

COURSE OVERVIEW PE0300-4D **Gas Conditioning, Treatment & Processing Technology**

Course Title

Gas Conditioning, Treatment & Processing Technology

Course Reference

PE0300-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs

Course Date/Venue

Session(s)	Dates	Venue
1	January 15-18, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	May 06-09, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA
3	July 08-11, 2024	Business Center, Concorde Hotel Doha, Doha, Qatar
4	September 16-19, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



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 complete and up-to-date overview of gas conditioning and processing technology. It covers product specifications and the processes available to condition the gas in order to meet these requirements. Participants will understand the nature and purpose of key gas processing operations, and how the individual operations are integrated into plants to process diverse feed streams received from gas fields around the world.



This course will provide participants with a working knowledge of the major processes for Dehydration, Acid Gas Removal (Gas Sweetening), Hydrocarbon Dewpoint Control (HCDP Control), LPG Production, NGL Recovery and Separation (Fractionation), Sulphur Recovery and Tail Gas Clean-up. Participants will also learn the basic vocabulary unique to the industry and the key physical and chemical properties of natural gas constituents.

This course will also cover the important considerations of the design and selection of key process equipment including Separators.

Basic properties of hydrocarbon gases and the behaviour of water-hydrocarbon systems will be discussed. Participants will learn how to calculate system energy changes. This course will discuss the design and operational aspects of process control systems, separation equipment, absorption and fractionation facilities. Further, the methods used for dehydrating natural gas will be covered within the duration of this important course.

Course Objectives

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

- Apply and gain an in-depth knowledge on natural gas conditioning, treatment and processing
- Identify the various types of separators and their sizing and become acquainted with slug catcher and twister supersonic separator
- Recognize the role and importance of water content and dew point applied in gas conditioning and processing technology
- Enumerate the formation, prediction and inhibition of hydrates and discuss the process of liquid desiccant dehydration
- Determine the operating variables of gas conditioning and processing technology and recognize enhanced glycol concentration and solid desiccant
- Analyze the process of hydrocarbon recovery (NGL) and discuss mechanical refrigeration
- Emphasize the thermodynamics of gas and employ the removal of acid gases such as H₂S, CO₂, CS₂, COS and RSH
- Discuss the pH diagram of propane and develop an understanding on liquid ethane recovery
- Review and improve the amine process, corrosion, process control, physical, combined and sulfinol processes
- Carryout the operation and control of natural gases as well as the sulphur recovery
- Describe the chemical reaction of natural gases and gain in-depth knowledge on claus process variations and claus combustion operation
- Identify the re-heating options and the mechanical considerations of natural gases
- Employ catalyst converter operation and distinguish the tail gas clean up options

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of gas conditioning, treatment & processing technology for those who are directly involved in supervising gas processing operations; managers and engineers involved in the planning and development of new gas processing facilities or modifying existing facilities; those who are involved in the negotiation of contracts for the sale of Natural Gas, LPG and NGL Products; and newly employed engineers and other technical staff in the oil and gas processing industry will find the course particularly relevant. Those employed in the activities that support the gas processing industry will also receive considerable benefit from the broad overview.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Workshops & Work Presentations
- 30% Case Studies & Practical Exercises
- 20% Software, Simulators & 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\$ 4,500 per Delegate + VAT . This rate includes H-STK [®] (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	US\$ 4,500 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\$ 4,500 per Delegate. This rate includes H-STK [®] (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	US\$ 4,500 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 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:

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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 **2.4 CEUs** (Continuing Education Units) or **24 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.

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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.

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. Mike Poulos, MSc, BSc, is a **Senior Process Engineer** with over **35 years** of industrial experience within the **Utilities, Refinery, Petrochemical and Oil & Gas** industries. His expertise lies extensively in the areas of **Process Equipment Design & Troubleshooting, Petroleum Processing, Process Design Specifications, Process Calculation Methods, Equipment Sizing & Selection, Piping, Pumps, Compressors, Heat Exchangers, Air Coolers, Direct-Fired Heaters, Process Vessels, Fractionator Columns, Reactors, Ancillary Equipment, Mechanical & Safety Aspects, Cost Estimation, Commissioning & Start-Up, Production & Cost Reduction**, Reactor Building Ventilation System, **PVC Initiators Storage Bunkers, PVC Modernization & Expansion, PVC Reactor, PVC Plant Reactors Pre-Heating, PVC Plant Start-Up & Commissioning, PVC Plant Shutdown, PVC Driers Automation, VCM Recovery, VCM Sphere Flooding System, VCM Storage Tanks, Steam Tripping Facilities, Solvents Plant Automation Commissioning & Start-Up and Inferential Properties System**. Further, he is also well-versed in **Advanced Process Control Technology, Designing Process Plant Fail-Safe Systems, Quantitative Risk Assessment, On-Line Statistical Process Control, Principles and Techniques of Contemporary Management, Rosemount RS3, Polymer Additives, Polymer Reaction Engineering, Polymer Rheology and Processing, GRID Management and Batch Process Engineering**.

During his career life, Mr. Poulos held significant positions as the **Chemical Plants Technology Engineer, PVC Plant Production Engineer, PVC Plant Shutdown Coordinator, PVC Plant/CC Solvents Plants Acting Section Head and Chemical Distribution Section Head** from Hellenic Petroleum, wherein he was responsible for the development of integrated system.

Mr. Poulos has **Master's and Bachelor's** degrees in **Chemical Engineering** from the **University of Massachusetts and Thessaloniki Polytechnic** respectively. Further, he is a **Certified Instructor/Trainer**, a and a **member of the Greek Society of Chemical Engineers and Greek Society of Engineers**.

