COURSE OVERVIEW PE0458
Distillation Technology

Course Title
Distillation Technology

Course Date/Venue
Session 1: June 28-July 02, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
Session 2: September 27-October 01, 2026/Meeting Plus 9, City Centre Rotana, Doha, Qatar

Course Reference
PE0458

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 Distillation Technology. It covers the basic principles of distillation technology and its importance in refining process; the Raoul's law and partial pressure concepts; the modelling techniques for vapour-liquid equilibria; the principles of column modelling, tray efficiency and rate-based models; setting operating conditions covering pressure, temperature limits and operating window; the types, features and limitations of distillation equipment, distillation trays, valves and downcomers; the types and functions of inlet and outlet devices; and the distributors and draw-off trays and design considerations for optimal performance.

Further, the course will also discuss the miscellaneous equipment including liquid ring pumps, drums and accumulators; the types and line-ups of vacuum distillation units including maxwell-Bonnell temperature and its significance; analyzing Conradson carbon residue and the specification requirements for vacuum distillation products; identifying and diagnosing operational problems; the tools and techniques for effective troubleshooting; the stabilizers, LPG splitters and stripper-dryer columns; and the principles of process control in distillation.

During this interactive course, participants will learn the key considerations in the design of distillation units; the principles of heat integration in distillation processes; the maintenance and reliability and optimization techniques; the evaluation of economic impact of operational decisions; the emerging technologies in distillation; and the advanced troubleshooting techniques and process safety considerations in distillation operations.

Course Objectives

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

- Apply and gain an in-depth knowledge on distillation technology
- Discuss the basic principles of distillation technology and its importance in refining process
- Explain Raoul's law and partial pressure concepts and apply modelling techniques for vapour-liquid equilibria
- Identify the principles of column modelling, tray efficiency and rate-based models as well as set operating conditions covering pressure, temperature limits and operating window
- Recognize the types, features and limitations of distillation equipment, distillation trays, valves and downcomers
- Identify the types and functions of inlet and outlet devices and describe the distributors and draw-off trays and design considerations for optimal performance
- Discuss the miscellaneous equipment including liquid ring pumps, drums and accumulators
- Recognize the types and line-ups of vacuum distillation units including maxwell-Bonnell temperature and its significance
- Analyze Conradson carbon residue and the specification requirements for vacuum distillation products
- Identify and diagnose operational problems and apply tools and techniques for effective troubleshooting
- Discuss the stabilizers, LPG splitters and stripper-dryer columns and the principles of process control in distillation
- Explain distillation open clinic, feedstock variability and energy efficiency in distillation
- Discuss the key considerations in the design of distillation units as well as the principles of heat integration in distillation processes
- Apply maintenance and reliability, optimization techniques and the evaluation of economic impact of operational decisions
- Discuss the emerging technologies in distillation and carryout advanced troubleshooting techniques and process safety considerations in distillation operations

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 distillation technology for chemical engineers, process engineers, operations personnel involved in operations and troubleshooting of crude distillation and saturation gas unit.

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 Fee

Dubai	**US$ 7,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Doha	**US$ 7,500** per Delegate. 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

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. Andrew Ladwig is a **Senior Process & Mechanical Maintenance Engineer** with over **25 years** of extensive experience within the **Oil & Gas**, **Refinery**, **Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting**, **Distillation Towers**, **Crude Oil Distillation**, **Ammonia Storage & Loading** Systems, **Operational Excellence** in **Ammonia Plants**, **Fertilizer Storage** Management (Ammonia & Urea), **Fertilizer Manufacturing** Process Technology, **Sulphur Recovery**, Phenol Recovery & Extraction, **Refining Process & Petroleum Products**, **Refinery Planning & Economics**, **Hydrotreating & Hydro-processing**, **Separators** in **Oil & Gas** Industry, **Gas Testing & Energy** Isolations, **Industrial Liquid Mixing**, **Extractors**, **Fractionation**, **Water Purification**, **Water Transport** & Distribution, **Environmental Emission Control**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant Performance**, **Plant Startup & Shutdown**, **Process Troubleshooting** Techniques and Oil & Gas Operation/Surface Facilities. Further, he is also well-versed in **Rotating Machinery** (**BRM**), **Rotating Equipment** Operation & Troubleshooting, Root Cause Analysis (**RCA**), **Process Plant** Shutdown, Turnaround & Troubleshooting, Planning & Scheduling **Shutdowns & Turnarounds**, Optimizing **Equipment Maintenance** & Replacement Decisions, **Maintenance Planning & Scheduling**, **Material Cataloguing**, Maintenance, Reliability & Asset Management Best Practices, **Storage Tanks Operations** & Measurements, **Tank** Inspection & Maintenance, **Pressure Vessel** Operation, **Flare & Relief** System, **Flaring System** Operation, **PSV** Inspection & Maintenance, **Centrifugal & Reciprocating Compressor**, **Screw Compressor** Troubleshooting, **Heat Exchanger** Overhaul & Testing, **Pipe Stress** Analysis, **Control Valves & Actuators**, **Vent & Relief System**, **Centrifugal & Reciprocating Pump** Installation & Repair, **Heat Exchanger** Troubleshooting & Maintenance, **Steam Trapping & Control**, **Control & ESD** System and Detailed Engineering Drawings, Codes & Standards.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer**, **Project Engineer**, **Reliability & Maintenance Engineer**, **Maintenance Support Engineer**, **Process Engineer**, **HSE Supervisor**, **Warehouse Manager**, **Quality Manager**, **Business Analyst**, **Senior Process Controller**, **Process Controller**, **Safety Officer**, **Mechanical Technician**, **Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma** in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, workshops, seminars, courses and conferences internationally.

