COURSE OVERVIEW PE0605
Ammonia Production Plant Operation

Course Title
Ammonia Production Plant Operation

Course Date/Venue
Session 1: June 29-July 03, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: November 24-28, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0605

Course Duration/Credits
Five days/3.0CEUs/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.

Ammonia is one of the most important inorganic basic chemicals, not only for the manufacture of fertilizers (85%) but also for the production of plastics, fibers, explosives, and intermediates for dyes and pharmaceuticals. It is an essential reaction component for the synthesis of numerous organic chemicals used as solvents and intermediates.

This course provides an up-to-date overview of the product properties, synthesis and reaction mechanisms, including catalysis and commercial catalysts, modern production technology for different feedstock's, quality specifications and environmental health and safety aspects, uses and economic data of this important commodity chemical.

The course also presents the perspectives of future developments of commercial ammonia production. Chemical engineers, process engineers and chemists in industry, engineering companies, catalyst manufacturers, equipment makers and chemical engineering university departments will certainly profit from this course.

Course Objectives

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

- Apply and gain a good working knowledge on ammonia manufacturing and process troubleshooting
- Identify the fundamentals of the synthesis reaction and physical properties of ammonia
- Carryout process steps of ammonia production and ammonia synthesis
- Describe the complete ammonia production plants, steam reforming ammonia plants and ammonia plants based on partial oxidation
- Explain the modernization of older plants (revamping) and also their objectives and revamping options
- Classify the integration of other process into an ammonia plant
- Outline the material considerations for equipment fabrication
- Recognize the storage, shipping and transportation of ammonia
- Specify the various quality and analysis of ammonia
- Discuss the environmental, safety and health aspects of production and handling ammonia, including its safety, health features and toxicity of ammonia
- Determine the diverse chemical reactions and uses of ammonia
- Identify the different economic aspects capacity and production, feedstock choice, capital demand of ammonia production and other production cost factors for various geographical locations
- Recognize the future perspectives and other nitrogen fixation methods for the future

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 covers systematic techniques and methodologies on ammonia manufacturing and process troubleshooting for engineers and other technical staff working in the ammonia industry, particularly those who have recently assigned new responsibilities to increase their technical knowledge in ammonia production and for experienced engineers to become better acquainted with new technologies in the industry. The course will help to improve the participants skills and broaden their vision and understanding of the entire industry including technology, economics, energy, use, safety and environmental stewardship.

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: -

- 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.

- 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 Fee

US$ 5,500 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), 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 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. Andrew Ladwig is a **Senior Process Engineer** with over **25 years** of extensive experience within the **Oil & Gas**, **Refinery**, **Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting**, **Ammonia Storage & Loading** Systems, **Ammonia Plant** Operation, Troubleshooting & Optimization, **Ammonia Recovery**, **Ammonia Plant Safety**, Hazard of **Ammonia Handling**, Storage & Shipping, **Operational Excellence** in **Ammonia Plants**, **Fertilizer Storage** Management (Ammonia & Urea), **Fertilizer Manufacturing** Process Technology, **Sulphur Recovery**, Phenol Recovery & Extraction, **Wax Sweating & Blending**, **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry Process** Engineering, **Separators** in **Oil & Gas** Industry, **Gas Testing & Energy** Isolations, Gas Liquor Separation, **Industrial Liquid Mixing**, **Wax Bleachers**, **Extractors**, **Fractionation**, Operation & Control of **Distillation**, Process of **Crude ATM & Vacuum Distillation** Unit, **Water Purification**, **Steam & Electricity**, **Flame Arrestors**, **Coal Processing**, **Environmental Emission Control**, R&D of **Wax Blending**, **Wax Molding/Slabbing**, **Industrial Drying**, Principles, Selection & Design, Certified **Process Plant Operations**, Control & Troubleshooting, **Operator** Responsibilities, **Storage Tanks Operations** & Measurements, **Process Plant Troubleshooting & Engineering Problem Solving**, **Process Plant Performance**, Efficiency & Optimization, Continuous Improvement & Benchmarking, **Process Troubleshooting** Techniques, Oil & Gas Operation/Introduction to **Surface Facilities**, **Pressure Vessel** Operation, **Process Equipment** Performance & Troubleshooting, **Plant Startup & Shutdown**, **Startup & Shutdown** the Plant While Handling Abnormal Conditions, **Process Gas Plant** Start-up, Commissioning & Problem Solving, **Process Liquid, Process Handling & Measuring** Equipment, **Steam Trap** Design, Operation, Maintenance & Troubleshooting, **Steam Trapping & Control**, **Column, Pump & Exchangers**, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, **Control & ESD** System, Root Cause Analysis (**RCA**), **Dangerous Goods**, **Production Optimization**, Permit to Work (**PTW**), Project Engineering, Data Analysis, **HAZOP** Study, Sampling & Analysis, **Job Analysis** Techniques, **Hazardous Material** Classification & Storage/Disposal, **Risk** Monitoring Authorized Gas Tester (**AGT**), Confined Space Entry (**CSE**), **Process Hazard** Analysis (**PHA**), Personal Protective Equipment (**PPE**), Fire & Gas, First Aid and Occupational Health & Safety.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer**, **Project Engineer**, **Reliability & Maintenance Engineer**, **Maintenance Support Engineer**, **Process Engineer**, **HSE Supervisor**, **Warehouse Manager**, **Quality Manager**, **Business Analyst**, **Senior Process Controller**, **Process Controller**, **Safety Officer**, **Mechanical Technician**, **Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig is a **Registered SAQA Qualification** (**NQF Level 4**) in **Chemical Operations**, a **Certified Multi-Skilled** in **Instrumentation** and **Mechanical Engineering**, a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, workshops, seminars, courses and conferences internationally.

