



COURSE OVERVIEW PE0206 Gas Fractionation (Advanced)

Course Title

Gas Fractionation (Advanced)

Course Date/Venue

Session 1: January 12-16, 2025/Boardroom 1,
Elite Byblos Hotel Al Barsha, Sheikh
Zayed Road, Dubai, UAE

Session 2: July 14-18, 2025/Fujairah Meeting
Room, Grand Millennium Al Wahda
Hotel, Abu Dhabi, UAE



Course Reference

PE0206



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 Fractionation and Absorption Fundamental. It covers the processes of fractionation and absorption and their significance in petroleum processing; the basic concepts, thermodynamics and phase equilibria of fractionation; the mass transfer and equilibrium concepts of absorption; the types of fractionation processes like distillation, stripping and flashing; the types of absorption processes covering physical and chemical absorption; addressing safety practices and environmental impacts in fractionation and absorption operations; designing distillation columns; and tray and packing design in fractionation columns.



Further, the course will also discuss the simulation and modelling of fractionation processes; the techniques to minimize energy consumption; troubleshooting fractionation operations including the criteria and methodologies for designing absorption units; the absorbent selection and management and mass transfer equipment in absorption processes; the software tools of absorption processes; the guidelines for efficient operation and solving common problems; the advanced control strategies for fractionation and absorption units; and the strategies for energy efficiency through heat integration.



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During this interactive course, participants will learn the emerging technologies and process intensification in fractionation and absorption; the environmental regulations and compliance strategies; analyzing cost-benefit, budgeting and cost control; ensuring safety and managing risks in fractionation and absorption processes; and exploring future trends and innovations.

Course Objectives

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

- Apply and gain a fundamental knowledge on fractionation and absorption
- Discuss the processes of fractionation and absorption and their significance in petroleum processing
- Identify the basic concepts, thermodynamics and phase equilibria of fractionation as well as the mass transfer and equilibrium concepts of absorption
- Recognize the types of fractionation processes like distillation, stripping and flashing as well as the types of absorption processes covering physical and chemical absorption
- Address safety practices and environmental impacts in fractionation and absorption operations
- Design distillation columns and apply tray and packing design in fractionation columns
- Illustrate simulation and modelling of fractionation processes and apply techniques to minimize energy consumption
- Troubleshoot fractionation operations including the criteria and methodologies for designing absorption units
- Apply absorbent selection and management and mass transfer equipment in absorption processes
- Use software tools of absorption processes and apply guidelines for efficient operation and solving common problems
- Implement advanced control strategies for fractionation and absorption units and enhance the strategies for energy efficiency through heat integration
- Discuss emerging technologies and process intensification in fractionation and absorption including the environmental regulations and compliance strategies
- Customize the fractionation and absorption and analyze cost-benefit, budgeting and cost control
- Ensure safety and manage risks in fractionation and absorption processes and explore future trends and innovations

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Howard 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 fractionation and absorption fundamental for process engineers, plant operators and other technical staff.

Course Certificate(s)


Internationally recognized certificates will be issued to all participants of the course 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.





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, PgDip, BSc, is a Senior Process & Petroleum Engineer with 30 years of integrated experience within the Oil & Gas industries. His specialization widely covers in the areas of Artificial Lift System, Artificial Lift Methods, Petroleum Economics, Petroleum Refinery Processing, Refinery Material Balance Calculation, Refinery Gas Treating, Asset Operational Integrity, Drilling Operations, Drilling Rig, Bits & BHA, Mud Pumps, Mud logging Services, Wireline & LWD Sensors, Casing & Cementing Operation, Completion & Workover Operations, Petroleum Engineering, Production Optimization, Well Completion, Rig & Rigless Workover, Advanced PVT & EOS Characterization, PVT/Fluid Characterization/EOS, Advanced Phase Behaviour & EOS Fluid Characterization, PVT Properties of Reservoir Fluids, Directional Drilling Fundamentals, Application & Limitation, Horizontal & Multilateral Wells (Analysis & Design), Directional, Horizontal & Multilateral Drilling, Root Cause Analysis (RCA), Root Cause Failure Analysis (RCFA), Root Cause Analysis Study, Root Cause Analysis Techniques & Methodologies, Process Hazard Analysis (PHA), 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), 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, 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** from Agiba Petroleum Company and **Engineering Consultant/Instructor** for various Oil & Gas companies as well as a **Senior Instructor/Lecturer** for **PhD, Master & BSc degree students** from various universities such as the Cairo University, Helwan University, British University in Egypt, Banha University.

