COURSE OVERVIEW PE0192
Hydroisomerization Unit Operation and Troubleshooting

Course Title
Hydroisomerization Unit Operation and Troubleshooting

Course Date/Venue
Session 1: August 25-29, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: November 02-06, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
PE0192

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

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.

This course is designed to provide participants with a detailed and up-to-date overview of Hydroisomerization Unit Operation and Troubleshooting. It covers the purpose of hydroisomerization, feedstock characteristics and chemistry of hydroisomerization; the process configuration and variables; the hydroisomerization unit startup and steady-state operations; the role of hydrogen in the process and heat management in hydroisomerization; the separation systems, key control systems and operational issues; and the catalyst-related issues and hydrogen system troubleshooting.

During this interactive course, each participant will learn the causes of reactor overheating or underheating; addressing hot spots in reactors, managing heat exchanger fouling and diagnosing quench system malfunctions; assessing feedstock and product quality issues; the mechanical and equipment troubleshooting; improving process efficiency, maximizing product yields and data analytics in hydroisomerization; the feedstock and catalyst strategies; the environmental and safety considerations; the best practices for proactive maintenance; ensuring equipment reliability under varying loads; and scheduling catalyst inspections and replacements.

Course Objectives

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

- Apply and gain an in-depth knowledge on hydroisomerization unit operation and troubleshooting
- Discuss the purpose of hydroisomerization including feedstock characteristics
- Determine the chemistry of hydroisomerization, catalysts in hydroisomerization, process configuration and process variables and their impact
- Carryrout hydroisomerization unit startup and steady-state operations
- Define the role of hydrogen in the process and apply heat management in hydroisomerization
- Recognize separation systems, key control systems and operational issues
- Identify catalyst-related issues and apply hydrogen system troubleshooting
- List the causes of reactor overheating or underheating, address hot spots in reactors, manage heat exchanger fouling and diagnose quench system malfunctions
- Assess feedstock and product quality issues and apply mechanical and equipment troubleshooting
- Improve process efficiency, maximize product yields and review data analytics in hydroisomerization
- Employ feedstock and catalyst strategies and recognize environmental and safety considerations
- Apply best practices for proactive maintenance, ensure equipment reliability under varying loads and schedule catalyst inspections and replacements

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

The course covers systematic techniques and methodologies on the hydroisomerization unit operation and troubleshooting for project engineers/managers, production managers and supervisors, process engineers, plant operators, maintenance technicians, troubleshooting specialists, safety and environmental compliance officers, research & development (R&D) teams, consultants and quality control/assurance teams.

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 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 book.

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:

Dr. Hesham Abdou, PhD, MSc, BSc, is a **Senior Drilling & Petroleum Engineer** with over **35 years** of integrated industrial and academic experience as a **University Professor**. His specialization widely covers in the areas of **Drilling & Completion** Technology, **Directional Drilling**, **Horizontal & Sidetracking**, **Drilling Operation** Management, **Drilling & Production** Equipment, **ERD Drilling & Stuck Pipe** Prevention, **Natural & Artificial Flow Well Completion**, **Well Testing** Procedures & Evaluation, **Well** Performance, **Coiled Tubing** Technology, **Oil Recovery Methods** Enhancement**, Well Integrity** Management, **Well Casing & Cementing**, **Acid Gas** Removal, **Heavy Oil Production** & Treatment Techniques, **Crude Oil Testing & Water Analysis**, **Crude Oil & Water** Sampling Procedures, **Equipment Handling** Procedures, **Crude & Vacuum Process** Technology, **Gas Conditioning & Processing**, **Cooling Towers** Operation & Troubleshooting, **Sucker Rod Pumping**, **ESP & Gas Lift**, **PCP & Jet Pump**, **Pigging** Operations, Electric Submersible Pumps (**ESP**), Progressive Cavity Pumps (**PCP**), **Water Flooding**, **Water Lift Pumps** Troubleshooting, **Water System Design** & Installation, **Water Networks Design** Procedures, **Water Pumping** Process, **Pipelines**, **Pumps**, **Turbines**, **Heat Exchangers**, **Separators**, **Heaters**, **Compressors**, **Storage Tanks**, **Valves** Selection, **Compressors**, **Tank & Tank Farms** Operations & Performance, **Oil & Gas Transportation**, **Oil & Gas Production** Strategies, **Artificial Lift** Methods, **Piping & Pumping** Operations, Oil & Water Source Wells Restoration, **Pump** Performance Monitoring, **Rotor Bearing** Modelling, **Hydraulic** Repairs & Cylinders, **Root Cause Analysis**, **Vibration & Condition** Monitoring, **Piping Stress** Analysis, **Amine Gas Sweetening & Sulfur Recovery**, Heat & Mass Transfer and Fluid Mechanics.

