

COURSE OVERVIEW PE0224 Gas Systems and Equipment – Basic

Course Title

Gas Systems and Equipment – Basic

Course Date/Venue

Session 1: April 07-11, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Session 2: September 28-October 02, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



Course Reference

PE0224



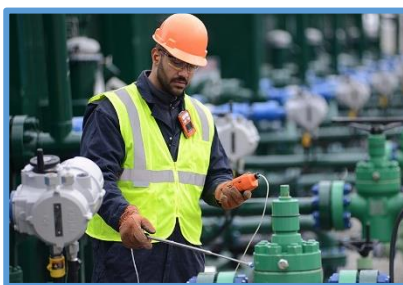
Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

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 Gas Systems and Equipment – Basic. It covers the types of gases used in petroleum processes; the safety and regulatory considerations in gas handling; the properties of gases and their behavior, classifying gas systems in petroleum operations and the basic components of gas systems; the gas measurement and monitoring, safety considerations in gas systems and gas separation and conditioning equipment; the gas compression and booster systems; and the gas dehydration and water removal as well as gas sweetening and sulfur removal.



During this interactive course, participants will learn the gas cooling and heat exchangers, gas pipeline networks and design considerations; the gas flow control and regulation equipment; the instrumentation and control in gas systems and gas leak detection and emergency response; the gas compression and distribution safety measures; the gas usage in industrial applications, gas flaring and venting control; the LNG (liquefied natural gas) and CNG (compressed natural gas) systems; the maintenance strategies for gas equipment, safety drills and emergency preparedness in gas facilities; and troubleshooting common gas system problems.

Course Objectives

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

- Apply and gain a basic knowledge on gas systems and equipment
- Discuss the types of gases used in petroleum processes including the safety and regulatory considerations in gas handling
- Identify the properties of gases and their behavior, classify gas systems in petroleum operations and discuss the basic components of gas systems
- Carryout gas measurement and monitoring, safety considerations in gas systems and gas separation and conditioning equipment
- Recognize gas compression and booster systems and illustrate gas dehydration and water removal as well as gas sweetening and sulfur removal
- Interpret gas cooling and heat exchangers, gas pipeline networks and design considerations and gas flow control and regulation equipment
- Interpret instrumentation and control in gas systems and apply gas leak detection and emergency response including gas compression and distribution safety measures
- Identify gas usage in industrial applications and apply gas flaring and venting control
- Discuss LNG (liquefied natural gas) and CNG (compressed natural gas) systems
- Employ maintenance strategies for gas equipment, safety drills and emergency preparedness in gas facilities and troubleshooting common gas system 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 a basic overview of all significant aspects and considerations of gas systems and equipment – basic for technicians, engineers, safety personnel, facility managers, operators and supervisors, maintenance workers, construction workers, regulatory and compliance officers, energy professionals and other technical staff.

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.

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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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.

Accommodation

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

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. Mohammad Hamami, is a **Senior Process Engineer** with an extensive practical experience within the **Oil, Gas, Refinery, Petrochemical** and **Power** industries. His experience covers **Clean Fuel** Technology & Standards, **Clean Fuel** Specification, Emission Regulation, **Crude Oil** Production, **Desulphurization**, Synthesis **Gas Production**, **Naphtha** Isomerization, **Diesel Fuel Additives**, **Storage Tanks** Filtration, **Fuel Quality** Inspection, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Equipment** Operation, **Process Plant** Operation, **Process Plant** Start-up & Commissioning, **Process Plant** Optimization, **Oil & Gas Field** Operation, **Oil Movement**, Storage & Troubleshooting, **Petroleum Refinery** Process, **Process Reactor** Operation & Troubleshooting, **LPG Oil & Gas** Operation & Troubleshooting, **Crude Oil & LNG** Storage, **LNG & LPG** Plants Gas Processing, **Refinery Process** Operations Technology, **Liquid Bulk Cargo Handling**, **Gas Conditioning** & Processing Technology, **Distillation Column** Design & Operation and **Gasoline & Diesel Fuel** Technology. Further he is also well-versed in **Refinery** Operational Economics & Profitability, Aromatics Manufacturing Process, **Hydrogen Production** Operation, **Steam Reforming** Technology, **Gas Treating**, **Hydro-treating & Hydro-Cracking**, **Catalyst** Material Handling, Gas Sweetening & Sulfur Recovery, Hydro Carbon Dew Point (HCDP) Control, **Heat Exchangers** & Fired Heaters, **Amine** Gas Sweetening, **Plastic Additives** Selection & Application, **Crude & Vacuum** Process Technology, **Flare & Pressure Relief Systems**, Stock Management & **Tank Dipping** Calculation, **NGL Recovery & Fractionation**, **Refrigerant & NGL** Extraction and **Catalytic Cracking & Reforming**.

