COURSE OVERVIEW SE0072
Geotechnical Engineering & Soil Analysis

Course Title
Geotechnical Engineering & Soil Analysis

Course Date/Venue
October 04-08, 2026/TBA Meeting Room, Royal Tulip Hotel, Muscat, Oman

Course Reference
SE0072

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Geotechnical Engineering & Soil Analysis. It covers the geotechnical engineering, soil formation, geology and engineering behavior; the soil composition, structure and phase relationships; the soil classification and identification, index properties, consistency soils and soil sampling; the site investigation, laboratory soil testing and quality control; and the particle size and graduation analysis including soil compaction principles and testing.

Further, the course will also discuss the field compaction control, earthworks, soil permeability and seepage; the groundwater and effective stress, stress distribution in soil and shear strength of soils; the direct shear and triaxial testing, consolidation and compressibility; the settlement analysis, practical soil strength and settlement evaluation; and the in-situ geotechnical testing, bearing capacity of soils and shallow foundation engineering.

During this interactive course, participants will learn the deep foundations and pile behavior, slope stability, soil failure and earth retaining structures; the problematic soils, ground conditions and ground improvement techniques; the soil stabilization and reinforcement and geotechnical analysis for excavations and construction; and the geotechnical reports and engineering interpretation.

Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply ang gain an in-depth knowledge on geotechnical engineering and soil analysis
- Discuss geotechnical engineering, soil formation, geology and engineering behavior
- Recognize soil composition, structure and phase relationships and apply soil classification and identification
- Identify index properties and consistency soils and carryout soil sampling, site investigation, laboratory soil testing and quality control
- Employ particle size and graduation analysis including soil compaction principles and testing
- Recognize field compaction control and earthworks, soil permeability and seepage as well as groundwater and effective stress
- Discuss stress distribution in soil and shear strength of soils and apply direct shear and triaxial testing
- Describe consolidation and compressibility and carryout settlement analysis and practical soil strength and settlement evaluation
- Employ in-situ geotechnical testing and discuss bearing capacity of soils and shallow foundation engineering
- Explain deep foundations and pile behavior, slope stability and soil failure as well as earth retaining structures
- Identify problematic soils and ground conditions and apply ground improvement techniques, soil stabilization and reinforcement
- Carryout geotechnical analysis for excavations and construction including geotechnical reports and engineering interpretation

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of geotechnical engineering & soil analysis for this course is designed for engineering managers, geotechnical engineering managers, civil engineering managers, construction managers, project managers, geotechnical engineers, senior civil engineers, senior structural engineers, engineering geologists, foundation engineers, civil engineers, structural engineers, site engineers, project engineers, soil and materials engineers, and laboratory engineers and technicians involved in soil testing and analysis.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Dr. Mostafa Eloyfi, PhD, MSc, BSc, Dip, NEBOSH, is a **Senior Project & Construction Management Consultant** with over **25 years** of extensive experience within the **Oil & Gas**, **Petroleum** and **Utility** industries. His expertise widely covers in the areas of **Construction Materials & Concrete** Technology, **Civil & Construction** Engineering, **Material** Testing & Quality Control, Modern & Sustainable **Construction Materials**, **Site Preparation & Construction** Methods, **Reinforced Concrete** Construction, **Structural Steel** Construction, **Masonry & Building Envelope** Construction, **Construction** Equipment & Productivity, **Construction Quality** Management, **Construction** Safety Practices, **Building** Codes & Standards, **Construction** Planning & Scheduling, **Prefabrication & Modular** Construction, **Sustainable Construction** Practices, Repair, Rehabilitation & Retrofitting, **Project** Management, **Project** Planning & Scheduling, **Project** Economics, Risk & Decision Analysis, **Asset Integrity** Management for Oil & Gas Industry, Planning & Cost Management of **Engineering Projects**, **Excavation** Techniques, **Contract** Preparation & Management, **Procurement** Skills and **Occupational Health & Safety**.

During his career life, Dr. Mostafa has gained his practical and field experience through his various significant positions and dedication as the Chief Executive Officer (**CEO**), **Business & Project Development Director**, **Projects Manager**, **Project Construction Manager**, **Deputy Construction Manager**, **Site Civil Supervisor**, **HSE Engineer**, **Senior Project Planning**, **Scheduling & Controlling Engineer**, **Project Planning**, **Scheduling & Controlling Engineer** and **Senior Instructor/Trainer** for numerous companies like the **GUPCO**, **BP**, Consolidated Contractors International Company (**CCIC**), Burullus Gas Company, Pharaonic Petroleum Company (PhPC), Petroleum Integrated Services (PICO), North Sinai Petroleum Company (NOSPCO), **MOG Energy**, Premier Petroleum Supplier (PPS), ARWIMCO LLC, Zaporozhe Cement Factory, Technical Integrity Solutions (TIS) and Misr Cement Group.