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager**, **Petroleum Engineering Assistant General Manager**, **Workover Assistant General Manager**, **Workover Department Manager**, **Artificial Section Head**, **Oil & Gas Production Engineer** and **Senior Instructor/Lecturer** from various companies and universities such as the Cairo University, Helwan University, British University in Egypt, Banha University and Agiba Petroleum Company.

Dr. Hesham has a **PhD** and **Master** degree in **Mechanical Power Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is a member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, seminars and conferences 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 – 0930	***Overview of Hydroisomerization*** *Definition and Purpose of Hydroisomerization • Key Applications in Refining and Petrochemicals • Market Relevance and Product Specifications • Comparison with other Refining Processes*
0930 - 0945	*Break*
0945 - 1045	***Feedstock Characteristics*** *Typical Feedstocks (Naphtha, Straight-Run Distillates, etc.) • Importance of Paraffinic Hydrocarbons • Impurities and their Impact (Sulfur, Nitrogen, Metals) • Pre-Treatment Requirements*
1045 - 1130	***Chemistry of Hydroisomerization*** *Mechanisms: Skeletal Isomerization vs Cracking • Role of Hydrogen and Catalysts in Reaction • Impact of Temperature, Pressure, and Feed Composition • Desired Isomers and Product Yield Optimization*
1130 - 1230	***Catalysts in Hydroisomerization*** *Types of Catalysts (Platinum-Based, Zeolites, etc.) • Catalyst Performance and Selectivity • Catalyst Life Cycle and Deactivation Mechanisms • Handling and Regeneration of Catalysts*
1230 - 1245	*Break*
1245 - 1330	***Process Configuration*** *Single-Stage vs Dual-Stage Hydroisomerization • Reactor Configurations: Fixed Bed, Fluidized Bed • Overview of Process Equipment • Flow Diagram of a Typical Hydroisomerization Unit*
1330 – 1420	***Process Variables & Their Impact*** *Temperature, Pressure, and Hydrogen-to-Hydrocarbon Ratio • Liquid Hourly Space Velocity (LHSV) Considerations • Effects of Process Deviations on Yield and Quality • Trade-Offs Between Operational Efficiency and Product Quality*
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

0730 – 0830	***Hydroisomerization Unit Startup*** *Pre-startup Checks and Inspections • Catalyst Pre-Sulfiding and Activation • Ensuring Proper Feedstock Quality • Gradual Heat-Up and Pressurization Procedures*
0830 – 0930	***Steady-State Operations*** *Monitoring Critical Operating Parameters • Maintaining Hydrogen Purity and Pressure • Managing Heat Integration in the System • Ensuring Feed and Product Flow Consistency*
0930 – 0945	*Break*

0945 – 1100	***Role of Hydrogen in the Process*** *Hydrogen Supply Sources • Hydrogen Purification Techniques • Managing Hydrogen Consumption and Losses • Impact of Insufficient Hydrogen on the Process*
1100 – 1230	***Heat Management in Hydroisomerization*** *Heat Exchangers and Reactor Temperature Control • Importance of Quench Systems in Multi-Bed Reactors • Fouling Prevention in Heat Exchangers • Impact of Temperature Deviations on Product Quality*
1230 – 1245	*Break*
1245 – 1330	***Separation Systems*** *Role of Stabilizers, Strippers, and Separators • Optimizing Fractionation Systems for Product Separation • Managing Light-End and Heavy-End By-Products • Troubleshooting common issues in separation units*
1330 – 1420	***Key Control Systems*** *Importance of Distributed Control Systems (DCS) • Alarms, Interlocks, and Safety Features • Automated Control of Critical Parameters • Troubleshooting Control System Malfunctions*
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

