

COURSE OVERVIEW PE0337

Hydrogen Energy Infrastructure Design & Maintenance

Course Title

Hydrogen Energy Infrastructure Design & Maintenance

Course Date/Venue

November 16-20, 2025/Executive Boardroom C Meeting Room, InterContinental Abu Dhabi, Abu Dhabi, UAE

Course Reference

PE0337

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



This course is designed to provide participants with a detailed and up-to-date overview of Hydrogen Energy Infrastructure Design and Maintenance. It covers the properties, applications and benefits of hydrogen energy; the hydrogen production methods covering steam methane reforming (SMR), electrolysis and biomass gasification; the comparative analysis of hydrogen production technologies; the types, efficiency and applications of electrolysis; the renewable hydrogen production, material selection basics and how hydrogen interacts with various materials; the hydrogen storage technologies and the design and engineering considerations for hydrogen storage systems; and the safety aspects of hydrogen storage.



Further, the course will also discuss the hydrogen transportation methods for pipelines, tankers and trucks; the pipeline design and construction for hydrogen transport; the logistics and infrastructure for hydrogen distribution; the corrosion concerns related to hydrogen transportation; the design and layout of hydrogen refueling stations; the components and equipment of hydrogen refueling stations; and the safety standards and regulations for refueling stations and fuel cell technologies.

During this interactive course, participants will learn the integration of fuel cells in transportation and stationary applications and fuel cell maintenance; the properties, hazards and mitigation strategies of hydrogen safety; the risk assessment and management in hydrogen infrastructure; the international and national safety standards and regulations; the environmental impact assessment of hydrogen energy projects; the life cycle analysis of hydrogen production and utilization; the carbon capture and storage (CCS) in hydrogen production and regulations related to hydrogen infrastructure; the maintenance and inspection procedures for hydrogen infrastructure; the non-destructive testing (NDT) techniques for hydrogen systems; and the condition monitoring, predictive maintenance and economic analysis of hydrogen energy projects.

Course Objectives

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

- Apply and gain an in-depth knowledge on hydrogen energy infrastructure design and maintenance
- Discuss the properties, applications and benefits of hydrogen energy
- Explain hydrogen production methods covering steam methane reforming (SMR), electrolysis and biomass gasification
- Apply comparative analysis of hydrogen production technologies and identify the types, efficiency and applications of electrolysis
- Identify renewable hydrogen production, material selection basics and how hydrogen interacts with various materials
- Recognize the hydrogen storage technologies, design and engineering considerations for hydrogen storage systems and safety aspects of hydrogen storage
- Apply hydrogen transportation methods for pipelines, tankers and trucks as well as pipeline design and construction for hydrogen transport
- Describe logistics and infrastructure for hydrogen distribution and corrosion concerns related to hydrogen transportation
- Illustrate the design and layout of hydrogen refueling stations and recognize the components and equipment of hydrogen refueling stations
- Apply safety standards and regulations for refueling stations and discuss fuel cell technologies
- Integrate fuel cells in transportation and stationary applications and fuel cell maintenance
- Identify the properties, hazards and mitigation strategies of hydrogen safety
- Carryout risk assessment and management in hydrogen infrastructure and review the international and national safety standards and regulations
- Explain the environmental impact assessment of hydrogen energy projects and life cycle analysis of hydrogen production and utilization

- Discuss carbon capture and storage (CCS) in hydrogen production and regulations related to hydrogen infrastructure
- Apply maintenance and inspection procedures for hydrogen infrastructure and non-destructive testing (NDT) techniques for hydrogen systems
- Carryout condition monitoring, predictive maintenance and economic analysis of hydrogen energy projects

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 hydrogen energy infrastructure design and maintenance for energy engineers, chemical engineers, mechanical engineers, civil engineers, maintenance technicians, safety officers, project managers, government officials and those who are interested in the development of hydrogen energy infrastructure.

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.

