COURSE OVERVIEW PE0018(KP4)-2D
Hydrogen Manufacturing Unit

Course Title
Hydrogen Manufacturing Unit

1.2 CEUs (12 PDHs) AWARD

Course Reference
PE0018(KP4)-2D

Course Duration/Credits
Two days/1.2 CEUs/12 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	May 19-20, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	July 20-21, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	October 13-14, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	December 14-15, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Description

This practical and 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.

Petroleum refineries are among the largest users of hydrogen in the chemical industry. Hydrogen is used in hydrogenation, desulfurization and denitrogenation processes and a large source of hydrogen in refining operations is the production of aromatic compounds which are used as octane enhancers in gasoline.

The role of the steam reformer for the production of both synthesis gas and steam will be discussed. The basic steam reformer design will be reviewed together with the water and steam systems. Feedstocks and feedstock purification topics will be followed by the steam reforming chemistry and steam reforming catalyst. All aspects of reformer metallurgy will be reviewed including monitoring and dealing with tube failures.

This course will cover all of the many catalysts, absorbents and adsorbents used for hydrogen production. In general, these units have long periods of operation between shutdowns and correct catalyst loading and activation procedures must be followed to avoid unintended outages.

All of the hydrogen purification options viz wash systems, methanation, PSA or membranes are covered in the course. The different designs of steam reformer now in service are covered together with options for up rating.

Course Objectives

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

- Apply and gain in-depth knowledge on hydrogen production by steam reforming
- Discuss steam reformer and identify the reasons behind the change in emphasis
- Recognize refinery hydrogen balance and the role of the steam reformer for the production of both synthesis gas and steam
- Illustrate the basic steam reformer design including the water and steam systems feedstocks
- Apply feedstock purification, steam reforming chemistry and steam reforming catalysts
- Discuss reformer metallurgy as well as monitor and deal with tube failures
- Recognize for catalysts, absorbents and adsorbents used for hydrogen production
- Employ proper shutdown, catalysts loading and activation procedures
- Identify the hydrogen purification options, wash systems and methanation
- Determine PSA, membranes, designs of steam reformer and options for up rating

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 production by steam performing for those involved in refinery process engineering, unit operations, research and development, sales and refinery technical service. Process engineers from design and construction companies as well as those who provide products and services to the petroleum refining industry will also find the course very useful and informative.

Course Fee

US$ 2,750 per Delegate **+ VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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

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 **1.2 CEUs** (Continuing Education Units) or **12 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. Mervyn Frampton is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Utilities** industries. His expertise lies extensively in the areas of **Process Troubleshooting**, **Distillation Towers**, **Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation**, **Distillation Column** Operation & Control, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, Applied **Process Engineering** Elements, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & Plant Upset, **Process Plant** Start-up & Commissioning, **Clean Fuel** Technology & Standards, Flare, Blowdown & Pressure Relief Systems, **Oil & Gas Field Commissioning** Techniques, **Pressure Vessel** Operation, **Gas Processing**, **Chemical** Engineering, **Process Reactors** Start-Up & Shutdown, **Gasoline Blending** for Refineries, **Urea Manufacturing** Process Technology, Continuous Catalytic Reformer (**CCR**), **De-Sulfurization** Technology, Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting, **Hazardous Waste Management & Pollution Prevention**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Energy Conservation** Skills, **Catalyst Technology**, **Refinery & Process Industry**, **Chemical Analysis**, **Process Plant**, **Commissioning & Start-Up**, **Alkylation**, **Hydrogenation**, **Dehydrogenation**, **Isomerization**, **Hydrocracking & De-Alkylation**, **Fluidized Catalytic Cracking**, **Catalytic Hydrodesulphuriser**, **Kerosene Hydrotreater**, **Thermal Cracker**, **Catalytic Reforming**, **Polymerization**, **Polyethylene**, **Polypropylene**, Pilot Water Treatment Plant, **Gas Cooling**, **Cooling Water Systems**, Effluent Systems, Material Handling Systems, **Gasifier**, **Gasification**, Coal Feeder System, **Sulphur Extraction Plant**, **Crude Distillation Unit**, **Acid Plant Revamp** and **Crude Pumping**. Further, he is also well-versed in HSE Leadership, Project and Programme Management, Project Coordination, Project Cost & Schedule Monitoring, Control & Analysis, Team Building, Relationship Management, Quality Management, Performance Reporting, Project Change Control, Commercial Awareness and Risk Management.

During his career life, Mr. Frampton held significant positions as the **Site Engineering Manager**, **Senior Project Manager**, **Process Engineering Manager**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project Engineer**, **Process Engineer**, **Project Engineer**, **Assistant Project Manager**, **Handover Coordinator** and **Engineering Coordinator** from various international companies such as the **Fluor Daniel**, **KBR** South Africa, **ESKOM**, MEGAWATT PARK, CHEMEPIC, PDPS, CAKASA, **Worley Parsons**, Lurgi South Africa, **Sasol**, **Foster Wheeler**, **Bosch** & **Associates**, **BCG** Engineering Contractors, Fina Refinery, Sapref Refinery, Secunda Engine Refinery just to name a few.

Mr. Frampton has a **Bachelor's degree** in **Industrial Chemistry** from **The City University** in **London**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, conferences and seminars 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.

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	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Steam Reformer***
0900 – 0930	***Reasons Behind the Change in Emphasis***
0930 – 0945	*Break*
0945 – 1000	***Refinery Hydrogen Balance***
1000 – 1020	***The Role of the Steam Reformer for the Production of Both Synthesis Gas & Steam***
1020 – 1040	***The Basic Steam Reformer Design***
1040 – 1100	***Water & Steam Systems Feedstocks***
1100 – 1120	***Feedstock Purification***
1120 – 1140	***Steam Reforming Chemistry***
1140 -1215	***Steam Reforming Catalysts***
1215 – 1230	*Break*
1230 – 1320	***Reformer Metallurgy***
1320 - 1420	***Monitoring & Dealing with Tube Failures***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Catalysts, Absorbents & Adsorbents Used for Hydrogen Production***
0800 – 0830	***Shutdowns***
0930 – 0945	*Break*
0945 – 1000	***Catalyst Loading***
1000 – 1020	***Activation Procedures***
1020 – 1040	***Hydrogen Purification Options***
1040 – 1100	***Wash Systems***
1100 – 1120	***Methanation***

1120 – 1140	***PSA***
1140 -1215	***Membranes***
1215 – 1230	*Break*
1230 – 1250	***Designs of Steam Reformer***
1250 – 1315	***Options for Up Rating***
1345 – 1400	***Course Conclusion***
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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org