Dr. Hesham has **PhD and Master** degrees as well as **Post Graduate Diploma 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 an active 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 Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Howard 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 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

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|-------------|--|
| 0730 - 0800 | Registration & Coffee |
| 0800 - 0815 | Welcome & Introduction |
| 0815 - 0830 | PRE-TEST |
| 0830 - 0930 | Introduction to Fractionation & Absorption: Overview of the Processes & their Significance in Petroleum Processing |
| 0930 - 0945 | Break |
| 0945 - 1030 | Fundamental Principles of Fractionation: The Basic Concepts, Thermodynamics & Phase Equilibria |
| 1030 - 1130 | Fundamental Principles of Absorption: Basic Theories, Mass Transfer & Equilibrium Concepts |
| 1130 - 1230 | Types of Fractionation Processes: Distillation, Stripping & Flashing, Among Others |
| 1230 - 1245 | Break |
| 1245 - 1330 | Types of Absorption Processes: Physical & Chemical Absorption |
| 1330 - 1420 | Safety & Environmental Considerations: Addressing Safety Practices & Environmental Impacts in Fractionation & Absorption Operations |
| 1420 - 1430 | Recap |
| 1430 | Lunch & End of Day One |



Day 2

| | |
|-------------|--|
| 0730 – 0830 | Design of Distillation Columns: Principles & Methodologies for Designing Distillation Columns |
| 0830 – 0930 | Tray & Packing Design in Fractionation Columns: Types of Trays & Packings, their Selection & Design |
| 0930 – 0945 | Break |
| 0945 – 1100 | Simulation & Modelling of Fractionation Processes: Using Software Tools for Design & Optimization |
| 1100 – 1230 | Energy Efficiency in Fractionation Processes: Techniques to Minimize Energy Consumption |
| 1230 – 1245 | Break |
| 1245 – 1330 | Troubleshooting Fractionation Operations: Common Operational Challenges & their Solutions |
| 1330 – 1420 | Case Studies: Examples of Fractionation Processes in the Petroleum Industry |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Two |

Day 3

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|-------------|--|
| 0730 – 0830 | Design of Absorbers: Criteria & Methodologies for Designing Absorption Units |
| 0830 – 0930 | Absorbent Selection & Management: Criteria for Selecting Absorbents & Managing their Use |
| 0930 – 0945 | Break |
| 0945 – 1100 | Mass Transfer Equipment in Absorption Processes: Design & Selection of Contactors, Including Trayed & Packed Towers |
| 1100 – 1230 | Simulation & Modelling of Absorption Processes: Applying Software Tools for Process Design & Analysis |
| 1230 – 1245 | Break |
| 1245 – 1330 | Operational Best Practices & Troubleshooting: Guidelines for Efficient Operation & Solving Common Problems |
| 1330 – 1420 | Case Studies: Real-World Applications of Absorption in the Petroleum Sector |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Three |

Day 4

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|-------------|--|
| 0730 – 0830 | Advanced Control Strategies for Fractionation & Absorption Units: Techniques for Optimizing Process Control |
| 0830 – 0930 | Heat Integration & Energy Recovery: Strategies to Enhance Energy Efficiency through Heat Integration |
| 0930 – 0945 | Break |
| 0945 – 1100 | Emerging Technologies in Fractionation & Absorption: Exploring Innovative Techniques & Technologies |
| 1100 – 1230 | Process Intensification in Fractionation & Absorption: Compact & Efficient Design Strategies |
| 1230 – 1245 | Break |
| 1245 – 1420 | Environmental & Regulatory Compliance: Environmental Regulations & Compliance Strategies |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Four |

