

COURSE OVERVIEW PE0446
Process Design and Management

Course Title

Process Design and Management

Course Date/Venue

Session 1: August 03-07, 2025/Boardroom 1,
 Elite Byblos Hotel Al Barsha,
 Sheikh Zayed Road, Dubai, UAE
 Session 2: December 08-12, 2025/Fujairah
 Meeting Room, Grand Millennium
 Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

PE0446



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 intermediate overview of Process Design. It covers the process design standards and protocols and the importance of adhering to these standards in process design; the types of documents used in process design and technical specifications; the methods for collecting and verifying data necessary for design; the basic concepts of pump performance curves and NPSH including compressor operations and performance factors; the principles of desalters and dehydrators and relief and flare systems; the orifice and control valve calculations; and the techniques for appropriate safety valve sizing and heavy oil processing systems.



During this interactive course, participants will learn how to calculate pressure drops in oil, gas and injection networks; the thermodynamic calculations for hydrate formation; the compressor discharge temperature calculations; the steps for creating comprehensive process design packages; the produced water treatment technologies, tank design and fluid handling; the principles and design considerations for micro bubble flotation technology and seawater treatment technologies; the technical specification documents and drawing verification; the enhanced oil recovery and improved oil recovery methods; the subsurface reservoir behaviors, offshore operations and challenges; and techniques and strategies for troubleshooting process design problems.

Course Objectives

At the end of this course, the Trainee will be able to:-

- Apply and gain a good working knowledge on process design
- Explain the importance of performing process design using industry and international standards
- Describe and analyse process design documents and specifications
- Collect and verify data required for process design calculations
- Perform calculations for pump performance curves, NPSN, desalter and dehydrator, relief and flare systems, compressors, orifice and control valves, safety valve sizing, etc.
- Perform calculation for Heave Oil processing system sizing/design of process equipment and piping
- Calculate pressure drops in oil and gas network, injection network, hydrate formation and compressor discharge temperature based on gas composition
- Provide technical support in resolving process design problems
- Describe steps for developing process design packages and technical specification documents
- Verify technical viability of drawings and specification documents such as equipment data sheets etc.
- Understanding of the EOR-IOR methods (introduction, design of equipment, troubleshooting, including type of polymers)
- Understanding of produced water treatment technologies (primary, secondary, tertiary stages etc.) design basics
- Understanding of tanks (gravity, multi-phase fluid handling (wet/dual tanks) design basics
- Understanding of water treatment - micro bubble flotation etc.) design basics
- Understanding of sea water treatment technologies and design basics
- Recognize the basics on sub-surface reservoir behaviors such as challenges associated with producer well fluid, injection water reservoir characteristics
- Discuss the basics on off-shore operations and challenges
- Discuss the process design standards and protocols and the importance of adhering to these standards in process design
- Identify the types of documents used in process design as well as analyze and interpret technical specifications
- Collect and verify data necessary for design using proper methods
- Recognize the basic concepts of pump performance curves and NPSH including compressor operations and performance factors
- Discuss the principles of separation and extraction as well as calculate and optimize performance for desalters and dehydrators
- Design principles for relief and flare systems as well as carryout orifice and control valve calculations

- Apply systematic techniques for appropriate safety valve sizing
- Carryout designing and sizing of equipment specific to heavy oil processing
- Calculate pressure drops in oil, gas and injection networks
- Understand thermodynamic calculations for hydrate formation and compressor discharge temperature calculations
- Develop steps for creating comprehensive process design packages
- Design and operate primary, secondary and tertiary water treatment stages
- Design the basics for gravity and multi-phase fluid handling tanks for the oil and gas industry
- Apply principles and design considerations for micro bubble flotation technology and seawater treatment technologies
- Ensure technical viability of designs and verify drawings and specification documents
- Employ enhanced oil recovery and improved oil recovery methods
- Understand subsurface reservoir behaviors as well as offshore operations and challenges
- Carryout proper techniques and strategies for troubleshooting process design problems

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 intermediate overview of all significant aspects and considerations of process design for process engineers engaged in the design of new process equipment and revamp of existing plants and who also in-charge of troubleshooting and maintaining of such equipment. The course is also recommended for mechanical, equipment and project engineers who wish to learn basic principles of process design and process equipment and who are willing to troubleshoot and maintain such equipment.

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 Certificate

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: -

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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.

