# COURSE OVERVIEW PE0630-4D
# Urea Manufacturing Process Technology

**Course Title**
Urea Manufacturing Process Technology

**Course Date/Venue**
March 04-07, 2024/Boardroom 2, Southern Sun Abu Dhabi Hotel, Abu Dhabi, UAE

**Course Reference**
PE0630-4D

**Course Duration/Credits**
Four days/2.4 CEUs/24 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.***

Today, urea is one of the most common nitrogen fertilizer. Urea manufacture is associated with anhydrous ammonia production in modern plants because carbon dioxide is a by-product of ammonia production and is thus readily available to react with the ammonia. The urea can either be dried and granulated into 46% N urea fertilizer, or dissolved in water with ammonium nitrate to make urea ammonium nitrate (UAN) solution.

In most of the modern fertilizer manufacturing plants, most of the ammonia is used on site in the production of urea. The urea is used as a nitrogen-rich fertilizer, and as such is of great importance in agriculture and is also used as a component in the manufacture of resins for timber processing and in yeast manufacture.

This course is designed to provide engineers in the fertilizer industry with an in-depth view of the urea production technologies.

The course will guide engineers to identify future trends and needs of this fast pace industry. The course will examine the status and the most recent urea production technologies. Looking further ahead, the course will review some potentially significant developments and concepts that may impact the manner in which urea is produced. Some of these manufacturing routes are being tested or employed at few plants around the world, but have yet to be fully developed into commercial processes.

The course will also provide an opportunity to exchange ideas and disseminate information through discussion of the various technical, economic, safety, and environmental issues. The knowledge gained will enable the participants to solve specific problems at his/her plant as well as improve its operation and enhance its profitability.

## Course Objectives

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

- Apply and gain an in-depth knowledge on urea manufacturing and update their knowledge with the latest trends in this fast pace technology
- Recognize the global overview and outlook of the nitrogen fertilizer industry including its materials product types, characteristics and properties
- Discuss the economics of the urea industry and employ ammonia production processes such as reforming, oxidation, removal of carbon monoxide and water and synthesis of ammonia
- Implement the latest strategies on urea production processes such as the urea plant installation, description of production, process water sources and quantities as well as the storage and transfer equipment
- Explain the environmental impact of the urea production such as emissions and waste, environmental hazards associated with emissions and quality standards
- Employ proven emission monitoring techniques and identify the major hazards in urea plants

## 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

The course provides an overview of all significant aspects and considerations of urea manufacturing process technology for engineers and other technical staff working in the urea industry, particularly those who have recently assumed new responsibilities, to increase their technical knowledge in urea production. The course is also beneficial for experienced engineers who want to have better knowledge on the 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:-

- 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.

- 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 Fee

**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 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. Saad Bedir**, MSc, BSc, is a **Senior Chemical Engineer** with over **30 years** of extensive experience in the **Power**, **Petrochemical**, **Oil & Gas** and **Cement** industries. He is well-versed in the areas of Introduction to **Urea Manufacturing Process** Technology, **Fertilizer** Storage Management (**Ammonia & Urea**), **Ammonia** Production, **Urea Synthesis & HP Recovery Section**, **Gas Processing** Chemical Treatment Principles, **Process Troubleshooting**, **Polyethylene** Manufacturing & Process Troubleshooting, **Polyethylene Flexible Packaging**, **Polyethylene** Wire & Cable, **Polymers**, **Polymers & Composites**, **Distillation Column** Operation & Control, **Polymers & Polymerization**, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, Applied **Process Engineering** Elements, **Polymer & Materials** Engineering, **Polyethylene Processing** Techniques, Advanced **Polymer Chemistry**, **Plastics** Technology, **LLDPE** Productions & Utilization, **Process Plant** Optimization, **Heat & Power Consumption**, **Heat Transfer**, **Clean Energy & Power Saving**, Fuel Handling System, **Oil Movement & Operation**, Oil Production, Gas Conditioning & Processing, Plastic Additives, Process Plant Performance & Efficiency, Plant Optimization and Process Operations. His expertise also includes the implementation of Environmental Impact Assessment (**EIA**), **OHSAS 18001**, **ISO 9001**, **ISO 14001**, **QHSE** Management Planning, Air Quality Management, Health, Fire, Safety, Security & Environmental Codes of Practice, Legislations and Procedures. Crisis & Business Continuity Management Planning, Emergency Response & Procedures, Industrial Security Risk Assessment & Management, , Behavioural Safety, Incident & Accident Investigation, Integrated EHS Aspects, Risk Assessment & Hazard Identification, Environmental Audits, Hazardous & Non-Hazardous Waste Management, Confined Space Safety, **SHEMS** Principles, Process Safety, Basic & Advanced Construction Safety, Rig & Barge Inspection, , Safety & Occupational Health Awareness, Loss Control, Lifting & Slinging, Marine Pollution Hazards & Control, Ground Contamination & Reclamation Processes, Waste Management & Recycling, **HAZOP**, **HAZID**, **HSEIA**, **QRA**, Hazardous Area Classification, Radiation Protection, Active and Positive Fire Fighting, Fire & Gas Detection Systems, Fire Fighting Systems, Fire Proofing, ESD, Escape Routes. Presently, he is the **HSE Director** for one of the largest and renowned companies in the Middle East, wherein he takes charge of all HSE and security operations of the company.

