# COURSE OVERVIEW PE0245
# Separation Process Technology in the Industry

**Course Title**
Separation Process Technology in the Industry




**Course Date/Venue**
Session 1: January 24-28, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 2: November 21-25, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar

**Course Reference**
PE0245

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

**Course Description**







***This practical and highly-interactive course includes real-life case studies 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 separation process technology in the industry. It covers the separation process technology and its various roles and separating agents; the common steps in designing all separation process; and the process of distillation including its similar and alternative processes and the stages of equilibrium and its efficiency.

Further, the course will also discuss the absorption and stripping processes covering the operating lines for absorption, stripping analysis, column diameter, dilute multisolute absorbers, strippers, etc; the extraction process and the various types and features of extractors; the importance and role of leaching and washing methods in separation technology and the common equipment used in the processes; the concept of adsorption process and desorption method; and the theory of membrane processes including its design consideration and future uses.

During this interactive course, participants will learn the role of energy consumption in distillation; the concept and uses of the distillation and extraction; the strengths and weaknesses of distillation and other separation processes in the industry; the advantages and disadvantages of each separation process their features and specifications; and the step-by-step procedures for separation process selection for liquid and gas waste treatment applications.

## Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain a comprehensive knowledge on separation process technology in the industry
- Discuss the separation process technology and identify its various roles and separating agents
- Recognize the common steps in designing all separation processes
- Explain the process of distillation including its similar and alternative processes and the stages of equilibrium and its efficiency
- Identify absorption and stripping processes covering the operating lines for absorption, stripping analysis, column diameter, dilute multisolute absorbers, strippers, etc.
- Carryout extraction process and recognize the various types and features of extractors
- Identify the importance and role of leaching and washing methods in separation technology and list down the common equipments used in the following processes
- Distinguish the concept of adsorption process and desorption method
- Discuss the theory of membrane processes including its design considerations and future uses
- Determine the role of energy consumption in distillation and differentiate the concepts and uses of distillation and extraction
- Describe the strengths and weaknesses of distillation and other separation processes in the industry as well as the advantages and disadvantages of each separation process and their features and specifications
- Employ the step-by-step procedures for separation process selection for liquid and gas waste treatment applications

## 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 separation process technology in the industry for engineers, chemists, managers and other technical staff who will maximize profitability by optimizing performance of separation processes in the chemical, petrochemical, petroleum, pharmaceutical, food and paper industries.

## 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. Manuel Dalas**, PEng, MSc, BSc, is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Refinery** industries. His expertise widely includes in the areas of **Process Engineering & Systems Failure** Analysis, **Equipment & Mechanical Integrity**, **Process Failure** Prevention, **Engineering Modifications & Systems Failures**, Root Cause Failure Analysis (**RCFA**) Techniques, **Methodology Selection** based on Specific Scenarios, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Operations, **Mass & Material Balance**, **Oil & Gas Processing**, **Process Plant** Performance & Efficiency, **Crude Distillation** Process Saturated Gas Process Technology, **Crude Dehydration & Desalting**, **Crude** Stabilization Operations, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Pressure Vessels** Maintenance & Operation, **Piping Support**, **Ironworks**, **Rotating & Static Equipment** (**Pumps**, **Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Bearings**, **Compressors**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Seals**), **Hydrogen Sulphide Stripping**, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** Systems, Pre-Fabrication of **Steel Structure**, Alloy Piping Pre-Fabrication, **Vertical Columns/Pressure Vessels**, **Distillation Column**, **Steel Structures**, **Construction** Management, **Building** Structures and **Electrical-Mechanical Equipment**. Currently, he is the **Technical Consultant** of the **Association of Local Authorities** of **Greater Thessaloniki** wherein he oversees mechanical engineering services while focusing on system reviews and improvements. His role involves a strategic approach to enhancing operational efficiencies and implementing robust solutions in complex engineering environments.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Construction Manager**, **Senior Process Engineer**, **Process Safety Engineer**, **Process Design Engineer**, **Project Engineer**, **Production Engineer**, **Construction Engineer**, **Consultant Engineer**, **Technical Consultant**, **Safety Engineer**, **Mechanical Engineer**, **External Collaborator**, **Deputy Officer** and **Senior Instructor/Trainer** for various companies including the Alpha Astika, Anamorfosis Technical Firm, EKME, ASTE, Elof Consulting and Hypergroup.

