



## COURSE OVERVIEW SE0023 Structural Engineering

### Course Title

Structural Engineering

### Course Date/Venue

Session 1: April 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Session 2: August 17-21, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



### Course Reference

SE0023



### Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

### Course Description



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



This course is designed to provide participants with a basic overview of civil engineering. It covers the grading design, hydrology design, storm sewer design and road design; the industrial projects and process facilities; the surveying, levelling, foundations and soil mechanics; the grading design and site grading; and the roads and highways.



During this interactive course, participants will learn the hydrology, drainage and storm sewer design; the structural use and design of concrete; the structural systems and components; the design basis of reinforced concrete, industrial floors, crane runways, concrete columns and beam frames, foundations, equipment footings and concrete walls; the design cases in process facilities and maintenance of concrete structures; the structural reliability; the time dependent reliability; the load and resistance effect on structural reliability; and the codes, structural reliability and probabilistic evaluation of existing structures.

### Course Objectives

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

- Apply and gain a basic knowledge on civil engineering
- Describe the design methodology, apply sample calculation and discuss reference systems
- Increase the knowledge about the design of petrochemical and heavy industrial projects related to grading and drainage design
- Explain and prepare calculations as well as grading design, site grading, hydrology, storm sewer and road designing
- Describe industrial projects and process facilities
- Employ surveying and levelling as well as identify foundations and soil mechanics
- Carryout grading design and site grading
- Discuss roads and highways covering road development plans, classification of roads, highway materials, highway pavements, functions of pavement components and cross-sectional elements of the highway
- Illustrate hydrology, drainage and storm sewer design including the structural use and design of concrete
- Recognize structural systems and components as well as the design basis of reinforced concrete, industrial floors, crane runways, concrete columns and beam frames, foundations, equipment footings and concrete walls
- Explain the design cases in process facilities and carryout maintenance of concrete structures
- Measure and assess structural reliability
- Describe time dependent reliability and determine the load and resistance effect on structural reliability
- Apply codes and structural reliability and perform probabilistic evaluation of existing structures

### Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Howard 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 basic civil engineering for under development employees.

### 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

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**. 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.

### Accommodation

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

**Course Fee**

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

**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.

**Course Program**

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

**Day 1**

0730 - 0800	<i>Registration &amp; Coffee</i>
0800 - 0815	<i>Welcome &amp; Introduction</i>
0815 - 0830	<b>PRE-TEST</b>
0830 - 0900	<b>Overview of Industrial Projects &amp; Process Facilities</b> <i>Process Plants &amp; Facilities • Oil &amp; Gas Fields • Oil Refineries &amp; Tank Farms • Piping &amp; Pipeline Load &amp; Vibration • Machinery Vibration &amp; Load Analysis • Crane Dynamic Loads</i>
0900 - 0930	<b>Surveying &amp; Levelling</b> <i>Tools of Surveying • Scales • Chaining &amp; Ranging • Linear Measurements • Compass Surveying • Levelling • Contouring • Area &amp; Volume • Theodolite • Photogrammetry &amp; Remote Sensing</i>
0930 - 0945	<i>Break</i>
0945 - 1030	<b>Foundations &amp; Soil Mechanics</b> <i>Soil Mechanics • Functions of Foundation • Types of Foundations • Shallow Foundations • Deep Foundations • Pile Foundations • Different Types of Deep Foundations • Machine Foundation</i>
1030 - 1230	<b>Grading Design &amp; Site Grading</b> <i>Ground Improvement Techniques for Stabilisation of Soil for Various Purposes • Ground Improvement Techniques for Stabilisation of Subgrade Soils • Improving Bearing Capacity of Soil • Soil Improvement • Soil Nailing Technique &amp; Types • Jet Grouting for Soil Stabilisation • Thermal Stabilisation of Soil • Ground Freezing Technique for Soil Stabilisation</i>
1230 - 1245	<i>Break</i>



1245 – 1335	<b>Roads &amp; Highways</b> <i>Road Development Plans • Classification of Roads • Highway Materials • Highway Pavements • Functions of Pavement Components • Cross-Sectional Elements of the Highway</i>
1335 – 1420	<b>Hydrology</b> <i>Open Channel Structures • Enclosed Flow • Spillways • Reservoir Outlet Works • Gates &amp; Valves</i>
1420 – 1430	<b>Recap</b> <i>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</i>
1430	<i>Lunch &amp; End of Day One</i>

**Day 2**

0730 – 0830	<b>Drainage &amp; Storm Sewer Design</b> <i>Storm Sewers • Sewage Systems • Pumping Sewage • Sewage Treatment • Effluent Disposal • Preliminary Treatment • Primary Treatment • Biological Treatment • Tertiary Treatment • Sludge Treatment &amp; Disposal</i>
0830 – 0930	<b>Structural Use &amp; Design of Concrete</b> <i>Concrete as a Structural Material • Common Forms of Concrete Structures • Primary Situations for Investigation &amp; Design • Materials &amp; Nature of Structural Concrete • Significant Properties of Concrete • Reinforcement • Prestressed Concrete • Design of Concrete Mixes • Special Concretes • Design Code &amp; Specification</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Structural Systems &amp; Components</b> <i>Systems with Cranes (Heavy Industrial Facilities) • Systems Without Cranes (Light Industrial/Facilities) • Reinforced Concrete Tanks • Steel Tanks Footing &amp; Foundation • Pipeline Anchor Blocks • Essential Subsystems (Walls, Floors, Crane Runways, Columns &amp; Foundations)</i>
1100 - 1230	<b>Design Basis of Reinforced Concrete</b> <i>Situations for Investigation and Design • Methods of Investigation and Design • The Stress Method • The Strength Method • Investigation of Columns and Beams • Investigation of Column and Beam Frames • Approximate Investigation of Indeterminate Structures • Load and Resistance Factor Design (LRFD) • Reinforced Concrete Flexural Members • Shear in Concrete Structures</i>
1230 - 1245	<i>Break</i>
1245 - 1335	<b>Design of Industrial Floors</b> <i>Types of Floors Used in Industrial Facilities • Design Concepts, Crack Control, Joints, Form Deck, Permanent Forms, Openings, and Composite vs. Non-Composite • Design of Elevated Floors for Forklift Truck Traffic • Classification of Floors on Grade Based on Usage and Design • Use of Vapor Barrier and Reinforcing Steel • Outline Specifications • Details of Slabs on Grade</i>