Accommodation

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

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 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:



Mr. Kyle Bester is a **Senior Mechanical & Process Engineer** with extensive years of practical experience within the **Oil & Gas, Power & Water Utilities** and other **Energy** sectors. His expertise includes **Process Design & Engineering, Piping Control Loops & Heat Exchangers, Hydrogen Energy, Hydrogen Storage Technologies, Logistics & Infrastructure for Hydrogen Distribution, Fuel Cell Technologies, Risk Assessment & Management in Hydrogen Infrastructure, Condition Monitoring & Predictive Maintenance, Safe Process Units Start-Up/Shutdown**, Development of Equipment Handling Over/Commissioning Procedures, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Performance & Efficiency, **Process Plant** Optimization, Rehabilitation, Revamping & Debottlenecking, **Distillation** Operation & Troubleshooting, Operation of the **Hydrocarbon Process** Equipment, Fired Heaters, Air Coolers, Crude Desalter, **Flare, Blowdown & Pressure Relief** Systems Operation, **Separation** Techniques, **Bulk Liquid Storage** Management, **Process Reactors, Compressors & Turbines** Troubleshooting, **Pumps & Valves** Installation & Operation, **Bearing & Bearing Failure** Analysis, **Pressure Vessel & High Pressure Boiler** Operation, Mechanical Seals, **Pipe** Maintenance & Repair, **Centrifugal & Positive Displacement Pump, Rotating Machinery, Tank Farm & Tank, Process Piping** Design, **Condition Monitoring** System, **Maintenance** Planning & Scheduling, **Maintenance** Shutdown & Turnaround, Reliability-Centered Maintenance (**RCM**), Root Cause Analysis (**RCA**) and Asset Integrity Management (**AIM**). Further, he is also well-versed in **Water Pumping** Station, **Water Distribution & Network** System, **Water Hydraulic** Modelling, **Water Pipelines** Materials & Fittings, **Potable Water Transmission, Water Supply & Desalination Plants** Rehabilitation, **Pipes & Fittings, Main Water Line** Construction and **Sewage & Industrial Wastewater** Treatment.

During his career life, Mr. Bester has gained his practical and field experience through his various significant positions and dedication as the **Project Manager, Asset Manager, Process Engineer, Water Engineer, Maintenance Engineer, Mechanical Engineer, Team Leader, Analyst, Process Engineering Dept. Supervisor, Landscape Designer** and **Senior Instructor/Trainer** for various international companies as well as infrastructures, water and wastewater treatment plants from New Zealand, UK, Samoa, Zimbabwe and South Africa, just to name a few.

Mr. Bester holds a **Diploma in Wastewater Treatment** and a **National Certificate in Wastewater & Water Treatment**. Further, he is a **Certified Instructor/Trainer**, an **Approved Chemical Handler** and has delivered numerous courses, trainings, conferences, seminars and workshops internationally.

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 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: Sunday, 16th of November 2025

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0900	Introduction to Hydrogen Energy: Properties, Applications & Benefits
0900 – 0930	Overview of Hydrogen Production Methods: Steam Methane Reforming (SMR), Electrolysis, Biomass Gasification, etc.
0930 – 0945	<i>Break</i>
0945 – 1030	Comparative Analysis of Hydrogen Production Technologies
1030 – 1130	Detailed Exploration of Electrolysis: Types, Efficiency & Applications
1130 – 1215	Renewable Hydrogen Production: Solar, Wind & Biomass Integration
1215 – 1230	<i>Break</i>
1230 – 1330	Case Studies: Hydrogen Production Plants & Projects
1330 – 1420	Material Selection Basics & How Hydrogen Interacts with Various Materials
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 17th of November 2025

0730 – 0830	Hydrogen Storage Technologies: Compressed Gas, Liquid Hydrogen, Solid-State Storage
0830 – 0930	Design & Engineering Considerations for Hydrogen Storage Systems
0930 – 0945	<i>Break</i>
0945 – 1030	Safety Aspects of Hydrogen Storage
1030 – 1130	Hydrogen Transportation Methods: Pipelines, Tankers, Trucks
1130 – 1215	Pipeline Design & Construction for Hydrogen Transport
1215 – 1230	<i>Break</i>
1230 – 1330	Logistics & Infrastructure for Hydrogen Distribution
1330 – 1420	Corrosion Concerns Related to Hydrogen Transportation
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 18th of November 2025

0730 – 0830	Design & Layout of Hydrogen Refueling Stations
0830 – 0930	Components & Equipment of Hydrogen Refueling Stations
0930 – 0945	<i>Break</i>
0945 – 1030	Safety Standards & Regulations for Refueling Stations
1030 – 1130	Fuel Cell Technologies: Types, Principles & Applications
1130 – 1215	Integration of Fuel Cells in Transportation & Stationary Applications
1215 – 1230	<i>Break</i>
1230 – 1330	Hands-on Exercises: Simulation of Refueling Station Operations
1330 – 1420	Fuel Cell Maintenance
1420 – 1430	Recap
1430	<i>Lunch & End of Day Three</i>