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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. Robert Harvey, MSc (Cum Laude), BSc is a **Senior Chemical Engineer** with over **45 years** of in-depth industrial experience within the **Oil & Gas, Refinery, Petrochemical, Mining** and **Power** industries. His expertise widely covers in the areas of **Fertilizer Manufacturing** Process Technology, **Fertilizer Storage** Management (Ammonia & Urea), **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry** Process Engineering, **Process Equipment** Design &

Troubleshooting, **Process Equipment & Piping Systems**, **Fertilizer** Manufacturing Process Technology, **Production** Management, **Process Plant** Optimization & Continuous Improvement, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Production Process** Optimization, **Debottlenecking**, **Unit Performance** Optimization, **Process Analyzers**, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, **Process Equipment** Design, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Monomer** Handling Safety, **Cement** Manufacturing Process Technology & Standards, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Process Equipment & Piping** System, **Fertilizer** Manufacturing, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), **HAZOP** Leadership, Project HSE Review (**PHSER**), Safe Handling of **Propylene Oxide & Ethylene Oxide**, Safety in **Process & Industrial Plants**, Environmental Impact Assessment (**EIA**) and Effective **Risk Assessment & HAZOP** Studies. Further, he is also well versed in Feasibility Studies Analysis & Evaluation, Project Gate System Procedures, Process Mapping, Change Management Skills, Change Management Strategy, Strategic Process Control in Process Industry, Developing Commercial Contracts, Project Management Skills, Project Scheduling & Cost Control, FIDIC & Other Model Contracts, EPC & EPCM Contracts, Knowledge Management, Job Evaluation, Creative Problems Solving & Innovation Skills, Problem Solving & Decision Making, Strategic Planning & Creative Thinking and Mind Mapping.

During his career life, Mr. Harvey has gained his practical and field experience through his various significant positions and dedication as the **Commercial Director**, **Manufacturing Director**, **Chief Operating Officer**, **Head Projects Division**, **Project Leader**, **Lead Technical Advisor/Consultant** and **Project Consultant** to various international companies such as the Trade and Industrial Policy Strategies (TIPS), PGBI Johannesburg, IDC Green Industries SBU/Arengo 316 Pty Ltd, Ferrum Crescent Limited, CEF Limited, Rio Tinto Alcan, Industrial Development Corporation of SA (IDC) and AECI Limited.

Mr. Harvey has **Master's (Cum Laude)** and **Bachelor's** degrees in **Chemical 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, seminars, conferences, workshops and courses globally.

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.

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

0730 – 0745	<i>Registration & Coffee</i>
0745 – 0800	<i>Welcome & Introduction</i>
0800 – 0815	PRE-TEST
0815 – 0915	Overview of Process Design Standards & Protocols <i>Introduction to Industry and International Standards • Importance of Adhering to these Standards in Process Design</i>
0915 – 0930	<i>Break</i>
0930 – 1030	Process Design Documents & Specifications <i>Types of Documents Used in Process Design • Analyzing and Interpreting Technical Specifications</i>
1030 – 1100	Data Collection & Verification <i>Methods for Collecting and Verifying Data Necessary for Design • Utilizing Software Tools for Data Management</i>
1100 – 1145	Pump & Compressor Systems <i>Basic Concepts of Pump Performance Curves and NPSH • Overview of Compressor Operations and Performance Factors</i>
1145 – 1200	<i>Break</i>
1200 – 1300	Desalter & Dehydrator Design <i>Principles of Separation and Extraction • Calculating and Optimizing Performance for Desalters and Dehydrators</i>
1300 – 1420	Desalter & Dehydrator Design (cont'd) <i>Principles of Separation and Extraction • Calculating and Optimizing Performance for Desalters and Dehydrators</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0830	Safety Systems: Relief & Flare Systems <i>Design Principles for Relief and Flare Systems • Sizing and Application in Upstream Operations</i>
0830 – 0915	Orifice & Control Valve Calculations <i>Theories and Calculations for Flow through Orifices • Sizing and Selecting Control Valves Based on Process Needs</i>
0915 – 0930	<i>Break</i>
0930 – 1100	Safety Valve Sizing & Management <i>Techniques for Appropriate Safety Valve Sizing • Considerations for Different Operating Conditions</i>



1100 – 1200	Heavy Oil Processing Systems <i>Design and Sizing of Equipment Specific to Heavy Oil Processing • Challenges and Solutions in Heavy Oil Environments</i>
1200 – 1215	Break
1215 – 1300	Pressure Drops in Networks <i>Calculating Pressure Drops in Oil, Gas and Injection Networks • Techniques to Minimize Pressure Losses and Improve Efficiency</i>
1300 – 1420	Pressure Drops in Networks (cont'd) <i>Calculating Pressure Drops in Oil, Gas and Injection Networks • Techniques to Minimize Pressure Losses and Improve Efficiency</i>
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 – 0830	Thermodynamic Calculations for Hydrate Formation <i>Understanding the Conditions for Hydrate Formation • Preventative Measures and Design Considerations</i>
0830 – 0915	Compressor Discharge Temperature Calculations <i>Influence of Gas Composition on Discharge Temperatures • Practical Applications in Process Adjustments and Equipment Selection</i>
0915 – 0930	Break
0930 – 1100	Developing Process Design Packages <i>Steps for Creating Comprehensive Design Packages • Integration of Specifications and Operational Requirements</i>
1100 – 1200	Produced Water Treatment Technologies <i>Design and Operation of Primary, Secondary and Tertiary Treatment Stages • Case Studies and Application in the Field</i>
1200 – 1215	Break
1215 – 1300	Tank Design & Fluid Handling <i>Design Basics for Gravity and Multi-Phase Fluid Handling Tanks • Challenges and Solutions in Tank Design for the Oil and Gas Industry</i>
1300 – 1420	Tank Design & Fluid Handling (cont'd) <i>Design Basics for Gravity and Multi-Phase Fluid Handling Tanks • Challenges and Solutions in Tank Design for the Oil and Gas Industry</i>
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Water Treatment: Micro Bubble Flotation <i>Principles and Design Considerations for Micro Bubble Flotation Technology • Applications in Separating Oil from Water</i>
0830 – 0930	Seawater Treatment Technologies <i>Introduction to Technologies for Treating Seawater for Industrial Use • Design Considerations and Challenges</i>
0930 – 0945	Break
0945 – 1100	Technical Specification Documents & Drawing Verification <i>Methods for Ensuring Technical Viability of Designs • Verification of Drawings and Specification Documents</i>
1100 – 1215	Basics of EOR-IOR Methods <i>Introduction to Enhanced oil Recovery and Improved Oil Recovery Methods • Designing Equipment and Troubleshooting for EOR-IOR</i>



