COURSE OVERVIEW PE0029
Hydrotreating Technology (Advanced)

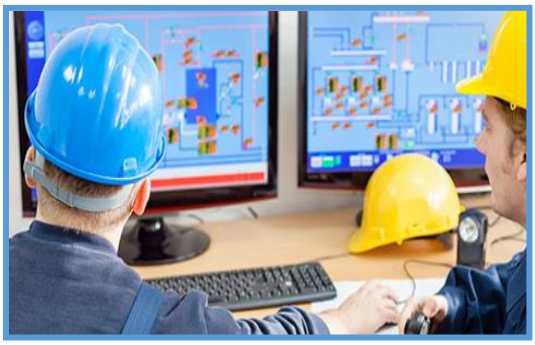
Course Title
Hydrotreating Technology (Advanced)

Course Date/Venue
July 20-24, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

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

Course Reference
PE0029

Course Description



This practical, 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.

For over three decades, refiners worldwide have been implementing various projects in their facilities to accommodate a variety of regulations to improve the quality of transportation fuels in order to reduce vehicle emissions.

The purpose of diesel, naphtha and kerosene hydrotreater unit is to remove sulphur, nitrogen, aromatics contents and oxygen containing hydrocarbons on the special catalyst in the presence of hydrogen, and also for decomposition of paraffinic compounds in diesel fuel for the purpose of decrease of cloud point and setting point for winter period of a season.

This course is designed to provide participants with a detailed and an up-to-date overview of hydro-treating technology. It covers the naphtha, kerosene and diesel hydrotreating technology; the monitoring of unit operations, troubleshooting, latest developments and areas of concern; and the refinery feeds, products, and processes as well as the development of hydro processing backgrounds.

During this interactive course, participants will learn the process fundamentals covering chemical reactions, catalysts, reaction kinetics, hydrogenation – dehydrogenation equilibrium, reaction selectivity, multicatalyst systems and commercial catalysts; the process design including typical processing conditions, reactor systems, flow schemes and design considerations; the distillate hydrotreating unit design and process capabilities; the naphtha hydrotreating process, kerosene hydrotreating process and diesel hydrotreating process; the licensed hydrotreating process; and the cost and economics.

Course Objectives

The purpose of this course is to improve and update participant's knowledge of hydrotreating technologies and will include:-

- Apply and gain an in-depth knowledge on hydro-treating technology
- Understand naphtha HT, kerosene HT and diesel HT
- Monitor unit operations, apply troubleshooting and latest developments and identify the areas of concern
- Recognize refinery feeds, products, and processes as well as the development of hydro processing backgrounds
- Identify process fundamentals covering chemical reactions, catalysts, reaction kinetics, hydrogenation – dehydrogenation equilibrium, reaction selectivity, multicatalyst systems and commercial catalysts
- Carryout process design including typical processing conditions, reactor systems, flow schemes and design considerations
- Illustrate distillate hydrotreating unit design and process capabilities
- Employ naphtha hydrotreating process, kerosene hydrotreating process and diesel hydrotreating process
- Identify licensed hydrotreating process as well the cost and economics

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 hydro-treating technology for operations personnel involved in operations and troubleshooting of hydrotreating unit.

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.

Accommodation

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

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 **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**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 20th of July 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Refinery Feeds, Products, & Processes*** *Introduction • ASTM Standard for Crude Characterization • Important Terminologies in Crude Characterization*
0930 – 0945	*Break*
0945 – 1030	***Refinery Feeds, Products, & Processes (cont'd)*** *Refining Processes • Products and Properties • Biofuel*
1030 – 1215	***Backgrounds – Development of Hydro Processing*** *Hydro Processing Objectives • Commercial History*
1215 – 1230	*Break*
1230 – 1420	***Process Fundamentals*** *Chemical Reactions • Catalysts • Reaction Kinetics • Hydrogenation – Dehydrogenation Equilibrium • Reaction Selectivity • Multicatalyst Systems • Commercial Catalysts*
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, 21st of July 2025***

0730 – 0930	***Process Design*** *Typical Processing Conditions • Reactor Systems*
0930 – 0945	*Break*
0945 – 1100	***Process Design (cont'd)*** *Flow Schemes • Design Considerations*
1100 – 1215	***Distillate Hydrotreating Unit Design*** *Introduction • Number of Separators*
1215 – 1230	*Break*

1230 – 1420	***Distillate Hydrotreating Unit Design (cont'd)*** *Stripper Design • Debutanizer Design • Integrated Design*
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, 22nd of July 2025***

0730 – 0930	***Process Capabilities*** *Feedstocks & Applications • Hydrogen Utilization • Product Qualities*
0930 – 0945	*Break*
0945 – 1100	***Process Capabilities (cont'd)*** *Catalyst Consumption • Hydrogen Consumption • Utilities*
1100 – 1215	***Naphtha Hydrotreating Process*** *Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products • Reaction Mechanisms*
1215 – 1230	*Break*
1230 – 1420	***Naphtha Hydrotreating Process (cont'd)*** *Hydrotreating Catalysts • Key Process Conditions • Different Types of Process Designs*
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, 23rd of July 2025***

0730 – 0930	***Kerosene Hydrotreating Process*** *Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products • Reaction Mechanisms*
0930 – 0945	*Break*
0945 – 1100	***Kerosene Hydrotreating Process (cont'd)*** *Hydrotreating Catalysts •Key Process Conditions •Different Types of Process Designs*
1100 – 1215	***Diesel Hydrotreating Process*** *Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products*
1215 – 1230	*Break*
1230 – 1420	***Diesel Hydrotreating Process (cont'd)*** *Reaction Mechanisms • Hydrotreating Catalysts • Key Process Conditions • Different Types of Process Designs*
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, 24th of July 2025***
0730 – 0930	***Licensed Hydrotreating Process*** *Chevron Lummus Global RDS/VRDS Hydrotreating – Transportation Fuels from the Bottom of the Barrel • Selective Hydrogen Processes • UOP Unionfining Technology • UOP RCD Unionfining Process*
0930 – 0945	*Break*
0945 – 1100	***Licensed Hydrotreating Process (cont'd)*** *UOP Catalytic Dewaxing Process • UOP Unisar Process for Saturation of Aromatics • Chevron Lummus Global Ebullated Bed Bottom-of-the-Barrel Hydroconversion (LC-Fining) Process*
1100 – 1230	***Cost & Economics*** *Gross Refining Margin (GRM) • Net Refining Margin • Contribution Margin • Production Plans (Unit Operating Goals, Blending Operations) • Feedstock Selection*
1230 – 1245	*Break*
1245 – 1300	***Cost & Economics (cont'd)*** *Optimality (Minimum Cost, Maximum Profit) • Optimal Product Mix • Marginal Economics • Investment Opportunities*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t 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

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