Dr. Mostafa holds a **Doctor** of **Business Administration** (**DBA**), a **Master's** degree and a **Bachelor's** degree in **Civil Engineering**, a **Master's** of **International Business Administration** in **Global Marketing**, a **Master's** of **Management** in **Global Management** and **Diploma** in Law, Project Management, Occupational Health & Safety & Environmental Control (HSE), Hazard Analysis and Sales & Marketing. He is also a Recognized **NEBOSH** – International General Certificate and a Certified Planning & Scheduling Professional (**PSP**) and a member of Egyptian Engineering Syndicate, Institution of Civil Engineers (ICE), Engineering New Zealand, Arab Engineers and Egyptian Society for Corrosion Engineers. He has further published several journals and papers and delivered numerous courses, seminars, trainings and workshops internationally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 04th of October 2026***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Geotechnical Engineering*** *Scope, Principles & Applications of Geotechnical Engineering • Role of Geotechnical Engineering in Civil & Infrastructure Projects • Soil–Structure Interaction & Its Importance in Engineering Design • Geotechnical Risks, Uncertainties & Common Ground-Related Failures*
0930 – 0945	*Break*
0945 – 1030	***Soil Formation, Geology & Engineering Behavior*** *Soil Origin, Weathering, Transportation & Deposition Processes • Residual, Alluvial, Aeolian, Marine & Colluvial Soils • Geological Factors Affecting Soil Engineering Properties • Relationship Between Soil Formation & Geotechnical Performance*
1130 – 1215	***Soil Classification & Identification*** *Particle Size Distribution & Soil Gradation • Gravel, Sand, Silt & Clay Identification • Unified Soil Classification System (USCS) • Engineering Interpretation of Soil Classification Results*

1215 – 1230	*Break*
1230 – 1330	***Index Properties & Consistency of Soils*** *Atterberg Limits: Liquid, Plastic & Shrinkage Limits • Plasticity Index, Liquidity Index & Consistency Index • Plasticity Chart & Classification of Fine-Grained Soils • Influence of Index Properties on Engineering Behavior*
1330 – 1420	***Soil Sampling & Site Investigation Fundamentals*** *Objectives & Planning of Geotechnical Site Investigations • Disturbed versus Undisturbed Soil Sampling • Boreholes, Trial Pits, Sampling Equipment & Procedures • Sample Handling, Preservation, Labeling & Documentation*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: ***Monday, 05th of October 2026***

0730 – 0830	***Laboratory Soil Testing & Quality Control*** *Laboratory Testing Programs for Geotechnical Investigations • Sample Preparation & Representative Specimen Selection • Test Standards, Procedures & Equipment Requirements • Quality Assurance, Repeatability & Sources of Testing Error*
0830 – 0930	***Particle Size & Gradation Analysis*** *Sieve Analysis of Coarse-Grained Soils • Hydrometer Analysis of Fine-Grained Soils • Grain Size Distribution Curves & Interpretation • Effective Size, Uniformity Coefficient & Coefficient of Curvature*
0930 – 0945	*Break*
0945 – 1100	***Soil Compaction Principles & Testing*** *Fundamentals of Soil Compaction & Densification • Standard & Modified Proctor Compaction Tests • Optimum Moisture Content & Maximum Dry Density • Influence of Soil Type, Moisture & Compactive Effort*
1100 – 1215	***Field Compaction Control & Earthworks*** *Field Density Measurement & Compaction Verification • Sand Cone, Core Cutter & Nuclear Density Methods • Relative Compaction & Acceptance Criteria • Earthwork Placement, Lift Thickness & Moisture Conditioning*
1215 – 1230	*Break*
1230 – 1330	***Soil Permeability & Seepage*** *Darcy's Law & Fundamentals of Groundwater Flow • Constant-Head & Falling-Head Permeability Tests • Factors Influencing Hydraulic Conductivity • Seepage Through Soil, Flow Nets & Hydraulic Gradients*
1330 – 1420	***Groundwater & Effective Stress*** *Groundwater Tables, Pore Water Pressure & Capillary Rise • Total Stress, Effective Stress & Neutral Stress Concepts • Effect of Groundwater Fluctuation on Soil Behavior • Dewatering, Seepage Control & Geotechnical Implications*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3:	Tuesday, 06th of October 2026
0730 – 0830	***Stress Distribution in Soil*** *Vertical & Horizontal Stresses Within Soil Masses • Geostatic Stress & Overburden Pressure • Stress Increase Due to Foundation Loading • Stress Distribution Concepts & Pressure Bulbs*
0830 – 0930	***Shear Strength of Soils*** *Fundamentals of Soil Shear Strength • Mohr–Coulomb Failure Criterion • Cohesion, Friction Angle & Effective Stress Parameters • Drained versus Undrained Soil Behavior*
0930 – 0945	*Break*
0945 – 1100	***Direct Shear & Triaxial Testing*** *Direct Shear Test Procedures & Interpretation • Unconsolidated Undrained (UU) Triaxial Testing • Consolidated Undrained (CU) & Consolidated Drained (CD) Testing • Determination & Application of Shear Strength Parameters*
1100 – 1215	***Consolidation & Compressibility*** *Fundamentals of Soil Consolidation • One-Dimensional Consolidation Testing • Compression Index, Recompression Index & Preconsolidation Pressure • Normally Consolidated versus Overconsolidated Soils*
1215 – 1230	*Break*
1230 – 1330	***Settlement Analysis*** *Immediate, Primary Consolidation & Secondary Settlement • Settlement of Shallow Foundations • Differential Settlement & Structural Implications • Settlement Prediction, Monitoring & Allowable Limits*
1330 – 1420	***Practical Soil Strength & Settlement Evaluation*** *Selection of Representative Soil Parameters • Interpretation of Laboratory Strength Data • Calculation of Consolidation Settlement • Case Study: Evaluating Settlement Risk for a Proposed Structure*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4:	Wednesday, 07th of October 2026
0730 – 0830	***In-Situ Geotechnical Testing*** *Standard Penetration Test (SPT) Procedures & Corrections • Cone Penetration Test (CPT/CPTu) Principles & Interpretation • Plate Load, Field Vane Shear & Pressuremeter Testing • Correlation of Field Test Results with Engineering Parameters*
0830 – 0930	***Bearing Capacity of Soils*** *Ultimate, Net & Allowable Bearing Capacity • Bearing Capacity Failure Mechanisms • Influence of Soil Strength, Foundation Geometry & Groundwater • Bearing Capacity Calculations & Safety Factors*
0930 – 0945	*Break*
0945 – 1100	***Shallow Foundation Engineering*** *Isolated, Strip, Combined & Raft Foundations • Selection of Foundation Type Based on Ground Conditions • Bearing Capacity & Settlement Design Considerations • Foundation Failure Modes & Mitigation Measures*

