CONCEPT

Geotechnical Site Investigation: Soil Testing, Slope Stability and Earthworks Control

27 June – 1 July 2027
Jeddah - Corniche four-star



Geotechnical Site Investigation: Soil Testing, Slope Stability and Earthworks Control

Ref: 437_14048 **Date:** 27 June – 1 July 2027 **Location:** Jeddah - Corniche four-star **Fees:** 19500 SAR

Introduction:

Foundation redesigns, excavation collapses and embankment settlement often trace back to a ground investigation that was scoped too thinly or a geotechnical report that nobody on site read critically. This Core Concept course gives civil, geotechnical and site engineers a working method for geotechnical site investigation, from soil classification and borehole planning through in-situ and laboratory testing to slope stability, excavation benching, embankments, bund walls and compaction control. Participants work on borehole logs, test records and report extracts and produce a Ground Investigation and Earthworks Control Plan for a project site.

Course Objectives:

- Classify soils with the Unified Soil Classification System and plan a ground investigation with borehole spacing, depth and test schedule matched to the proposed works
- Supervise boreholes, trial pits, sampling and SPT, CPT and plate load tests and judge whether logs and field results are reliable
- Select laboratory soil tests and translate their results into strength, compressibility and swell parameters
- Review a geotechnical report and check its bearing capacity and settlement recommendations for shallow and piled foundations at overview level
- Assess problematic soils and slope stability and choose excavation sloping, benching and support methods
- Specify embankment and bund wall earthworks with compaction acceptance criteria and field density testing

Target Audience:

- Engineers responsible for scoping and supervising ground investigation contracts
- Site engineers responsible for excavations, backfilling and earthworks quality
- Design engineers who rely on geotechnical reports for foundation and earthwork decisions
- Consultant and owner engineers responsible for reviewing geotechnical submissions
- Materials and laboratory staff responsible for soil testing and field density records

Course Outline:

Day 1: Soil Origins, Classification and Ground Investigation Planning

- Residual, Transported and Aeolian Soil Formation and Typical Soil Profiles
- Unified Soil Classification System Groups under ASTM D2487
- Phase Relationships: Water Content, Void Ratio, Unit Weight and Degree of Saturation
- Desk Study, Walkover Survey and Geological Map Review
- Ground Investigation Scope Sheet: Borehole Spacing, Depth and Test Schedule

Day 2: Boreholes, Trial Pits, Sampling and In-Situ Testing

- Rotary and Auger Boring Methods and Borehole Log Recording
- Trial Pit and Trench Excavation, Logging and Groundwater Observation
- Thin-Walled Tube and Piston Sampling for Undisturbed Specimens
- Standard Penetration Test Procedure, N-Value Corrections and Common Errors
- Cone Penetration, Piezocone Profiling and Plate Load Test Interpretation

Day 3: Laboratory Soil Tests, the Geotechnical Report and Foundation Inputs

- Atterberg Limits and Sieve and Hydrometer Particle Size Analysis
- Direct Shear, Triaxial and Unconfined Compression Strength Parameters
- Oedometer Consolidation and Swell Test Results as Settlement Inputs
- Geotechnical Report Review Checklist: Stratigraphy, Soil Parameters and Recommendations
- Bearing Capacity and Settlement at Overview for Shallow Footings and Piles

Day 4: Problematic Soils, Slope Stability and Excavation Support

- Collapsible, Expansive and Sabkha Soils: Identification Tests and Treatment Options
- Limit Equilibrium Slope Analysis: Method of Slices, Bishop Simplified and Spencer
- Factor of Safety, Pore Pressure Conditions and Slope Software Output Checks
- Excavation Sloping, Benching and Shoring Selection by Soil Type and Depth
- Dewatering, Base Heave and Excavation Monitoring with Inclinometers and Settlement Markers

Day 5: Case Work: Embankments, Bund Walls, Compaction Control and the Site Plan

- Case Study: Embankment Fill Selection and Side Slope Check on Soft Ground
- Case Study: Tank Farm Bund Wall Earthworks, Crest Width and Seepage Control
- Compaction Specification Using Standard Proctor ASTM D698 and Modified Proctor ASTM D1557
- Field Density Acceptance from Sand Cone and Nuclear Gauge Test Records
- Ground Investigation and Earthworks Control Plan Drafting and Peer Review

Skills You Will Gain:

- Ground Investigation Scoping
- Borehole Log Interpretation
- In-Situ Test Evaluation
- Soil Parameter Derivation
- Stratigraphy Interpretation
- Slope Stability Assessment
- Excavation Benching Planning
- Compaction Quality Control

Why Attend This Course:

- Return with a Ground Investigation and Earthworks Control Plan for a project site you are responsible for
- Spot thin investigation scopes, unreliable test data and optimistic report recommendations before they reach design
- Reduce excavation collapse and embankment settlement risk with benching, support and compaction checks you can apply on site
- Compare ground conditions and practice with engineers from building, plant, utility and infrastructure projects

Conclusion:

Earthworks and foundations behave as the ground allows, so the quality of the investigation decides the quality of every later decision. The one week move from soil formation and classification, through boreholes, trial pits, in-situ and laboratory tests and the geotechnical report, to problematic soils, slope stability and excavation support. The final day applies this to embankment, bund wall and compaction cases and closes with a Ground Investigation and Earthworks Control Plan ready for use on the next project.