COURSE OVERVIEW PE1041-2D
Crude Distillation Unit Operations

Course Title
Crude Distillation Unit Operations

Course Reference
PE1041-2D

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

Course Date/Venue

Session(s)	Date	Venue
1	June 23-24, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	August 17-18, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	October 27-28, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	December 07-08, 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.

This course is designed to provide participants with a detailed and up-to-date overview of Crude Distillation Unit Operations. It covers the crude distillation process, basic principles of distillation and distillation unit components; the crude distillation column design, operating principles of the crude unit and control systems and instrumentation; the types of heat exchangers, preheat feedstock, heat integration and energy optimization; the safety and environmental considerations, distillation column performance evaluation, tray efficiency, poor separation efficiency and column pressure drop; and the pre-treatment of feed and different types of crude oil.

During this interactive course, participants will learn the column flooding, foaming and entrainment; managing temperature and pressure imbalances; the distillate cuts, product specifications, laboratory analysis and online analyzers; the operational parameters for product quality optimization, planned and unplanned shutdowns and pre-startup checks and safety measures; the impact of startup conditions on unit performance, startup failures and troubleshooting strategies; and the optimization techniques for throughput and yield and enhancing energy efficiency in crude distillation.

Course Objectives

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

- Apply and gain an in-depth knowledge on crude distillation unit operations
- Discuss crude distillation process, basic principles of distillation and distillation unit components
- Explain crude distillation column design, operating principles of the crude unit and control systems and instrumentation
- Identify the types of heat exchangers, preheat feedstock, apply heat integration and energy optimization and manage heat duty in the column
- Interpret safety and environmental considerations covering safety standards in distillation units, common hazards in crude distillation, emergency shutdown procedures and environmental compliance
- Carryout distillation column performance evaluation, calculate and analyze tray efficiency, troubleshooting poor separation efficiency and evaluate column pressure drop
- Discuss feedstock characteristics and its impact on operation and apply pre-treatment of feed and handling different types of crude oil
- Identify and resolve column flooding, deal with foaming and entrainment and manage temperature and pressure imbalances
- Monitor distillate cuts, control product specifications, use laboratory analysis and online analyzers and adjust operational parameters for product quality optimization
- Employ planned and unplanned shutdowns and pre-startup checks and safety measures
- Discuss the impact of startup conditions on unit performance and handle startup failures and troubleshooting strategies
- Apply optimization techniques for throughput and yield and enhance energy efficiency in crude distillation

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 crude distillation unit operations for process operators and technicians, refinery engineers, unit supervisors and shift leaders, maintenance personnel, technical managers, plant engineers, project engineers, design engineers and other technical staff.

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, **Piping Systems**, 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.

Accommodation

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

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.

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 to Crude Distillation*** *Overview of the Crude Distillation Process • Importance in Refining Operations • Basic Principles of Distillation • Distillation Unit Components*
0930 – 0945	*Break*
0945 – 1030	***Crude Distillation Column Design*** *Column Sizing and Selection • Tray versus Packed Columns • Heat Exchanger Integration • Design Considerations for Capacity and Efficiency*
1030 – 1130	***Operating Principles of the Crude Unit*** *Process Flow and Unit Operation • The Role of Temperature and Pressure • Boiling Point Curves and Their Application • Reflux Ratio and its Impact on Separation Efficiency*
1130 – 1215	***Control Systems & Instrumentation*** *Essential Control Loops (Level, Pressure, Temperature) • Flow Measurement and Regulation • Control Strategies for Column Operations • Troubleshooting Common Control Issues*
1215 – 1230	*Break*
1230 – 1330	***Heat Exchange in Crude Distillation*** *Types of Heat Exchangers Used • Preheating of Feedstock • Heat Integration and Energy Optimization • Managing Heat Duty in the Column*

1330 – 1420	***Safety & Environmental Considerations*** *Safety Standards in Distillation Units • Common Hazards in Crude Distillation • Emergency Shutdown Procedures • Environmental Compliance (Emissions, Waste Management)*
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	***Distillation Column Performance Evaluation*** *Performance Indicators (Throughput, Product Quality) • Calculating and Analyzing Tray Efficiency • Troubleshooting Poor Separation Efficiency • Evaluating Column Pressure Drop*
0830 – 0930	***Feedstock Characteristics & Its Impact on Operation*** *Properties of Crude Oil (Density, API Gravity, Sulfur Content) • Effects of Feed Variability on Distillation • Pre-Treatment of Feed (Desalting, Filtration) • Handling Different Types of Crude Oil*
0930 – 0945	*Break*
0945 – 1100	***Troubleshooting Common Issues in Crude Distillation*** *Identifying and Resolving Column Flooding • Dealing with Foaming and Entrainment • Managing Temperature and Pressure Imbalances • Solutions for Poor Separation and Bottom Product Quality*
1100 – 1215	***Product Quality Control in Crude Distillation*** *Monitoring Distillate Cuts (Gasoline, Kerosene, Diesel, Heavy Oils) • Techniques for Controlling Product Specifications • Use of Laboratory Analysis and Online Analyzers • Adjusting Operational Parameters for Product Quality Optimization*
1215 – 1230	*Break*
1230 – 1300	***Crude Distillation Unit Shutdowns & Startups*** *Procedures for Planned and Unplanned Shutdowns • Pre-Startup Checks and Safety Measures • Impact of Startup Conditions on Unit Performance • Handling Startup Failures and Troubleshooting Strategies*
1300 – 1345	***Advanced Process Optimization & Energy Efficiency*** *Optimization Techniques for Throughput and Yield • Enhancing Energy Efficiency in Crude Distillation • Advanced Process Control (APC) Systems • Case Studies on Process Improvements and Best Practices*
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