



COURSE OVERVIEW PE0621 Petrochemical Manufacturing Process & Troubleshooting

Course Title

Petrochemical Manufacturing Process & Troubleshooting

Course Reference

PE0621

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Date/Venue

Session(s)	Date	Venue
1	January 18-22, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	May 17-21, 2026	Meeting Plus 9, City Centre Rotana, Doha Qatar
3	August 17-21, 2026	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	November 15-19, 2026	Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA

Course Description



This hands-on, 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

Natural gas and crude distillates such as naphtha from petroleum refining are used as feedstocks to manufacture a wide variety of petrochemicals that are in turn used in the manufacture of consumer goods. The basic petrochemicals manufactured by cracking, reforming and other processes include olefins (such as ethylene, propylene, butylenes and butadiene) and aromatics (such as benzene, toluene and xylenes). The capacity of naphtha crackers is generally of the order of 250,000-750,000 metric tons per year (tpy) of ethylene production. Some petrochemical plants also have alcohol and oxo-compound manufacturing units on site. The base petrochemicals or products derived from them, along with other raw materials, are converted to a wide range of products.

This course is designed to cover the manufacturing process of petrochemicals and the monitoring and troubleshooting of such process. It covers petrochemicals and petrochemical complex, aromatics, olefins, synthesis gas (syngas), methanol synthesis, formaldehyde, methanol manufacturing and sources of olefinic and aromatic hydrocarbons.



Further, the course will also cover the treatment of olefinic C₄ and C₅ cuts and the treatment of aromatic gasolines including acetylene, monomers for the synthesis of elastomers, ethylene and propylene oxides, acetic derivatives, alcohols, phenol, acetone and methyl ethyl ketone, vinyl monomers, monomers for polyamide synthesis, monomers for polyester synthesis, monomers for polyurethane synthesis and olefin production from methanol.

Course Objectives

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

- Apply systematic techniques on petrochemical manufacturing process and troubleshooting
- Discuss petrochemicals and petrochemical complex that includes downstream units and petrochemicals' hub
- Determine aromatics, olefins, synthesis gas (syngas), methanol synthesis and formaldehyde
- Carryout methanol manufacturing as well as recognize the sources of olefinic and aromatic hydrocarbons
- Perform proper treatment of olefinic C₄ and C₅ cuts as well as the treatment of aromatic gasolines
- Describe acetylene, monomers for the synthesis of elastomers, ethylene and propylene oxides
- Identify the acetic derivatives, alcohols, phenol, acetone, methyl ethyl ketone and vinyl monomers
- Differentiate monomers for polyamide synthesis, monomers for polyester synthesis, monomers for polyurethane synthesis and olefin production from methanol

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 petrochemical manufacturing process and troubleshooting for process, chemical, operation, maintenance and design and production engineers and technical staff. Further, the course is suitable for environmental, laboratory, R&D and R&T staff including chemists, scientists, analysts, technologist, technicians and environmental professionals.

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: -

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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**. 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.

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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 **30 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.



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

Dubai	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.
Doha	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.
Abu Dhabi	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.
Al Khobar	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 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0845	Introduction of Petrochemicals <i>Feedstocks • Intermediates • Finished Products</i>
0845 – 0930	Petrochemical Complex <i>Downstream Units • Petrochemicals' Hub</i>
0930 – 0945	<i>Break</i>



