

COURSE OVERVIEW PE0902
Refinery Process Yields Optimization

Course Title

Refinery Process Yields Optimization

Course Date/Venue

October 14-18, 2024/Abu Dhabi Meeting Room,
 Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference

PE0902

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes real-life case studies 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 refinery process yields and optimization. It covers the crude oil origin, crude oil dehydration, desalting and stabilization; the petroleum refinery processes; the coking and thermal process that include delayed coking, operating variables, process yields, coke characteristics, gas composition, sulfur and nitrogen distribution and visbreaking process; the motor fuel production processes; and the UOP fluid catalytic cracking unit, reactor and generator system, catalyst, feedstock, process chemistry and fractionator system.



During this interactive course, participants will learn the UOP hydrotreating for naphtha/gasoline production; the UOP hydrocracking/isocracking process for gasoline conversion; the catalytic reforming process, fixed bed factor, process reactions, dehydrogenation and isomerization; the alkylation process; the isomerization as well as supporting operations for blending; the gas processing lube oil blending feedstock and petrochemical feedstock; and the additives production from refinery feedstock covering alcohols, ethers, ether production reaction and ether production process.

Course Objectives

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

- Apply and gain an in-depth knowledge on refinery process yields optimization
- Discuss crude oil origin, crude oil dehydration, desalting and stabilization
- Carryout petroleum refinery processes covering crude oil distillation, nitrogen and sulfur distribution, crude unit desalters, etc.
- Employ coking and thermal process that include delayed coking, operating variables, process yields, coke characteristics, gas composition, sulfur and nitrogen distribution and visbreaking process
- Illustrate motor fuel production processes and discuss UOP fluid catalytic cracking unit, reactor and generator system, catalyst, feedstock, process chemistry and fractionator system
- Apply UOP hydrotreating for naphtha/gasoline production and UOP hydrocracking/isocracking process for gasoline conversion
- Identify catalytic reforming process, fixed bed factor, process reactions, dehydrogenation, isomerization, etc.
- Recognize alkylation process including chemical reaction, hydrofluoric and sulfuric acid process, process yield and the octane number of product and alkylate properties
- Apply isomerization as well as supporting operations for blending for product specifications, batch blending, inline blending, index blending for gasoline, RVP process, vapor pressure index blending, etc.
- Discuss gas processing lube oil blending feedstock and petrochemical feedstock
- Identify additives production from refinery feedstock covering alcohols, ethers, ether production reaction and ether production process

Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive “Howard 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


This course provides an overview of all significant aspects and considerations of refinery process yields optimization for process engineers, technologists, operating and supervisory personnel engaged in the refining activities who have a minimum of experience and those who are required to understand and discuss issues to their processes. This course is also suitable for business, sales, technical and scientific personnel with limited or no broad refinery operating experience, along with technical sales personnel; those who are involved in selling equipment or supplies to the refining industry and those who are involved with economic evaluations of refinery operations.

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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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.

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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

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 **45 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, Strategic 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.

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\$ 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: Sunday, 14th October 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction, Crude Oil Origin, Crude Oil Dehydration, Desalting & Stabilization Characteristics of Crude Oil • Types of Crude Oil • API Gravity • Sulfur Content • Salt Content • Pour Point • Carbon Residue • Nitrogen Content • Metal Content • Distillation Range • Characteristic Factor (K) • Product Specifications • Crude Assay
0930 – 0945	Break
0945 – 1230	Petroleum Refinery Processes Overall Refinery Flow • Crude Oil Distillation • Product Cut-points • Nitrogen & Sulfur Distribution
1230 – 1245	Petroleum Refinery Processes (cont'd) Crude Unit Desalters • Wash Water Ratio • Hydrolysis of Crude Oil Salts, Vacuum Distillation • Refinery Complexity
1245 – 1320	Break
1320 – 1420	Coking & Thermal Processes Delayed Coking • Process Description • Operating Variables • Process Yields • Coke Characteristics • Gas Composition • Sulfur & Nitrogen



	<i>Distribution • Visbreaking Process</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 15th October 2024

0730 – 0930	Processes for Motor Fuel Production <i>UOP Fluid Catalytic Cracking Unit (FCC) • Reactor System • Regenerator System • Riser Design for Optimum Reaction • Catalyst Composition • Catalyst/Oil Ratio • Catalyst Regeneration • Delta Coke on Catalyst • Feedstock Quality • Catalyst Slide • Valves</i>
0930 – 0945	<i>Break</i>
0945 - 1130	Processes for Motor Fuel Production (cont'd) <i>Reactor/Regenerator Differential Pressure • Process Chemistry • Reaction Termination • Process Description • Flue Gas System • Fractionator System • Wet Gas Concentration System • Products Mode of Operation • Gasoline Mode • Kerosine Mode • Motor Diesel Mode • LPG Mode & Petro FCC Mode</i>
1130 - 1245	UOP Hydrotreating for Naphtha/Gasoline Production <i>Hydrodesulfurisation • Hydrodenitrogenation • Aromatic Saturation • Catalyst • Feedstock Quality • PFD • Operating Variables • Hydrogen/Hydrocarbon Ratio • Recycle Das System</i>
1245 - 1300	<i>Break</i>
1300 - 1420	UOP Hydrocracking/Isocracking Process for Gasoline Conversion <i>Feedstock Quality • Type of Catalyst • Conversion • Single Stage Reactor • Two Stage Reactors • Isocracking for Naphtha (Gasoline) Production</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 16th October 2024