Mr. Saad's vast professional experience in directing & managing process operations and health, safety and the environment aspects as per OSHA framework and guidelines can be traced back to his stint with a few international companies like **Saudi ARAMCO**, **CONOCO**, **Kuwait Oil Co.** (**KOC**), etc, where he worked as the **Field Senior Process Consultant** handling major projects and activities related to the discipline. Through these, he gained much experience and knowledge in the implementation and maintenance of **internationally accepted principles** of process operations. Through this, he has also gained knowledge regarding international safety standards for the National Fire Protection Association (**NFPA**), the American Petroleum Institute (**API**), Safety of Life at Sea (**SOLAS**), and Safety for Mobile Offshore Drilling Unit (**MODU**).

Mr. Saad has a **Bachelor's** degree in **Chemistry** from the **Ain Shams University** and a **NEBOSH** certificate holder. Further, he is a **Certified Instructor/Trainer**, a **Certified Lead Auditor** for **OHSAS 18001**, **ISO 9001**, **ISO 14001** and a **member** of the **Egyptian Syndicate** & **Scientific Professions**. His passion for development and acquiring new skills and knowledge has taken him all over the Middle East to attend and share his expertise in numerous trainings and workshops.

## 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:*** ***Monday, 04th of March 2024***

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| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***A Global Overview & Outlook of the Nitrogen Fertilizer Industry***<br>*Fertilizer Terminology • Fertilizer Materials & Product Types • Characteristics of Efficient Distribution Systems • Physical Properties of Fertilizer* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***A Global Overview & Outlook of the Nitrogen Fertilizer Industry (cont'd)***<br>*Chemical Characteristics of Fertilizers • Sampling of Fertilizers • Automatic Sampling Equipment • Fertilizer Regulations* |
| *1100 – 1230* | ***Ammonia Production***<br>*Steam Reforming of Natural Gas • Excess Air Secondary Reforming • Heat Exchange Autothermal Reforming* |
| *1230 – 1245* | *Break* |
| *1245 – 1420* | ***Ammonia Production (cont'd)***<br>*Partial Oxidation of Hydrocarbons • Hydrogen Production* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2:*** ***Tuesday, 05th of March 2024***

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| *0730 – 0900* | ***Ammonia Production (cont'd)***<br>*Nitrogen Addition • Removal of Carbon Monoxide • Water Removal* |
| *0900 – 0915* | *Break* |
| *0915 – 1100* | ***Ammonia Production (cont'd)***<br>*Removal of Carbon Oxides • Synthesis of Ammonia* |
| *1100 – 1230* | ***Urea Process Technologies***<br>*Urea Plants Installations • Description of BAT Production Processes* |

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| *1230 – 1245* | *Break* |
| *1245 – 1420* | ***Urea Process Technologies (cont'd)***<br>*Process Water sources and Quantities • Prilling and Granulation* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Two* |

***Day 3:*** ***Wednesday, 06th of March 2024***

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| *0730 – 0930* | ***Urea Process Technologies (cont'd)***<br>*Feasible and Available Emission Abatement Techniques • Description of Process Water BAT Treatment Systems* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Urea Process Technologies (cont'd)***<br>*Prill Tower Emissions • Granulator Emissions* |
| *1100 – 1215* | ***Urea Process Technologies (Storage & Transfer Equipment)***<br>*Ammonia • Carbon Dioxide • Formaldehyde* |
| *1215 – 1230* | *Break* |
| *1230 – 1420* | ***Urea Uses & Outlook*** |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Three* |

***Day 4:*** ***Thursday, 07th of March 2024***

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| *0730 – 0930* | ***Urea & the Environment (Environmental Data)***<br>*Inputs • Outputs • Typical Inputs for BAT Synthesis/Prilling Processes • Typical Inputs for BAT Melt Granulation Process • Production Outputs • Emissions and Waste* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Urea & the Environment (Environmental Data) (cont'd)***<br>*Environmental Hazards Associated with Emissions • Statutory Emissions Limit Values (ELVs) • Environmental Quality Standards (EQSs)* |
| *1100 – 1215* | ***Urea & the Environment (Emission Monitoring)***<br>*Parameters and Frequency of Monitoring • General* |
| *1215 – 1230* | *Break* |
| *1230 – 1345* | ***Urea & the Environment (Major Hazards)***<br>*Corrosion Protection in Urea Plants • Explosive Gas Mixtures • Hazard Study* |
| *1345 – 1400* | ***Course Conclusion*** |
| *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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