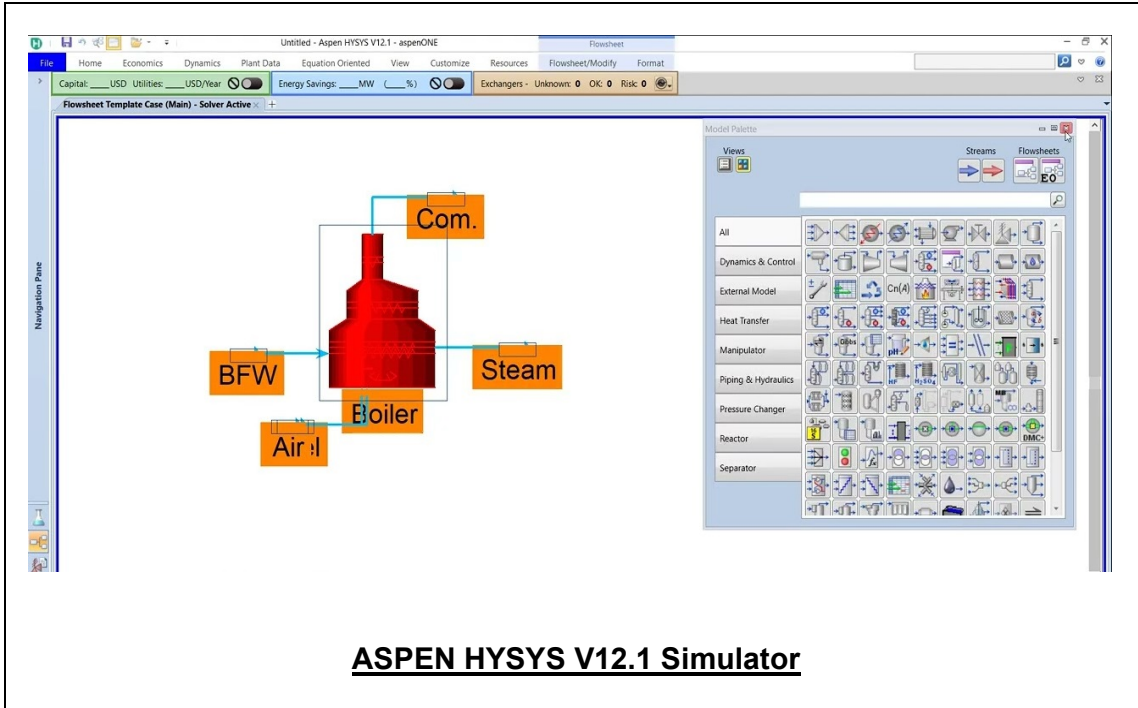
1215 - 1230	Break
1230 - 1315	Understanding Subsurface Reservoir Behaviors Challenges Associated with Producer Well Fluids and Injection Water Characteristics • Approaches to Manage and Optimize Production
1315 - 1420	Understanding Subsurface Reservoir Behaviors (cont'd) Challenges Associated with Producer Well Fluids and Injection Water Characteristics • Approaches to Manage and Optimize Production
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 - 0900	Offshore Operations & Challenges Overview of Offshore Process Design and Operational Challenges • Strategies to Mitigate Common Issues in Offshore Environments
0900 - 0915	Break
0915 - 1000	Offshore Operations & Challenges (cont'd) Overview of Offshore Process Design and Operational Challenges • Strategies to Mitigate Common Issues in Offshore Environments
1000 - 1100	Troubleshooting Process Design Problems Techniques and Strategies for Identifying and Resolving Process Design Issues • Case Studies and Practical Exercises
1100 - 1200	Troubleshooting Process Design Problems (cont'd) Techniques and Strategies for Identifying and Resolving Process Design Issues • Case Studies and Practical Exercises
1200 - 1215	Break
1215 - 1330	Review of Case Studies & Real-World Applications (cont'd) Examination of Real-World Scenarios to Apply Learned Concepts • Interactive Discussion and Problem-Solving Session
1330 - 1420	Course Conclusion
1420 - 1430	POST-TEST
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

Practical sessions 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 “ASPEN HYSYS” simulator.



Course Coordinator

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