COURSE OVERVIEW PE1043-3D
Hydrocracker & Base Oil Process – Basic

Course Title
Hydrocracker & Base Oil Process - Basic

Course Date/Venue
Please see page 3

Course Reference
PE1043-3D

Course Duration
Three days/1.8 CEUs/18 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 Hydrocracker and Base Oil Process – Basic. It covers the hydrocracking process, basic chemistry involved in hydrocracking and the importance in refining and product upgrade; the hydrocracking unit configuration, catalysts used in hydrocracking and types of hydrocracking processes; the hydrocracking operating conditions and hydrocracking feedstocks and products; the reaction mechanisms in hydrocracking, rate of reaction and temperature effect; and the role of hydrogen in hydrocracking and reaction equilibrium and selectivity.

During this interactive course, participants will learn the heat exchangers in hydrocracking units, energy consumption and heat recovery; optimizing energy efficiency, minimizing energy usage and troubleshooting pressure and temperature variations; the control systems in hydrocracking operations, automation techniques and technologies used; the base oil production and types of base oils and their applications; the base oil process units and configuration, base oil process optimization and environmental and safety considerations in hydrocracking; the key quality parameters for hydrocracking products and quality control techniques; the sampling and testing procedures and quality assurance systems; the cost analysis in hydrocracking and base oil processes, ROI and profitability considerations; and benchmarking operational performance and optimizing throughput and reducing operational costs.

Course Objectives

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

- Apply and gain the basic knowledge on hydrocracker and base oil process
- Discuss hydrocracking process, basic chemistry involved in hydrocracking and the importance in refining and product upgrade
- Carryout hydrocracking unit configuration and identify catalysts used in hydrocracking and types of hydrocracking processes
- Apply hydrocracking operating conditions and recognize hydrocracking feedstocks and products
- Discuss reaction mechanisms in hydrocracking, rate of reaction and temperature effect, the role of hydrogen in hydrocracking and reaction equilibrium and selectivity
- Identify heat exchangers in hydrocracking units and energy consumption and heat recovery
- Optimize energy efficiency, minimize energy usage and apply troubleshooting techniques for pressure and temperature variations
- Carryout control systems in hydrocracking operations, automation techniques and technologies used and monitoring and data acquisition systems
- Apply base oil production and identify the types of base oils and their applications
- Employ base oil process units and configuration, base oil process optimization and environmental and safety considerations in hydrocracking
- Discuss key quality parameters for hydrocracking products and apply quality control techniques in base oil production, sampling and testing procedures and quality assurance systems
- Apply cost analysis in hydrocracking and base oil processes, ROI and profitability considerations, benchmarking operational performance and optimizing throughput and reducing operational costs

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 hydrocracker and base oil process for process engineers, shift leaders, senior operation personnel, maintenance and reliability engineers, project engineers and other technical staff.

Course Date/Venue

Session(s)	Date	Venue
1	June 22-24, 2025	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	September 14-16, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	October 27-29, 2025	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	December 21-23, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

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

US$ 3,750 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: -

- 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 **1.8 CEUs** (Continuing Education Units) or **18 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 Process & 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 **Operations Abnormalities & Plant Upset**, **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, **Production Process** Optimization, **Process Analyzers**, **Process Equipment** Design, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Cement** Manufacturing Process Technology & Standards, **Process Equipment & Piping** System, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), Process Mapping, Strategical Process Control in Process Industry, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Debottlenecking**, **Unit Performance** Optimization, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, **Monomer** Handling Safety, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Fertilizer** Manufacturing, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **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, Change Management Skills, Change Management Strategy, 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** (**Cum Laude**) and **Bachelor** 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.