1335 – 1420	<b>Design of Crane Runways</b> Crane Systems Commonly used in the Industrial Facilities; Under Hung, Overhead (EOT), Yard Cranes, and Floor Mounted Jibs • Service Classifications (CMAA) and Usage • Forces Imparted by Cranes and Operational Aspects of Cranes • Crane Load Specifications • Load Combinations Involving Cranes • Design of EOT Crane Runways and Details
1420 – 1430	<b>Recap</b> 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**

0730 – 0830	<b>Design of Concrete Columns &amp; Beam Frames</b> Types of Columns • Reinforcement for Columns • Combined Compression and Bending • Considerations for Column Shape • Columns in Sitecast Frames • Design Methods and Aids • Approximate Design of Tied Columns • Special Concerns for Concrete Columns • Vertical Concrete Compression Elements • Concrete Masonry Columns and Piers • Column and Beam Frames
0830 – 0930	<b>Design of Foundations &amp; Equipment Footings</b> General Concerns for Foundations • Soil Conditions Related to Foundation Design • Foundation Design: Criteria and Process • Shallow Bearing Foundations • Equipment Footings • Column Footings • Pedestals • Foundation Walls and Grade Beams • Deep Foundation
0930 – 0945	Break
0945 – 1100	<b>Design of Concrete Walls</b> Sitecast Walls: General Concerns • Concrete Bearing Walls • Concrete Basement Walls • Concrete Shear Walls • Precast Concrete Walls • Concrete Masonry Walls
1100 - 1230	<b>Some Design Cases in Process Facilities</b> Design of Reinforced Concrete Tanks • Design of Steel Tank Footing & Foundation
1230 - 1245	Break
1245 - 1335	<b>Some Design Cases in Process Facilities (cont'd)</b> Design of Piping & Pipeline Supports and Anchor Blocks • Design of Machinery Footing & Foundation
1335 – 1420	<b>Maintenance of Concrete Structures - General</b> Embedded Metal Corrosion • Disintegration Mechanisms • Moisture Effects • Thermal Effects • Load Effects • Faulty Workmanship: Designer, Detailer, Contractor • Concrete Evaluation
1420 – 1430	<b>Recap</b> 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 4**

0730 – 0830	<b>Maintenance of Concrete Structures – Surface Repair</b> Analysis, Strategy & Design • Material Requirements • Material Selection • Surface Preparation • Reinforcing Steel Cleaning, Repair & Protection • Bonding Repair Materials to Existing Concrete • Placement Methods
0830 – 0930	<b>Maintenance of Concrete Structures - Strengthening and Stabilization</b> Techniques/Design Considerations • Beam Shear Capacity Strengthening • Shear Transfer Strengthening Between Members • Stress Reduction Techniques • Column Strengthening
0930 – 0945	Break
0945 – 1100	<b>Maintenance of Concrete Structures - Protection</b> Strategies • Methods
1100 - 1230	<b>Measures of Structural Reliability</b> What is Structural Reliability? • Deterministic Measures of Limit State Violation • A Partial Probabilistic Safety Measure–the Return Period • Probabilistic Measure of Limit State Violation • Generalized Reliability Problem
1230 - 1245	Break
1245 – 1420	<b>Structural Reliability Assessment</b> Uncertainties in Reliability Assessment • Integrated Risk Assessment • Criteria for Risk Acceptability • Nominal Probability of Failure • Hierarchy of Structural Reliability Measures
1420 – 1430	<b>Recap</b> 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 5**

0730 – 0830	<b>Time Dependent Reliability</b> Time-Integrated Approach • Discretized Approach • Stochastic Process Theory • Stochastic Processes and Outcrossings • Time Dependent Reliability • Load Combinations • Dynamic Analysis of Structures • Fatigue Analysis
0830 – 0930	<b>Load Effect on Structural Reliability</b> Wind Loading • Wave Loading • Floor Loading
0930 – 0945	Break
0945 – 1100	<b>Resistance Effect on Structural Reliability</b> Basic Properties of Hot-Rolled Steel Members • Properties of Steel Reinforcing Bars • Concrete Statistical Properties • Statistical Properties of Structural Members • Connections • Incorporation of Member Strength in Design
1100 - 1230	<b>Codes and Structural Reliability</b> Structural Design Codes • Improved Safety-Checking Formats • Selection of Code Safety Levels • Code Calibration Procedure • Observations
1230 – 1245	Break



1245 - 1345	<b>Probabilistic Evaluation of Existing Structures</b> Assessment Procedures • Updating Probabilistic Information • Proof and Service Load Information • Analytical Techniques • Acceptance Criteria for Existing Structures
1345 - 1400	<b>Course Conclusion</b> Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1400 - 1415	<b>POST-TEST</b>
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

**Practical Sessions**

This hands-on, highly-interactive course includes real-life case studies and exercises:-



**Course Coordinator**

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