During his long professional career, Mr. Mohammad worked as a **Refinery Manager**, **Operations Manager**, **Section Head/Superintendent** and **Process Engineer** for **Process Units**, **Utilities & Oil Movement** in various companies. He has been responsible for a number of **technological-driven world-scale hydrocarbon processing projects** from **beginning to successful start-up**.

Mr. Mohammad has a **Bachelor's** degree in **Chemical Engineering**. He is an **active member** of the **American Institute of Chemical Engineers (AIChE)** and has presented **technical papers** at its **several national meetings**. He has largely participated in the **start-up of seven world-scale process plants** which made him an **International Expert** in **Process Plant Start-Up** and **Oil Movement** and a **Certified Instructor/Trainer**.

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 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 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Gas Systems in Petroleum Industry Importance of Gas Systems in Upstream, Midstream, & Downstream Operations • Types of Gases Used in Petroleum Processes (Natural Gas, Process Gas, Inert Gas) • Role in Gas Production, Processing, & Distribution • Safety & Regulatory Considerations in Gas Handling
0930 – 0945	Break
0945 – 1040	Properties of Gases & their Behavior Basic Gas Laws (Boyle's, Charles', & Ideal Gas Law) • Gas Density, Viscosity, & Compressibility • Phase Behavior of Gases Under Varying Temperature & Pressure • Impact of Impurities on Gas Quality & Handling
1040 – 1135	Classification of Gas Systems in Petroleum Operations Production Gas Systems (Associated & Non-Associated Gas) • Processing Gas Systems (Separation, Dehydration, Sweetening) • Utility Gas Systems (Fuel Gas, Flare Gas, Instrument Air) • Gas System Classifications & Applications
1135 - 1230	Basic Components of Gas Systems Pipelines & Gas Transmission Networks • Compressors & Booster Stations • Gas Separators & Scrubbers • Valves, Regulators, & Control Systems
1230 - 1245	Break
1245 – 1335	Gas Measurement & Monitoring Flow Measurement Techniques (Orifice Plates, Turbine Meters, Ultrasonic Meters) • Gas Quality Measurement (H ₂ S, CO ₂ , Water Content, Heating Value) • Pressure & Temperature Monitoring Devices • Standards for Gas Metering & Quality Control

1335 - 1420	Safety Considerations in Gas Systems Gas Leak Detection & Alarm Systems • Fire & Explosion Prevention Measures • Personal Protective Equipment (PPE) for Gas Handling • ADNOC's HSE Policies for Gas Operations
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	Gas Separation & Conditioning Equipment Principles of Gas-Liquid Separation • Types of Gas Separators (Two-Phase, Three-Phase, Scrubbers) • Knockout Drums & Slug Catchers • Specifications for Separation Efficiency
0830 - 0930	Gas Compression & Booster Systems Purpose of Gas Compression in Petroleum Industry • Types of Compressors (Reciprocating, Centrifugal, Screw) • Compression Ratio & Efficiency Factors • Requirements for Gas Compression Units
0930 - 0945	Break
0945 - 1040	Gas Dehydration & Water Removal Importance of Gas Dehydration in Transmission & Processing • Types of Dehydration Systems (Glycol, Solid Desiccant, Membrane) • Dew Point Control & Measurement • Best Practices for Gas Dehydration
1040 - 1135	Gas Sweetening & Sulfur Removal Need for Gas Sweetening (Removal of H ₂ S & CO ₂) • Processes Used (Amine Absorption, Solid Scavengers, Direct Oxidation) • Sulfur Recovery Unit (SRU) Operation • Gas Sweetening Process Standards
1135 - 1230	Gas Cooling & Heat Exchangers Role of Heat Exchangers in Gas Processing • Types of Gas Cooling Systems (Air-Cooled, Shell & Tube, Plate Exchangers) • Heat Recovery in Gas Processing Plants • Guidelines for Gas Cooling Systems
1230 - 1245	Break
1245 - 1420	Case Studies on Gas Processing Equipment Challenges in Gas Separation & Treatment • Equipment Failure & Troubleshooting Strategies • Lessons Learned from Operational Experience • Future Improvements in Gas Processing Systems
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 Two