0730 - 0830	***Identifying Operational Issues*** *Symptoms of Process Inefficiencies • Common Causes of Process Imbalances • Establishing a Troubleshooting Workflow • Importance of Process Monitoring Tools*
0830 – 0930	***Catalyst-Related Issues*** *Catalyst Deactivation Mechanisms (Coking, Sintering, Poisoning) • Signs of Catalyst Fouling and Wear • Strategies for Improving Catalyst Life • Catalyst Changeout and Regeneration Procedures*
0930 – 0945	*Break*
0945 – 1100	***Hydrogen System Troubleshooting*** *Insufficient Hydrogen Purity or Pressure • Hydrogen Compressor Issues and Solutions • Hydrogen Recycles System Optimization • Minimizing Hydrogen Consumption*
1100 – 1230	***Temperature & Heat Transfer Problems*** *Causes of Reactor Overheating or Underheating • Addressing Hot Spots in Reactor • Managing Heat Exchanger Fouling • Diagnosing Quench System Malfunctions*
1230 – 1245	*Break*
1245 – 1330	***Feedstock & Product Quality Issues*** *Handling Variable Feedstock Compositions • Dealing with Impurities and Contaminants • Managing Off-Specification Products • Realigning Operations to Meet Product Standards*
1330 – 1420	***Mechanical & Equipment Troubleshooting*** *Reactor and Piping Integrity Issues • Compressors and Pumps: Common Malfunctions • Separator and Stabilizer Inefficiencies • Leak Detection and Resolution Strategies*
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

0730 - 0830	***Improving Process Efficiency*** *Energy Integration and Heat Recovery • Hydrogen Utilization and Recovery • Reactor Performance Optimization • Minimizing Operational Costs*
0830 – 0930	***Maximizing Product Yields*** *Adjusting Process Conditions for Better Yields • Advanced Modeling and Simulation Techniques • Managing Recycle Streams and By-Products • Use of Additives and Modifiers for Performance Improvement*
0930 - 0945	*Break*
0945 - 1100	***Data Analytics in Hydroisomerization*** *Role of Advanced Process Control (APC) • Using Data for Predictive Maintenance • Monitoring System Health with Real-Time Analytics • Leveraging Historical Data for Optimization*
1100 - 1230	***Feedstock & Catalyst Strategies*** *Selecting Optimal Feedstocks for Desired Outcomes • Tailoring Catalyst Use for Specific Product Requirements • Strategies to Extend Catalyst Life • Balancing Feedstock Quality with Unit Efficiency*
1230 - 1245	*Break*
1245 - 1330	***Environmental & Safety Considerations*** *Managing Emissions and Waste Stream • Hydrogen Safety: Risks and Mitigation • Adherence to Environmental Regulations • Sustainable Operations and Carbon Footprint Reduction*
1330 - 1420	***Case Studies & Lessons Learned*** *Examples of Successful Unit Optimizations • Common Failures and their Resolutions • Benchmarking Against Industry Standards • Lessons from Field Applications*
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

0730 – 0830	***Interactive Troubleshooting Scenarios*** *Simulating Real-Life Operational Issues • Collaborative Problem-Solving Exercises• Analyzing Root Causes of Process Deviations • Prioritizing Corrective Actions*
0830 – 0930	***Hands-On Process Analysis*** *Interpreting Process Data and Trends • Using Diagnostic Tools for Issue Identification • Simulating Control System Adjustments • Evaluating the Impact of Operational Changes*
0930 – 0945	*Break*
0945 – 1100	***Mock Emergency Response*** *Simulating Emergency Shutdown Scenarios • Developing Quick Response Strategies • Ensuring Personnel Safety During Emergencies • Restarting Operations After Shutdown*
1100 – 1230	***Maintenance & Reliability*** *Best Practices for Proactive Maintenance • Ensuring Equipment Reliability Under Varying Loads • Scheduling Catalyst Inspections and Replacements • Long-Term Reliability Planning*
1230 - 1245	*Break*

1245 – 1345	***Process Audit & Review*** *Conducting Unit Performance Audits • Identifying Gaps and Improvement Areas • Developing an Action Plan for Continuous Improvement • Sharing Audit Findings with Stakeholders*
1345 - 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course 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

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