0945 – 1100	Aromatics <i>Xylene and Polyester Chain • Toluene, Benzene, Polyurethane and Phenolic Chain • Benzene and Styrenic Chain, Derivatives</i>
1100 – 1215	Olefins <i>Ethylene, Derivatives • Propylene, Derivatives • Butadiene, Butylenes, and Pygas, Derivatives</i>
1215 – 1230	<i>Break</i>
1230 – 1420	Synthesis Gas (Syngas) <i>Methanol Based Products • Ammonia Based Products</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0815	Methanol Synthesis <i>Preparation of Synthesis Gas • Thermodynamic Aspects of Methanol Synthesis • Kinetic Aspects of Methanol Synthesis • Processes • Economic Data • Uses and Producers</i>
0815 – 0930	Formaldehyde <i>Direct Oxidation of Hydrocarbons • Methanol Oxidation • Economic Data • Uses and Producers</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Methanol Manufacturing <i>Lurgi MegaMethanol® Technology • Process Description</i>
1100 – 1215	Sources of Olefinic and Aromatic Hydrocarbons <i>Steam Cracking • Catalytic Reforming • Other Sources of Olefinic Hydrocarbons • Other Sources of Aromatic Hydrocarbons</i>
1215 – 1230	<i>Break</i>
1230 – 1420	The Treatment of Olefinic C₄ and C₅ Cuts <i>Upgrading of C₄ Cuts • Upgrading of C₅ Cuts</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 – 0915	The Treatment of Aromatic Gasolines <i>Main Processing Schemes • Physical Methods for Separating Aromatics • Treatment of the Aromatic C₈ Cut • Aromatics Conversion Processes • Aromatic Loop, Simplified Balance • Uses & Producers</i>
0915 – 0930	<i>Break</i>
0930 – 1030	Acetylene <i>Theoretical Considerations • Acetylene Manufacture from Coal Calcium Carbide Process • Acetylene Manufacture from Hydrocarbons, Thermal Processes with Direct Heat Transfer • Acetylene Manufacture from Hydrocarbons, Thermal Processes with Indirect Heat Transfer • Acetylene Manufacture from Hydrocarbons, Autothermal Processes • Acetylene Manufacture by Extraction from Steam-Cracked C₂ Cuts • Economic Data • Uses & Procedures</i>
1030 – 1145	Monomers for the Synthesis of Elastomers <i>Butadiene • Isobutene • Isoprene • Styrene • p-Methyl Styrene • Chloropene</i>
1145 – 1200	<i>Break</i>
1200 – 1420	Ethylene and Propylene Oxides <i>Ethylene Oxide • Propylene Oxide • Ethylene Glycol • Propylene Glycol</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Three</i>





Day 4

0730 – 0930	Acetic Derivatives Acetaldehyde • Acetic Acid • Acetic Anhydride
0930 – 0945	Break
0945 – 1115	Alcohols Ethanol • Isopropanol • Butanols • Higher Alcohols
1115 – 1145	Phenol, Acetone and Methyl Ethyl Ketone Phenol • Acetone • Methyl Ethyl Ketone
1145 – 1200	Break
1200 – 1420	Vinyl Monomers Vinyl Acetate • Vinyl Chloride • Acrylic Acid, Acrylates and Methacrylates • Acrylonitrile
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0945	Monomers for Polyamide Synthesis Manufacture of Nylon-6,6, Adipic Acid and Hexamethylene Diamine • Manufacture of Nylon-6, Caprolactam • Manufacture of Nylon-11, 11-Aminoundecanoic Acid • Manufacture of Nylon-12, Laurolactam
0945 – 1000	Break
1000 – 1100	Monomers for Polyester Synthesis Dimethyl Terephthalate and Terephthalic Acid • Maleic Anhydride • Phthalic Anhydride • 1,4-Butanediol • 1,4-Dimethylol Cyclohexane
1100 – 1215	Monomers for Polyurethane Synthesis Main Monomers Used Industrially to Synthesize Polyurethanes • Synthesis of Toluene Diisocyanate, TDI • Synthesis of Diphenylmethane 4,4'-Diisocyanate MDI and Polymeric MDI • Polyether-Polyols
1215 – 1230	Break
1230 – 1345	Olefin Production from Methanol Introduction • MTO Technology • Production Process • Economic Basis
1345 – 1400	Course Conclusion
1400 – 1415	POST-TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course



Practical Sessions

This hands-on, highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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