Day 3

0730 - 0830	Gas Pipeline Networks & Design Considerations Types of Gas Pipelines (Gathering, Transmission, Distribution) • Pipeline Material Selection & Coating Techniques • Pressure Regulation & Surge Control • Pipeline Integrity Management Program
0830 - 0930	Gas Flow Control & Regulation Equipment Role of Regulators, Control Valves, & Safety Relief Systems • Gas Pressure Reducing Stations • Gas Storage & Buffer Systems • Flow Control Best Practices

0930 – 0945	Break
0945 – 1040	Instrumentation & Control in Gas Systems Process Control Systems (SCADA, DCS, PLC) • Remote Monitoring & Automation in Gas Transmission • Flow Metering & Custody Transfer Measurements • Standards for Gas Instrumentation
1040 – 1135	Gas Leak Detection & Emergency Response Methods for Gas Leak Detection (Infrared, Ultrasonic, Fixed Detectors) • Pipeline Integrity Testing & Pigging Operations • Emergency Shutdown (ESD) & Blowdown Systems • Emergency Response Procedures for Gas Leaks
1135 – 1230	Gas Compression & Distribution Safety Measures Pressure Relief Devices & Blowdown Operations • Risks Associated with High-Pressure Gas Transmission • Fire Suppression & Hazard Mitigation Strategies • Regulatory Compliance in Gas Distribution Safety
1230 - 1245	Break
1245 - 1420	Case Studies on Gas Transmission Challenges Experience with Pipeline Failures & Integrity Management • Successful Implementation of Gas Control Strategies • Lessons Learned from Gas Transportation Incidents • Future Trends in Gas Transmission Optimization
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 Three

Day 4

0730 – 0830	Gas Usage in Industrial Applications Natural Gas as a Fuel in Power Generation • Use of Gas in Petrochemical & Refining Processes • Role of Gas in Enhanced Oil Recovery (EOR) • Strategic Gas Utilization Plans
0830 - 0930	Gas Flaring & Venting Control Environmental Impact of Gas Flaring & Venting • Zero-Flaring Initiatives & Gas Recovery Strategies • Alternative Uses of Flared Gas (Power Generation, Reinjection) • Compliance with International Emission Reduction Regulations
0930 – 0945	Break
0945 – 1040	LNG (Liquefied Natural Gas) & CNG (Compressed Natural Gas) Systems LNG Liquefaction & Regasification Processes • CNG Compression & Storage Techniques • Safety Considerations for LNG/CNG Transportation • Initiatives in LNG & CNG Projects
1040 – 1135	Maintenance Strategies for Gas Equipment Preventive versus Predictive Maintenance Approaches • Common Failures in Gas Processing Equipment • Condition Monitoring Techniques for Rotating & Static Equipment • Maintenance Standards for Gas Facilities
1135 - 1230	Safety Drills & Emergency Preparedness in Gas Facilities Fire Drills & Emergency Evacuation Procedures • Safe Handling of Toxic & Flammable Gases • Compliance with International HSE Regulations • Case Study on Gas-Related Emergency Management
1230 - 1245	Break

1245 - 1420	Case Studies on Gas Safety & Best Practices Safety Initiatives in Gas Processing & Transportation • Incident Analysis & Corrective Action Planning • Training & Competency Development for Gas System Operators • Future Safety Trends in Gas Operations
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 Four

Day 5

0730 - 0830	Gas System Components & Equipment Identification & Function of Key Gas Processing Equipment • Demonstration of Separator, Compressor, & Dehydration Unit Operation • Safe Handling of Gas Equipment in Field Conditions • Best Practices for Equipment Operation
0830 - 0930	Gas Flow Measurement & Analysis Demonstration of Flow Measurement Devices • Calibration of Gas Meters & Pressure Regulators
0930 - 0945	Break
0945 - 1100	Gas Flow Measurement & Analysis (cont'd) Real-Time Monitoring of Gas Quality & Composition • Troubleshooting Common Gas Metering Issues
1100 - 1230	Troubleshooting Common Gas System Problems Diagnosing Pipeline Pressure Fluctuations • Addressing Gas Dehydration System Failures
1230 - 1245	Break
1245 - 1345	Troubleshooting Common Gas System Problems (cont'd) Identifying & Resolving Gas Quality Issues • Troubleshooting Framework for Gas System Failures
1345 - 1400	Course Conclusion 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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