0730 – 0930	Catalytic Reforming Process <i>Fixed Bed Reactor • Process Reactions • Dehydrogenation • Isomerization • Cyclization • Dealkylation • Aromatization • Cracking • Reaction Rate</i>
0930 – 0945	<i>Break</i>
0945 - 1130	Catalytic Reforming Process (cont'd) <i>Catalyst • Catalyst Poisoning • Catalyst Selectivity • Activity • Stability • Operating Variables • RON • Reformate Optimization</i>
1130 - 1245	Alkylation Process <i>Chemical Reaction • Hydrofloric Acid Process • Sulfuric Acid Process • Operating Variables • Process Yield Octane Number of Product • Alkylate Properties</i>
1245 - 1300	<i>Break</i>
1300 - 1420	Isomerization
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about</i>





	<i>the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>Lunch & End of Day Three</i>

Day 4: Wednesday, 17th October 2024

0730 – 0930	Supporting Operations <i>Blending for Product Specifications • Batch Blending • Inline Blending • Index Blending for Gasoline • RVP Process • Vapor Pressure Index Blending • Examples • Hydrogen Production • Steam-Methane Process</i>
0930 – 0945	<i>Break</i>
0945 – 1130	Supporting Operations (cont'd) <i>Primary Reaction • Operating Variable • Steam/Carbon Ratio • Catalyst Quality • Shift Converters • Methanator • CO₂ Removal • PFD • Product Specification</i>
1130 - 1245	Gas Processing <i>Inlet Separator • Contactor • Flash Drum • Filtration • Foaming in Contactor & in Regenerator • Acid Gas Removal</i>
1245 - 1300	<i>Break</i>
1300 - 1400	Gas Processing (cont'd) <i>Corrosion • Material • Regenerator Temperature • Solvent Specification • Types of Amines</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Four</i>

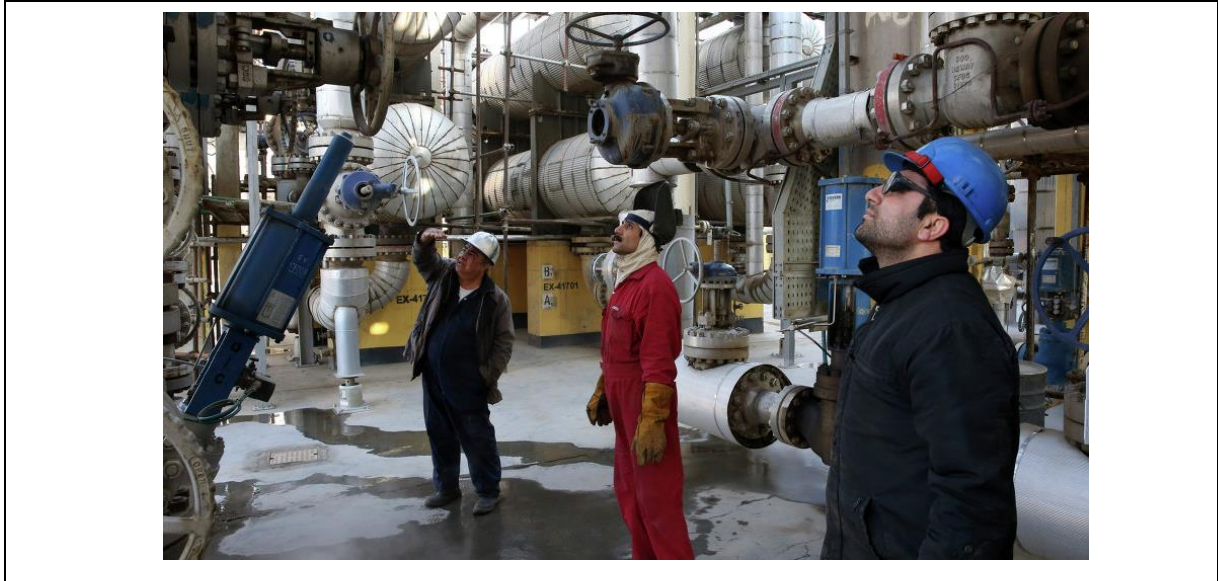
Day 5: Thursday, 18th October 2024

0730 - 0830	Lube Oil Blending Feedstock <i>Viscosity • Viscosity Change with Temperature • Pour Point • Flash Point • Boiling Temperature • Lube Oil Processing • Propane Deasphalting • PFD</i>
0830 - 0930	Petrochemical Feedstock <i>Aromatic Production • Solvent Extraction of Aromatics</i>
0930 – 0945	<i>Break</i>
0945 – 1245	Petrochemical Feedstock (cont'd) <i>Aromatic Separation • PFD • Un-Saturate Production</i>
1245 – 1300	<i>Break</i>
1300 – 1315	Additives Production from Refinery Feedstock <i>Use of Alcohols & Ethers • Ether Production Reaction • Ether Production Process PFD</i>
1315 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>



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