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	***Introduction & Basics of Distillation*** *Overview of Distillation Technology • Basic Principles & Theory of Distillation • Importance of Distillation in the Refining Process*
0930 – 0945	*Break*
0945 – 1030	***Modelling of Vapour-Liquid Equilibria*** *Raoul's Law & Partial Pressure Concepts • Modelling Techniques for Vapour-Liquid Equilibria • Application of Equilibrium Models in Distillation*
1030 – 1130	***Column Modelling & Tray Efficiency*** *Principles of Column Modelling • Tray Efficiency & Rate-Based Models • Setting Operating Conditions: Pressure & Temperature Limits, Operating Window*
1130 – 1215	***Distillation Equipment*** *Types, Features & Limitations of Distillation Equipment • Distillation Trays, Valves & Downcomers • Random & Structured Packing*
1215 – 1230	*Break*
1230 – 1330	***Inlet & Outlet Devices*** *Types & Functions of Inlet & Outlet Devices • Distributors & Draw-Off Trays • Design Considerations for Optimal Performance*
1330 – 1420	***Exercise 1: Crude Distillation Units*** *Practical Exercise on Crude Distillation Units • Types & Line-Ups of Crude Distillation Units • Operation, Monitoring & Optimization Techniques • Product Specifications: Flash Point, Cloud Points, Distillation (Initial/Final) Boiling Points*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Miscellaneous Equipment*** *Vacuum Sets & their Applications • Liquid Ring Pumps, Drums & Accumulators • Design & Operation of Miscellaneous Equipment*
0830 – 0930	***Vacuum Distillation Units*** *Types & Line-Ups of Vacuum Distillation Units • Operation, Monitoring & Optimization • Maxwell-Bonnell Temperature & Its Significance*
0930 – 0945	*Break*
0945 – 1100	***Product Specifications*** *Cloud Points & their Importance • Conradson Carbon Residue Analysis • Specification Requirements for Vacuum Distillation Products*
1100 – 1215	***Exercise 2: Troubleshooting Distillation Units*** *Practical Exercise on Troubleshooting Common Issues • Jet Flooding, Foaming, Entrainment, Downcomer Limitations • Column Turndown & Its Impact on Performance*

1215 – 1230	*Break*
1230 – 1330	***Troubleshooting Techniques*** *Identifying & Diagnosing Operational Problems • Root Cause Analysis & Corrective Actions • Tools & Techniques for Effective Troubleshooting*
1330 – 1420	***Interactive Session: Real-World Case Studies*** *Discussion of Real-World Case Studies • Group Problem-Solving & Brainstorming Sessions • Sharing of Best Practices & Lessons Learned*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Other Distillation Units*** *Overview of Stabilizers, LPG Splitters & Stripper-Dryer Columns • Design & Operation of Specialized Distillation Units • Applications & Performance Optimization*
0830 – 0930	***Process Control Schemes*** *Principles of Process Control in Distillation • Control Strategies & Schemes for Distillation Units • Integration of Control Systems with Plant Operations*
0930 – 0945	*Break*
0945 – 1100	***Exercise 3: Process Control Applications*** *Practical Exercise on Process Control Schemes • Case Studies on Control System Optimization • Group Discussions & Problem-Solving*
1100 – 1215	***Distillation Open Clinic*** *Interactive Session for Discussing Specific Challenges • Analyzing Real-World Issues & Developing Solutions • Sharing Experiences & Best Practices*
1215 – 1230	*Break*
1230 – 1330	***Feedstock Variability & its Impact*** *Understanding the Impact of Feedstock Changes • Strategies to Manage Feedstock Variability • Case Studies on Successful Adaptations*
1330 – 1420	***Energy Efficiency in Distillation*** *Identifying Opportunities for Energy Savings • Implementing Energy-Efficient Technologies • Case Studies on Energy Efficiency Improvements*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Design Aspects of Distillation Units*** *Key Considerations in the Design of Distillation Units • Material Selection & Equipment Sizing • Safety & Environmental Compliance*
0830 – 0930	***Heat Integration & Recovery*** *Principles of Heat Integration in Distillation Processes • Techniques for Heat Recovery & Utilization • Case Studies on Heat Integration Projects*
0930 – 0945	*Break*
0945 – 1100	***Maintenance & Reliability*** *Maintenance Best Practices for Distillation Units • Reliability Engineering Principles • Predictive & Preventive Maintenance Strategies*
1100 – 1215	***Optimization Techniques*** *Strategies for Optimizing Distillation Performance • Advanced Techniques & Technologies • Cost-Benefit Analysis of Optimization Efforts*
1215 – 1230	*Break*

