PLAXIS for Geotechnical Engineering Training Course

Professional Development Training Course Outline

Category	Construction Institute	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The PLAXIS for Geotechnical Engineering Training Course is designed to develop advanced skills in geotechnical numerical modelling, finite element analysis (FEA), soil-structure interaction, underground construction simulation, and advanced ground engineering solutions. PLAXIS is widely recognized as a powerful geotechnical software platform for analyzing complex engineering problems involving soil behavior, excavation stability, foundation performance, slope stability, tunneling, seismic response, groundwater flow, and deformation analysis. This training equips engineers, consultants, researchers, and infrastructure professionals with practical expertise in 2D and 3D geotechnical modelling, constitutive soil models, construction staging, parameter calibration, and predictive engineering analysis.

With increasing demand for digital transformation, BIM integration, sustainable infrastructure development, resilient design, and AI-supported engineering workflows, proficiency in PLAXIS has become a valuable skill for modern geotechnical professionals. This course combines theoretical concepts with hands-on simulation exercises, real-world case studies, practical modelling workflows, and industry best practices to enable participants to solve challenging geotechnical problems with confidence. Learners will gain the ability to perform reliable finite element simulations, risk assessments, optimization studies, and advanced geotechnical design evaluations for infrastructure projects worldwide.

Programme Curriculum

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Course Objectives

1. Develop advanced skills in PLAXIS 2D and PLAXIS 3D finite element modelling for geotechnical applications.
2. Understand soil constitutive models and their application in realistic ground behaviour prediction.
3. Master soil–structure interaction analysis for foundations, retaining walls, and underground structures.
4. Perform advanced slope stability analysis and geotechnical risk assessment using numerical methods.
5. Apply PLAXIS for excavation support systems, deep foundations, and construction sequence simulations.
6. Analyze tunneling and underground infrastructure projects using advanced modelling techniques.
7. Develop expertise in groundwater seepage analysis and coupled hydro-mechanical simulations.
8. Improve decision-making through data-driven geotechnical engineering workflows.
9. Integrate PLAXIS modelling with BIM, digital engineering, and infrastructure asset management systems.
10. Apply advanced methods for earthquake engineering and seismic soil response analysis.
11. Interpret numerical results for engineering optimization, safety evaluation, and design improvement.
12. Develop professional capability in sustainable and resilient geotechnical design practices.
13. Build industry-ready expertise in next-generation geotechnical simulation and digital twin technologies.

Target Audience

1. Geotechnical Engineers and Soil Mechanics Specialists
2. Civil and Structural Engineers involved in foundation design
3. Engineering Consultants and Design Professionals
4. Infrastructure and Transportation Project Engineers
5. Tunnel, Underground Construction, and Mining Engineers
6. Academic Researchers and University Faculty Members
7. Graduate Students in Civil and Geotechnical Engineering
8. Project Managers and Technical Specialists involved in ground engineering projects

Course Modules

Module 1: Introduction to PLAXIS and Geotechnical Numerical Modelling

- Overview of PLAXIS 2D and PLAXIS 3D capabilities and applications.
- Fundamentals of finite element analysis (FEA) in geotechnical engineering.
- Understanding modelling philosophy, assumptions, and engineering workflows.
- Creating project environments, geometry definition, and boundary conditions.
- Introduction to industry applications and case study approaches.
- Case Study: High-rise building foundation settlement prediction using PLAXIS numerical modelling.

Module 2: Soil Behaviour and Advanced Constitutive Models

- Understanding Mohr-Coulomb, Hardening Soil, and Soft Soil models.
- Soil parameter selection and laboratory data interpretation.
- Advanced stress–strain behaviour simulation.
- Calibration of soil parameters for accurate prediction.
- Best practices for realistic ground modelling.
- Case Study: Settlement analysis of an industrial facility using Hardening Soil Model.

Module 3: Foundation Engineering and Soil–Structure Interaction

- Modelling shallow and deep foundation systems.
- Pile foundation analysis and load transfer mechanisms.
- Contact elements and interface modelling.
- Bearing capacity and deformation analysis.
- Performance-based foundation design optimization.
- Case Study: Pile group behaviour analysis for a commercial tower foundation project.

Module 4: Excavation, Retaining Structures, and Construction Staging

- Deep excavation modelling techniques.
- Retaining wall and diaphragm wall analysis.
- Construction sequence simulation.
- Ground movement prediction and monitoring correlation.
- Risk evaluation for urban excavation projects.
- Case Study: Metro station excavation stability analysis in a dense urban environment.

Module 5: Slope Stability and Ground Improvement Analysis

- Advanced slope stability modelling approaches.
- Strength reduction method (SRM) applications.
- Landslide risk assessment and mitigation design.
- Ground improvement modelling techniques.
- Numerical evaluation of reinforcement systems.
- Case Study: Highway embankment slope stabilization using geotechnical reinforcement.

Module 6: Tunneling and Underground Infrastructure Simulation

- Tunnel excavation modelling workflows.
- NATM and TBM tunneling simulation.
- Rock and soil interaction analysis.
- Underground structure deformation assessment.
- Support system optimization.
- Case Study: Urban tunnel excavation impact assessment using PLAXIS 3D.

Module 7: Groundwater, Seismic Analysis, and Advanced Applications

- Groundwater flow modelling and seepage analysis.
- Coupled hydro-mechanical simulations.
- Earthquake loading and dynamic analysis.
- Liquefaction assessment concepts.
- Climate-resilient geotechnical engineering applications.
- Case Study: Seismic response evaluation of an earth dam foundation system.

Module 8: Advanced PLAXIS Workflow, Automation, and Industry Projects

- Advanced modelling strategies and optimization techniques.
- Integration with BIM and digital engineering workflows.
- Result interpretation and engineering reporting.
- Automation concepts using scripting tools.
- Complete project-based PLAXIS simulation workflow.
- Case Study: Digital geotechnical twin development for a major infrastructure 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	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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