analysis

- Wind pressure modeling
- Gust factor effects
- Lateral load distribution
- Building height impact
- Code-based wind design
- **Case Study:** Coastal high-rise wind analysis

Module 9: Nonlinear Analysis

- Material nonlinearity modeling
- Pushover analysis techniques
- Plastic hinge formation
- Failure mechanism prediction
- Energy dissipation analysis
- **Case Study:** Collapse prevention of steel frame

Module 10: Design Optimization

- Structural efficiency methods
- Cost reduction strategies
- Member sizing optimization
- Weight reduction techniques
- Safety factor balancing
- **Case Study:** Cost-optimized residential tower design

Module 11: Steel Structure Design

- Steel frame behavior
- Connection modeling
- Buckling analysis
- Column-beam interaction
- Design code compliance
- **Case Study:** Industrial warehouse steel structure

Module 12: Reinforced Concrete Design

- RCC beam and slab design
- Reinforcement detailing
- Crack control analysis
- Serviceability checks
- Deflection control methods
- **Case Study:** Apartment RCC structural design

Module 13: Bridge Modeling (SAP2000 Focus)

- Bridge load simulation
- Deck and girder modeling
- Traffic load analysis
- Cable-stayed structures
- Dynamic bridge response
- **Case Study:** Highway bridge structural analysis

Module 14: Model Validation & Error Checking

- Structural integrity checks
- Debugging modeling errors
- Load verification
- Result validation techniques
- Code compliance review
- **Case Study:** Error correction in high-rise model

Module 15: Final Project & Industry Simulation

- End-to-end project execution
- Real-world building design
- Code-based validation
- Report generation
- Presentation of structural results
- **Case Study:** Complete 10-storey building simulation project

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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