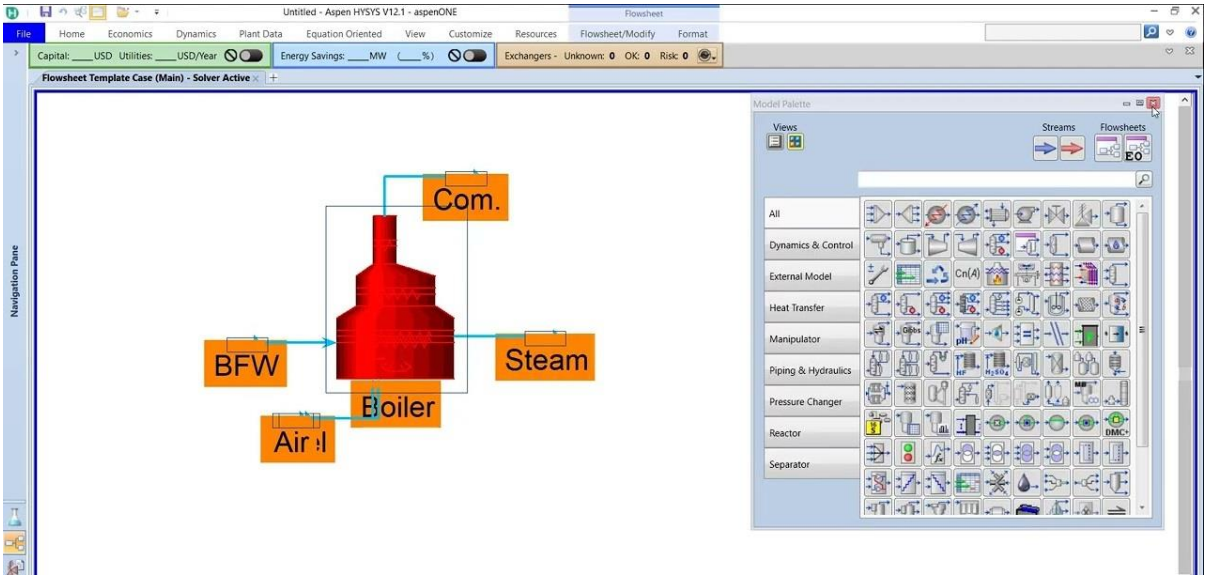
1230 – 1330	***Economic Analysis*** *Economic Considerations in Distillation Operations • Evaluating the Economic Impact of Operational Decisions • Case Studies on Economic Analysis*
1330 – 1420	***Interactive Workshop: Optimization Projects*** *Group Activity to Develop Optimization Projects • Presentations & Discussions of Project Ideas • Feedback & Improvement Suggestions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Emerging Technologies in Distillation*** *Overview of New & Emerging Distillation Technologies • Potential Benefits & Challenges • Case Studies on Technology Adoption*
0830 – 0930	***Advanced Troubleshooting Techniques*** *Techniques for Troubleshooting Complex Issues • Practical Exercises & Simulations • Sharing of Best Practices & Lessons Learned*
0930 – 0945	*Break*
0945 – 1100	***Process Safety & Risk Management*** *Process Safety Considerations in Distillation Operations • Risk Assessment & Mitigation Strategies • Emergency Response Planning & Drills*
1100 – 1230	***Interactive Clinic Workshop: Problem Solving*** *Participants Present Current Challenges & Issues • Group Discussions & Brainstorming Sessions • Developing Practical Solutions to Real-World Problems*
1230 – 1245	*Break*
1245 – 1345	***Workshop Continued: Advanced Troubleshooting*** *Advanced Techniques for Troubleshooting Complex Issues • Practical Exercises & Simulations • Sharing of Best Practices & Lessons Learned*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical session 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 the state-of-the-art simulators "ASPEN HYSYS" simulator.



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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