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 - 0845	<i>Introduction to Natural Gas Processing</i>
0845 - 0930	<i>Contract Terms Gas Contracts • Liquid Contracts</i>



0930 - 0945	Break
0945 - 1015	Separators Types of Separators
1015 - 1045	Separator Sizing
1045 - 1130	Slug Catcher
1130 - 1215	Twister Super Sonic Separator
1215 - 1230	Break
1230 - 1315	Water Content & Dew Point Sweet/Sour Gas • Calculation Charts
1315 - 1345	Hydrates Formation, Prediction and Inhibition • Examples
1345 - 1420	Case Study
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0830	Liquid Desiccant Dehydration TEG Process
0830 - 0930	Operating Variables
0930 - 0945	Break
0945 - 1015	Enhanced Glycol Concentration
1015 - 1045	Solid Desiccant
1045 - 1130	Hydrocarbon Recovery (NGL) Solid Desiccant Short Cycle Units (HRU's) • Joule-Thompson (JT) Plants • Mechanical Refrigeration Plants
1130 - 1215	Mechanical Refrigeration
1215 - 1230	Break
1230 - 1300	Thermodynamics of Gas
1300 - 1330	Removal of Acid Gases (H₂S, CO₂, CS₂, COS & RSH) Batch Processes • Amines • Physical Solvents
1330 - 1345	pH Diagram of Propane
1345 - 1420	Case Study
1420 - 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 - 0930	Liquid Ethane Recovery
0930 - 0945	Break
0945 - 1030	Gas Sweetening Introduction • Batch Process • Mercury Removal
1015 - 1045	Corrosion
1045 - 1130	Process Control
1130 - 1215	Physical Process
1215 - 1230	Break
1230 - 1300	Combined Process
1300 - 1330	Sulfinol Process
1330 - 1345	Operation & Control
1345 - 1420	Case Study
1420 - 1430	Recap
1430	Lunch & End of Day Three

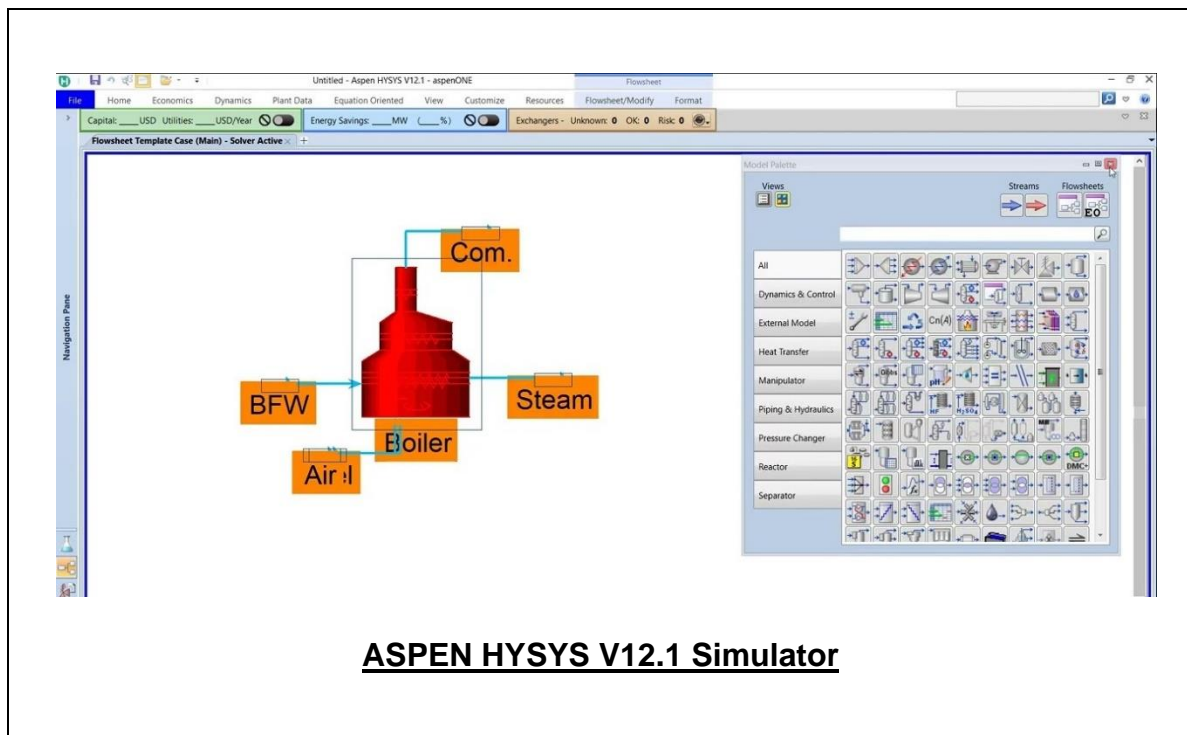


Day 4

0730 – 0800	<i>Sulphur Recovery Modified Claus Plants & Tail Gas Clean-up</i>
0800 – 0830	<i>Chemical Reaction</i>
0830 – 0900	<i>Straight through Operation</i>
0900 – 0915	<i>Break</i>
0915 – 0945	<i>Claus Process Variations</i>
0945 – 1015	<i>Claus Combustion Operation</i>
1015 – 1045	<i>Re-heating Options</i>
1045 – 1100	<i>Break</i>
1100 – 1200	<i>Mechanical Considerations</i>
1200 - 1345	<i>Tail Gas Clean Up Options</i>
1345 - 1400	<i>Course Conclusion</i>
1400 – 1415	POST-TEST
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

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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