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 Hydrocracking*** *Overview of the Hydrocracking Process • Key Objectives & Applications • Basic Chemistry Involved in Hydrocracking • Importance in Refining & Product Upgrade*
0930 – 0945	*Break*
0945 – 1030	***Hydrocracking Unit Configuration*** *Main Components of Hydrocracking Unit • Reaction Vessel, Reactors & Catalysts • Feedstocks & Product Distribution • Process Flow & Configuration*
1030 – 1130	***Catalysts Used in Hydrocracking*** *Types of Catalysts: Metal versus Zeolite • Catalyst Activity & Deactivation • Regeneration of Catalysts • Catalyst Selection Criteria*
1130 – 1215	***Types of Hydrocracking Processes*** *Fixed Bed versus Slurry Bed Processes • Advantages & Disadvantages of Each Type • Hydrocracking for Light versus Heavy Feedstocks • Applications of Each Process Type*
1215 – 1230	*Break*
1230 – 1330	***Hydrocracking Operating Conditions*** *Temperature & Pressure Requirements • Flow Rates & Residence Time • Effect of Operating Conditions on Conversion • Safety Considerations*
1330 – 1420	***Hydrocracking Feedstocks & Products*** *Types of Feedstocks: Vacuum Gas Oil, Heavy Gas Oil • Products Produced: Jet Fuel, Diesel, Naphtha • Product Specifications • By-Products & Waste Streams*
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	***Hydrocracking Reaction Kinetics*** *Reaction Mechanisms in Hydrocracking • Rate of Reaction & Temperature Effect • The Role of Hydrogen in Hydrocracking • Reaction Equilibrium & Selectivity*
0830 – 0930	***Heat Integration & Energy Efficiency*** *Heat Exchangers in Hydrocracking Units • Energy Consumption & Heat Recovery • Optimization of Energy Efficiency • Techniques to Minimize Energy Usage*
0930 – 0945	*Break*
0945 – 1100	***Troubleshooting in Hydrocracking Units*** *Common Operational Issues: Catalyst Deactivation, Fouling • Identification of Process Disruptions • Troubleshooting Techniques for Pressure & Temperature Variations • Resolving Catalyst-Related Issues*

1100 – 1215	***Process Control & Automation*** *Control Systems in Hydrocracking Operations • Process Parameters to Be Controlled • Automation Techniques & Technologies Used • Monitoring & Data Acquisition Systems*
1215 – 1230	*Break*
1230 – 1330	***Base Oil Production Overview*** *Overview of Base Oil Production in Refining • Key Steps in Base Oil Production • Different Processes Involved: Solvent Extraction, Dewaxing • Market Demand for High-Quality Base Oils*
1330 – 1420	***Types of Base Oils & Their Applications*** *Classification of Base Oils: Group I, II, III • Key Properties of Base Oils • Applications in Lubricant Formulations • Comparison of Base Oil Grades*
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	***Base Oil Process Units & Configuration*** *Unit Operations in Base Oil Production • Integration of Hydrocracking with Base Oil Units • Main Components in Base Oil Production Facilities • Typical Flowsheet for Base Oil Production*
0830 – 0930	***Base Oil Process Optimization*** *Factors Influencing Base Oil Yield • Techniques for Improving Yield & Quality • Optimization of Solvent Extraction & Dewaxing • Technology Advancements in Base Oil Production*
0930 – 0945	*Break*
0945 – 1030	***Environmental & Safety Considerations in Hydrocracking*** *Emissions Control in Hydrocracking Units • Safety Systems & Hazard Analysis • Waste Management in Hydrocracking & Base Oil Production • Regulatory Compliance & Environmental Impact*
1030 – 1130	***Quality Control in Hydrocracking & Base Oil Production*** *Key Quality Parameters for Hydrocracking Products • Quality Control Techniques in Base Oil Production • Sampling & Testing Procedures • Quality Assurance Systems*
1130 – 1230	***Economic & Operational Performance of Hydrocracking*** *Cost Analysis in Hydrocracking & Base Oil Processes • ROI & Profitability Considerations • Benchmarking Operational Performance • Optimizing Throughput & Reducing Operational Costs*
1230 – 1245	*Break*
1245 – 1345	***Future Trends in Hydrocracking & Base Oil Production*** *Emerging Technologies in Hydrocracking • Innovations in Base Oil Processing • The Role of Renewable Feedstocks in Refining • Sustainability Trends in the Refining Industry*
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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org