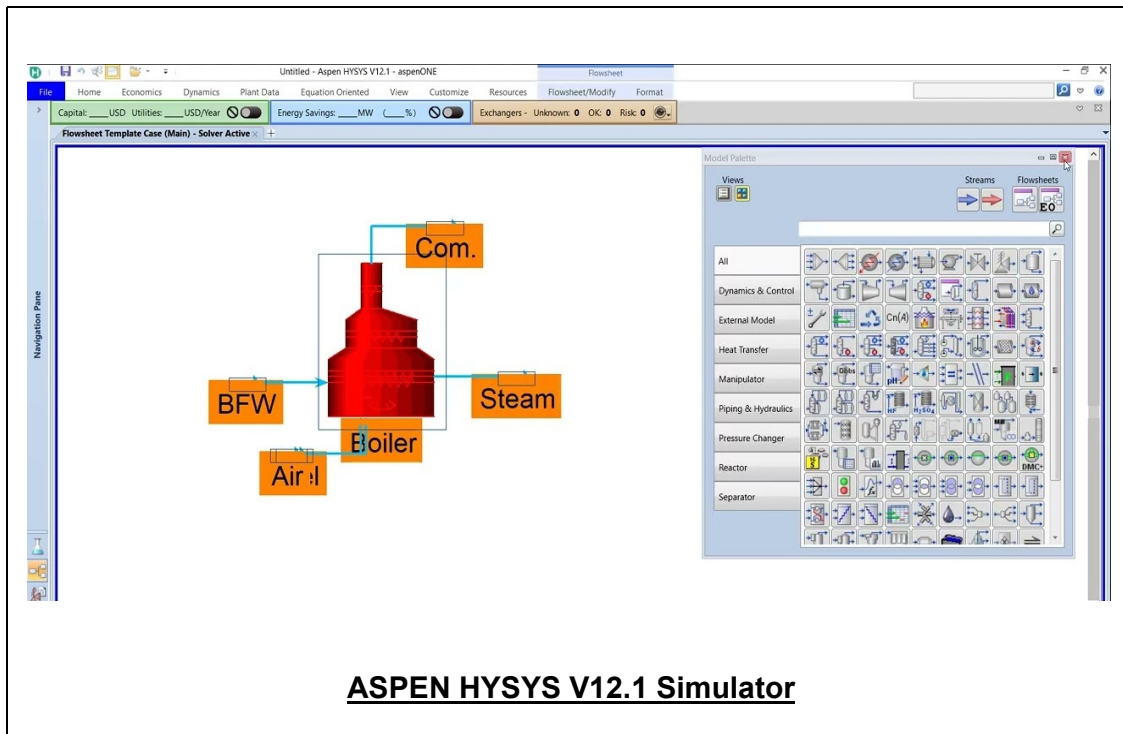


Day 5

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|-------------|--|
| 0730 – 0830 | Customization of Fractionation & Absorption: Adapting Processes to Fit Specific Operational Needs |
| 0830 – 0930 | Economic Aspects & Cost Management: Cost-Benefit Analysis, Budgeting & Cost Control |
| 0930 – 0945 | Break |
| 0945 – 1100 | Case Studies: Analysis of Fractionation & Absorption Operations in Company's Projects |
| 1100 – 1215 | Risk Management & Safety in Operations: Ensuring Safety & Managing Risks in Fractionation & Absorption Processes |
| 1215 – 1230 | Break |
| 1230 – 1345 | Future Trends & Innovations in Fractionation & Absorption: Exploring Future Directions & Potential Technological Advancements |
| 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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