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 & Historical Development of Ammonia***
0930 – 0945	*Break*
0945 – 1100	***Fundamentals of the Synthesis Reaction*** *Physical Properties of Ammonia • Thermodynamic Data of the Reaction • General Aspects*
1100 – 1215	***Fundamentals of the Synthesis Reaction (cont'd)*** *Mechanism of the Intrinsic Reaction • Kinetics • Catalysts*
1215 – 1230	*Break*
1230 – 1420	***Process Steps of Ammonia Production*** *Synthesis Gas Production • Carbon Monoxide Shift Conversion • Gas Purification*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***Process Steps of Ammonia Production (cont'd)*** *Compression • Ammonia Synthesis (Waste-Heat Boilers for High Pressure) • Steam Generation*
0900 – 0915	*Break*
0915 – 1100	***Complete Ammonia Production Plants*** *Steam Reforming Ammonia Plants*
1100 – 1230	***Complete Ammonia Production Plants (cont'd)*** *Ammonia Plants based on Partial Oxidation*
1230 – 1245	*Break*
1245 – 1420	***Modernization of Older Plants*** *Revamping Objectives • Revamping Options*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Integration of Other Processes into an Ammonia Plant***
0930 – 0945	*Break*
0945 – 1100	***Material Considerations for Equipment Fabrication*** *Hydrogen Attack • Nitriding • Temper Embrittlement*
1100 – 1215	***Material Considerations for Equipment Fabrication (cont'd)*** *Metal Dusting • Hydrogen Sulfide Corrosion • Stress Corrosion Cracking*
1215 – 1230	*Break*
1230 – 1420	***Storage & Shipping*** *Storage • Transportation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

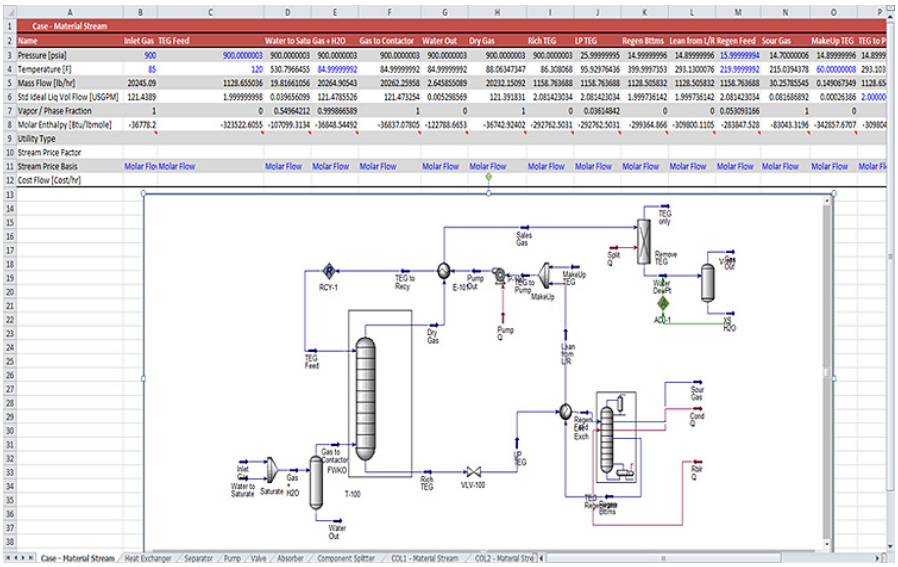
0730 – 0930	***Quality Specifications & Analysis***
0930 – 0945	*Break*
0945 – 1100	***Environmental, Safety & Health Aspects*** *Environmental Aspects of Ammonia Production and Handling • Safety Features • Health Aspects and Toxicity of Ammonia*
1100 – 1215	***Chemical Reactions & Uses of Ammonia*** *Reactions of Ammonia*
1215 – 1230	*Break*
1230 – 1420	***Chemical Reactions & Uses of Ammonia (cont'd)*** *Uses of Ammonia*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Economic Aspects*** *Capacity & Production • Feedstock Choice • Capital Demand for Ammonia Production*
0930 – 0945	*Break*
0945 – 1100	***Economic Aspects (cont'd)*** *Other Production Cost Factors*
1100 – 1215	***Economic Aspects (cont'd)*** *Production Costs for Various Geographical Locations*
1215 – 1230	*Break*
1230 – 1345	***Future Perspectives*** *Other Nitrogen Fixation Methods for the Future*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
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.



ASPEN HYSYS Simulator

Course Coordinator

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