Mr. Dalas is a **Registered Professional Engineer** and has a **Master's** degree in **Energy System** from the **International Hellenic University** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University**, **Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University** of **Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

## Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

## Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

## Course Fee

**US$ 6,000** 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 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 - 0945* | ***Introduction***<br>*Roles of Separation Processes in Industry ● Separating Agents ● Technological Maturity of Processes • Efficiency versus Capacity ● Emergence of the Monolith as a Contacting Device ● Steps Common to Designing All Separation Processes* |
| *0945 - 1000* | *Break* |
| *1000 - 1130* | ***Distillation***<br>*Equilibrium ● Equilibrium Stages ● Efficiency ● Trays • Packings* |
| *1130 – 1230* | ***Distillation (cont'd)***<br>*Trays versus Packings ● Membrane Phase Contractors ● Design Procedures ● Rate-Based Design Method* |

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| 1230 – 1245 | Break |
| 1245 - 1420 | ***Distillation (cont'd)***<br>*Alternative Distillation Processes ● Processes Similar to Distillation ● Enhanced Distillation Configurations ● Hybrid Systems ● Distillation Economics* |
| 1420 – 1430 | ***Recap***<br>*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***

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| 0730 – 0900 | ***Absorption & Stripping***<br>*Absorption and Stripping Equilibria ● Operating Lines for Absorption ● Stripping Analysis ● Column Diameter* |
| 0900 – 0915 | Break |
| 0915 – 1100 | ***Absorption & Stripping (cont'd)***<br>*Analytical Solution: Kremser Equation ● Dilute Multisolute Absorbers and Strippers ● Matrix Solution for Concentrated Absorbers and Strippers ● Irreversible Absorption* |
| 1100 – 1230 | ***Extraction***<br>*Liquid/Liquid Extraction ● Supercritical Fluid Extraction ● Liquid/Liquid Equilibria ● Equilibrium Stage Calculations ● Efficiency* |
| 1230 - 1245 | Break |
| 1245 – 1420 | ***Extraction (cont'd)***<br>*Solvent Selection ● Extraction Equipment ● Simple Extractors ● Mechanical Extractors ● Extractor Costs* |
| 1420 – 1430 | ***Recap***<br>*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***

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| 0730 – 0900 | ***Leaching & Washing***<br>*Instructional Objectives ● Equipment for Leaching* |
| 0900 – 0915 | Break |
| 0915 – 1100 | ***Leaching & Washing (cont'd)***<br>*Equilibrium-Stage Model for Leaching & Washing ● Rate-Based Model for Leaching* |
| 1100 – 1230 | ***Adsorption***<br>*Adsorption & Desorption ● Adsorbents* |
| 1230 – 1245 | Break |
| 1245 – 1420 | ***Adsorption (cont'd)***<br>*Design Considerations ● Adsorption Processes* |
| 1420 – 1430 | ***Recap***<br>*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**

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| 0730 - 0900 | ***Membrane Processes***<br>*Theory ● Membranes & Modules ● Design Considerations* |
| 0900 - 0915 | *Break* |
| 0915 - 1100 | ***Membrane Processes (cont'd)***<br>*Some Current Uses ● Future Uses for Membranes* |
| 1100 – 1230 | ***Crystallization, Desublimation & Evaporation***<br>*Instructional Objectives ● Crystal Geometry ● Thermodynamic Considerations ● Kinetic & Transport Considerations ● Equipment for Solution Crystallization ● The MSMPR Crystallization Model* |
| 1230 – 1245 | *Break* |
| 1245 – 1420 | ***Crystallization, Desublimation & Evaporation (cont'd)***<br>*Precipitation ● Melt Crystallization ● Zone Melting ● Desublimation ● Evaporation* |
| 1420 – 1430 | ***Recap***<br>*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**

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| 0730 - 0900 | ***Energy Considerations***<br>*Energy Consumption in Distillation ● Energy Consumption-Distillation versus Extraction ● Maximum Thermodynamic Efficiency* |
| 0900 - 0915 | *Break* |
| 0915 - 1100 | ***Process Selection***<br>*Strengths & Weaknesses of Distillation & Other ● Vapor-Liquid Separation Processes* |
| 1100 – 1230 | ***Process Selection (cont'd)***<br>*Pluses & Minuses of Alternative Processes ● Separation of Complex Mixtures and Heuristic Guidelines for Process Selection* |
| 1230 – 1245 | *Break* |
| 1245 - 1345 | ***Process Selection (cont'd)***<br>*Procedures for Process Selection ● Process Selection for Liquid & Gas Waste Treatment Applications* |
| 1345 – 1400 | ***Course Conclusion***<br>*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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