

COURSE OVERVIEW PE0029 Hydrotreating System Design

Course Title

Hydrotreating System Design

Course Date/Venue

Session 1: February 17-21, 2025/Fujairah
Meeting Room, Grand Millennium Al
Wahda Hotel, Abu Dhabi, UAE

Session 2: September 14-18, 2025/
Boardroom 1, Elite Byblos Hotel Al
Barsha, Sheikh Zayed Road, Dubai,
UAE



Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Reference

PE0029

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.

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, mult catalyst 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, mult catalyst 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

Certificates are accredited by the following international accreditation organizations: -

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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.

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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. Basem Al-Qarout is a Senior Process & Chemical Engineer with over 35 years of extensive teaching and field industrial experience. His expertise covers Fundamentals of Process Operations, Hydrocarbon Processing, Process Plant Start-Up & Commissioning, Crude Oil & Refinery Products, Sampling & Feed/Product Quality, Process Troubleshooting & Problem Solving, Separation of Oil/Gas/Water, Oil Field Operations, Gas Field Operations, Oil Production, Gas Processing, Process Equipment Design, Operation of Process Equipment, Hydro-Treating, Hydro-Forming, Hydro-Cracking and Catalyst Technology. Furthermore, he is also well-versed in P&ID and Wiring Schematics Rotating Equipment-Machinery (Pumps, Compressors, Turbines, Fans & Blowers, Electric Motors, Gears & Transmission Equipment), Static Equipment-Stationary, (Heat Exchangers, Distillation Column, How Trays Work, Process Heaters/Furnaces, Reboilers, Condensers, Piping System, Valves) and Process Control & Instrumentation (Process Control, Instrumentation, Control Valves).

During Mr. Al-Qarout's career life, he has handled challenging positions wherein he has acquired his thorough practical and academic experience as the **Technical Instructor, Senior Production Foreman, Panel Operator at Hydro Cracking Plant and Plant Foreman** of various companies such as **Mellitah Oil and Gas B.V., KNPC, Chevron, Jordan Refinery Company and Libya Oil Center.**

Mr. Al-Qarout has a **Diploma in Chemical Engineering** from the **Polytechnic University in Jordan**. Further, he is **Certified by City & Guilds as Level 2 & 3 NVQ Processing Operations: Hydrocarbons Assessor** and a **Certified Instructor by Haward Technology Train-the-Trainer Program.**

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

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 • Refining Processes • Products and Properties • Biofuel
0930 – 0945	Break
0945 – 1030	Refinery Feeds, Products, & Processes (cont'd) Introduction • ASTM Standard for Crude Characterization • Important Terminologies in Crude Characterization • Refining Processes • Products and Properties • Biofuel
1030 – 1130	Backgrounds – Development of Hydro Processing Hydro Processing Objectives • Commercial History
1130 – 1215	Backgrounds – Development of Hydro Processing (cont'd) Hydro Processing Objectives • Commercial History
1215 – 1230	Break
1230 – 1330	Process Fundamentals Chemical Reactions • Catalysts • Reaction Kinetics
1330 – 1420	Process Fundamentals (cont'd) Chemical Reactions • Catalysts • Reaction Kinetics
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 – 0830	Process Design Typical Processing Conditions • Reactor Systems • Flow Schemes • Design Considerations
0830 – 0930	Process Design (cont'd) Typical Processing Conditions • Reactor Systems • Flow Schemes • Design Considerations
0930 – 0945	Break
0945 – 1100	Distillate Hydrotreating Unit Design Introduction • Number of Separators
1100 – 1215	Distillate Hydrotreating Unit Design (cont'd) Introduction • Number of Separators
1215 – 1230	Break
1230 – 1330	Process Capabilities Feedstocks & Applications • Hydrogen Utilization • Product Qualities
1330 – 1420	Process Capabilities (cont'd) Feedstocks & Applications • Hydrogen Utilization • Product Qualities
1420 – 1430	Recap
1430	Lunch & End of Day Two



Day 3

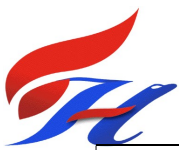
0730 – 0830	Process Capabilities Catalyst Consumption • Hydrogen Consumption • Utilities
0830 – 0930	Process Capabilities (cont'd) Catalyst Consumption • Hydrogen Consumption • Utilities
0930 – 0945	Break
0945 – 1100	Process Capabilities (cont'd) Catalyst Consumption • Hydrogen Consumption • Utilities
1100 – 1215	Naphtha Hydrotreating Process Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1215 – 1230	Break
1230 – 1330	Naphtha Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1330 – 1420	Naphtha Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Kerosene Hydrotreating Process Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
0830 – 0930	Kerosene Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
0930 – 0945	Break
0945 – 1100	Kerosene Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1100 – 1215	Diesel Hydrotreating Process Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1215 – 1230	Break
1230 – 1330	Diesel Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1330 – 1420	Diesel Hydrotreating Process (cont'd) Why Diesel Hydrotreating • Basic Process Flowsheeting • Feeds • Products
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0830	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
0830 – 0930	Licensed Hydrotreating Process (cont'd) 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) Chevron Lummus Global RDS/VRDS Hydrotreating – Transportation Fuels from the Bottom of the Barrel • Selective Hydrogen Processes • UOP Unionfining Technology • UOP RCD Unionfining Process
1100 – 1230	Cost & Economics Optimality (Minimum Cost, Maximum Profit) • Optimal Product Mix • Marginal Economics • Investment Opportunities



1230 – 1245	Break
1245 – 1345	Cost & Economics (cont'd) Optimality (Minimum Cost, Maximum Profit) • Optimal Product Mix • Marginal Economics • Investment Opportunities
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

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