COURSE OVERVIEW PE0902
Refinery Process Yields Optimization

Course Title
Refinery Process Yields Optimization

Course Reference
PE0902

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Dates	Venue
1	June 23-27, 2024	The Kooh Al Noor Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE
2	September 29-October 03, 2024	Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey
3	December 22-26, 2024	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar

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 "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

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: -

- 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.

- British Accreditation Council (BAC)

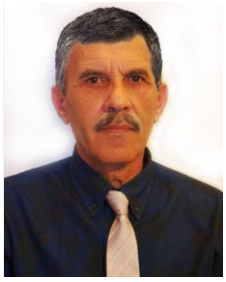
  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC

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. Mike Poulos, MSc, BSc, is a **Senior Process Engineer** with over **35 years** of industrial experience within the **Utilities**, **Refinery**, **Petrochemical** and **Oil & Gas** industries. His expertise lies extensively in the areas of **Process Equipment Design & Troubleshooting**, **Petroleum Processing**, **Process Design Specifications**, **Process Calculation Methods**, **Equipment Sizing & Selection**, **Piping**, **Pumps**, **Compressors**, **Heat Exchangers**, **Air Coolers**, **Direct-Fired Heaters**, **Process Vessels**, **Fractionator Columns**, **Reactors, Ancillary Equipment**, **Mechanical & Safety Aspects**, **Cost Estimation**, **Commissioning & Start-Up**, **Production & Cost Reduction**, Reactor Building Ventilation System, **PVC** Initiators Storage Bunkers, **PVC** Modernization & Expansion, **PVC** Reactor, **PVC** Plant Reactors Pre-Heating, **PVC** Plant Start-Up & Commissioning, **PVC** Plant Shutdown, **PVC** Driers Automation, **VC**M Recovery, **VCM** Sphere Flooding System, **VCM** Storage Tanks, Steam Tripping Facilities, Solvents Plant Automation Commissioning & Start-Up and Inferential Properties System. Further, he is also well-versed in Advanced Process Control Technology, Designing Process Plant Fail-Safe Systems, Quantitative Risk Assessment, On-Line Statistical Process Control, Principles and Techniques of Contemporary Management, Rosemount RS3, Polymer Additives, Polymer Reaction Engineering, Polymer Rheology and Processing, GRID Management and Batch Process Engineering.

During his career life, Mr. Poulos held significant positions as the **Chemical Plants Technology Engineer**, **PVC Plant Production Engineer**, **PVC Plant Shutdown Coordinator**, **PVC Plant/CC Solvents Plants Acting Section Head** and **Chemical Distribution Section Head** from Hellenic Petroleum, wherein he was responsible for the development of integrated system.

Mr. Poulos has **Master** and **Bachelor** degrees in **Chemical Engineering** from the **University of Massachusetts** and **Thessaloniki Polytechnic** respectively. Further, he is a **Certified Instructor/Trainer, a** and a **member** of the **Greek Society of Chemical Engineers** and **Greek Society of Engineers**.

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.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), 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.

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, 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 Distribution • Visbreaking Process*
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 – 0930	***Processes for Motor Fuel Production*** *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*
0930 – 0945	*Break*

0945 - 1130	***Processes for Motor Fuel Production (cont'd)*** *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*
1130 - 1245	***UOP Hydrotreating for Naphtha/Gasoline Production*** *Hydrodesulfurisation • Hydrodenitrogeneration • Aromatic Saturation • Catalyst • Feedstock Quality • PFD • Operating Variables • Hydrogen/Hydrocarbon Ratio • Recycle Das System*
245 - 1300	*Break*
1300 - 1420	***UOP Hydrocracking/Isocracking Process for Gasoline Conversion*** *Feedstock Quality • Type of Catalyst • Conversion • Single Stage Reactor • Two Stage Reactors • Isocracking for Naphtha (Gasoline) Production*
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 – 0930	***Catalytic Reforming Process*** *Fixed Bed Reactor • Process Reactions • Dehydrogenation • Isomerization • Cyclization • Dealkylation • Aromatization • Cracking • Reaction Rate*
0930 – 0945	*Break*
0945 - 1130	***Catalytic Reforming Process (cont'd)*** *Catalyst • Catalyst Poisoning • Catalyst Selectivity • Activity • Stability • Operating Variables • RON • Reformate Optimization*
1130 - 1245	***Alkylation Process*** *Chemical Reaction • Hydrofloric Acid Process • Sulfuric Acid Process • Operating Variables • Process Yield Octane Number of Product • Alkylate Properties*
1245 - 1300	*Break*
1300 - 1420	***Isomerization***
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 Three*

Day 4

0730 – 0930	***Supporting Operations*** *Blending for Product Specifications • Batch Blending • Inline Blending • Index Blending for Gasoline • RVP Process • Vapor Pressure Index Blending • Examples • Hydrogen Production • Steam-Methane Process*
0930 – 0945	*Break*
0945 – 1130	***Supporting Operations (cont'd)*** *Primary Reaction • Operating Variable • Steam/Carbon Ratio • Catalyst Quality • Shift Converters • Methanator • CO^2 Removal • PFD • Product Specification*

1130 - 1245	***Gas Processing*** *Inlet Separator • Contactor • Flash Drum • Filtration • Foaming in Contactor & in Regenerator • Acid Gas Removal*
1245 - 1300	*Break*
1300 - 1400	***Gas Processing (cont'd)*** *Corrosion • Material • Regenerator Temperature • Solvent Specification • Types of Amines*
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 Four*

Day 5

0730 - 0830	***Lube Oil Blending Feedstock*** *Viscosity • Viscosity Change with Temperature • Pour Point • Flash Point • Boiling Temperature • Lube Oil Processing • Propane Deasphalting • PFD*
0830 - 0930	***Petrochemical Feedstock*** *Aromatic Production • Solvent Extraction of Aromatics*
0930 – 0945	*Break*
0945 – 1245	***Petrochemical Feedstock (cont'd)*** *Aromatic Separation • PFD • Un-Saturate Production*
1245 – 1300	*Break*
1300 – 1315	***Additives Production from Refinery Feedstock*** *Use of Alcohols & Ethers • Ether Production Reaction • Ether Production Process PFD*
1315 – 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

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