1100 – 1215	***Deep Foundations & Pile Behavior*** *Driven Piles, Bored Piles & Micropiles • End-Bearing & Skin-Friction Resistance • Axial Capacity, Settlement & Group Effects • Pile Load Testing & Integrity Assessment*
1215 – 1230	*Break*
1230 – 1330	***Slope Stability & Soil Failure*** *Natural & Engineered Slope Failure Mechanisms • Rotational, Translational & Compound Failures • Factors of Safety & Limit Equilibrium Concepts • Effects of Groundwater, Drainage & External Loading*
1330 – 1420	*Earth Retaining Structures* *Lateral Earth Pressure: At-Rest, Active & Passive Conditions • Rankine & Coulomb Earth Pressure Concepts • Retaining Walls, Sheet Piles & Reinforced Soil Systems • Stability Against Sliding, Overturning & Bearing Failure*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: ***Thursday, 08th of October 2026***

0730 – 0830	***Problematic Soils & Ground Conditions*** *Expansive, Collapsible & Highly Compressible Soils • Loose Sands, Soft Clays & Organic Soils • Sabkha, Saline Soils & Aggressive Ground Conditions • Identification & Engineering Management of Problematic Soils*
0830 – 0930	***Ground Improvement Techniques*** *Mechanical Compaction & Dynamic Compaction • Vibrocompaction, Stone Columns & Soil Replacement • Grouting, Deep Soil Mixing & Chemical Stabilization • Preloading, Surcharging & Vertical Drain Systems*
0930 – 0945	*Break*
0945 – 1100	***Soil Stabilization & Reinforcement*** *Lime & Cement Stabilization of Soils • Geotextiles, Geogrids & Geosynthetic Applications • Reinforced Earth & Mechanically Stabilized Earth Systems • Selection of Stabilization Methods Based on Soil Conditions*
1100 – 1215	***Geotechnical Analysis for Excavations & Construction*** *Excavation Stability & Temporary Support Systems • Shoring, Bracing, Anchors & Soldier Pile Systems • Groundwater Control & Construction Dewatering • Monitoring Ground Movement During Construction*
1215 – 1230	*Break*
1230 – 1315	***Geotechnical Reports & Engineering Interpretation*** *Structure & Content of Geotechnical Investigation Reports • Soil Profiles, Borehole Logs & Geotechnical Cross-Sections • Interpretation of Laboratory & Field Test Results • Development of Foundation, Earthwork & Construction Recommendations*

1315 – 1345	***Integrated Geotechnical Case Study & Practical Workshop*** *Review of Borehole, SPT, Laboratory & Groundwater Data • Development of a Representative Geotechnical Ground Model • Assessment of Bearing Capacity, Settlement & Foundation Options • Preparation of Engineering Conclusions, Risk Controls & Geotechnical Recommendations*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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