Day 4: Wednesday, 19th of November 2025

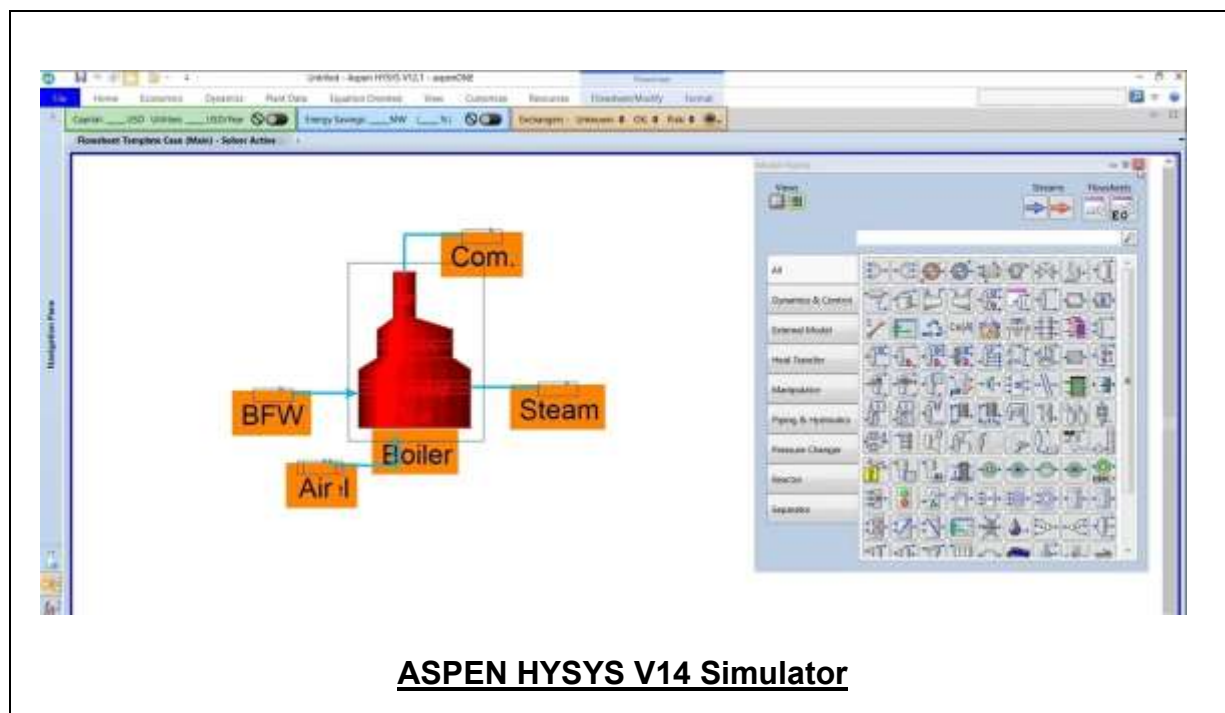
0730 – 0830	<i>Hydrogen Safety: Properties, Hazards & Mitigation Strategies</i>
0830 – 0930	<i>Risk Assessment & Management in Hydrogen Infrastructure</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<i>Overview of International & National Safety Standards & Regulations</i>
1030 – 1130	<i>Environmental Impact Assessment of Hydrogen Energy Projects</i>
1130 – 1215	<i>Life Cycle Analysis of Hydrogen Production & Utilization</i>
1215 – 1230	<i>Break</i>
1230 – 1330	<i>Carbon Capture & Storage (CCS) in Hydrogen Production</i>
1330 – 1420	<i>Regulations Related to Hydrogen Infrastructure</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

Day 5: Thursday, 20th of November 2025

0730 – 0830	<i>Maintenance & Inspection Procedures for Hydrogen Infrastructure</i>
0830 – 0930	<i>Non-Destructive Testing (NDT) Techniques for Hydrogen Systems</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<i>Condition Monitoring & Predictive Maintenance</i>
1030 – 1130	<i>Economic Analysis of Hydrogen Energy Projects</i>
1130 – 1215	<i>Future Trends in Hydrogen Technology & Infrastructure</i>
1215 – 1230	<i>Break</i>
1230 – 1345	<i>Group Project: Developing a Hydrogen Infrastructure Plan</i>
1345 – 1400	<i>Course Conclusion</i>
1400 – 1415	<i>POST-TEST</i>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using “ASPEN HYSYS V14 Simulator” simulator.



Course Coordinator

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