## COURSE OVERVIEW PE0912
# Advanced Refinery Operations, Plants Process & Troubleshooting

**Course Title**
Advanced Refinery Operations, Plants Process & Troubleshooting

**Course Date/Venue**
October 14-18, 2024/Camera Privata Meeting Room, Manor Amsterdam Hotel, Amsterdam, Netherland


**Course Reference**
PE0912

**Course Duration/Credits**
Five days/3.0 CEUs/30 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.***

Refinery processes consist of many complex apparatuses involving both moving and static parts as well as interconnecting pipes, control mechanisms and electronics, mechanical and thermal stages, heat exchangers, waste and side product processing units, power ducts and many others. Bringing such a complicated unit online and ensuring its continued productivity requires substantial skill at anticipating, detecting and solving acute problems. Failure to identify and resolve these problems quickly can lead to lost production, off-spec product, equipment loss, and even catastrophic accidents. Therefore, the ability to troubleshoot refinery operations is one of the most valuable skills operations personnel can possess.

Typical refineries operate about 26 days of the month to cover costs. The remaining days in the month they operate to make a profit. If the process is down for five days, then the company cannot cover costs and no profit has been made. Engineers must quickly and successfully solve any troublesome problems that occur. Sometimes the problems occur during startup; sometimes, just after a maintenance turn-around; and sometimes unexpectedly during usual operation. A troubleshooting problem is one where something occurs that is unexpected to such an extent that it is perceived that some corrective action may be needed. The trouble usually occurs somewhere in a system that consists of various pieces of interacting equipment run by people.

Troubleshooting is the process used to diagnose the fault safely and efficiently, decide on corrective action and prevent the fault from reoccurring. Process engineering, especially troubleshooting, is different from most other branches of technology in another respect: It is not advancing very quickly. The principles of distillation, hydraulics, phase separation, and heat transfer, as they apply to process applications, have been well known for quite some time. The challenge in troubleshooting consists of untangling the influence that human error, mechanical failure, and corrosion have on these well-known principles. The aspect of the job that makes it so difficult is that most refinery problems are initiated by human error – a never-ending source of surprise.

Most Refinery troubles have a simple origin. However, this simple origin is clouded by false data, misconceptions, superficial observations, and third-hand reports. The error that most engineers often make is that they develop a theory, usually with process computer simulations, as to the cause of the malfunction. The theory is then reviewed with management and other technical personnel at a large meeting. If no one objects to the theory, it is accepted as the solution to the problem. Technical training is one tool that should be taken into the field to reveal the underlying problem, but confining the investigation to technical areas only will severely limit the chances of success.

## Course Objectives

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

- Apply and gain an in-depth knowledge on advanced refinery operations, plants process and troubleshooting
- Discuss petroleum refinery process including crude processing, desalting, atmospheric distillation and vacuum distillation
- Explain heavy oils processing and bottom of the barrel upgrading covering the cocking and thermal processes, delayed coking, fluid coking, flexicoking and visbreaking
- Carryout process of production that covers the fluid catalytic cracking, hydrocracking, cat cracking, isomerization, alkylation, hydrotreating and catalytic reforming
- Review process operations key operational conditions and factors as well as discuss blending for product specifications, hydrogen production, refinery gas plants and acid gas treating
- Identify process troubleshooting including troubleshooting concepts and techniques, troubleshooting tools, typical problems, flooding and its detection
- Determine refinery economics comprising of residue reduction, asphalt and residual fuel, refinery complexity and netback

## Who Should Attend

This course is suitable for section head.

## 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.

## Course Fee

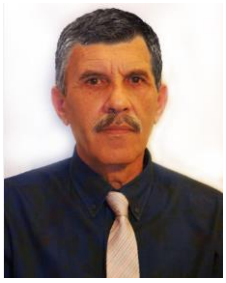
**US$ 8,800** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## 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. 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 Plant** & **Troubleshooting**, **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's** and **Bachelor's** 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 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, 14th of October 2024***

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|---|---|
| *0730 – 0745* | *Registration & Coffee* |
| *0745 – 0800* | *Welcome & Introduction* |
| *0800 – 0815* | ***PRE-TEST*** |
| *0815 – 0800* | ***Petroleum Refinery Process*** |
| *0800 – 0930* | ***Crude Processing*** |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Desalting*** |
| *1100 – 1130* | ***Atmospheric Distillation*** |
| *1130 – 1215* | ***Vacuum Distillation*** |
| *1215 – 1230* | ***Heavy Oils Processing/Bottom of the Barrel Upgrading (Cocking & Thermal Processes, Delayed Coking, Fluid Coking, Flexicoking, Visbreaking)*** |
| *1230 – 1245* | *Break* |
| *1245 – 1315* | ***Process of Production*** |
| *1315 – 1420* | ***Case Study – Example*** |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2:*** ***Tuesday, 15th of October 2024***

| | |
|---|---|
| *0730 – 0830* | ***Fluid Catalytic Cracking*** |
| *0830 – 0930* | ***Hydrocracking*** |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Cat Cracking*** |
| *1100 – 1130* | ***Isomerization*** |
| *1130 – 1200* | ***Alkylation*** |
| *1200 – 1230* | ***Hydrotreating*** |
| *1230 – 1330* | *Break* |
| *1330 – 1400* | ***Catalytic Reforming*** |
| *1400 – 1420* | ***Case Study – Example*** |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Two* |

***Day 3:*** ***Wednesday, 16th of October 2024***

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|---|---|
| *0730 – 0830* | ***Process Key Operational Conditions & Factors*** |
| *0830 – 0930* | ***Blending for Product Specifications*** |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Hydrogen Production*** |
| *1100 – 1130* | ***Refinery Gas Plants*** |
| *1130 – 1200* | ***Acid Gas Treating*** |
| *1200 – 1230* | ***Utilities*** |
| *1230 – 1330* | *Break* |
| *1330 – 1400* | ***Sulfur Recovery Plants*** |
| *1400 – 1420* | ***Case Study – Example*** |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day Three* |

| Day 4: | Thursday, 17th of October 2024 |
|---|---|
| 0730 – 0830 | ***Utilities*** |
| 0830 – 0930 | ***Oil & Gas Measurement & Control*** |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Process Troubleshooting Concepts & Techniques*** |
| 1100 – 1130 | ***Troubleshooting Tools*** |
| 1130 – 1200 | ***Typical Problems*** |
| 1200 – 1230 | ***Flooding & its Detection*** |
| 1230 – 1330 | *Break* |
| 1330 – 1400 | ***Interaction of Process & Equipment*** |
| 1400 – 1420 | ***Case Study – Example*** |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

| Day 5: | Friday, 18th of October 2024 |
|---|---|
| 0730 – 0830 | ***Saltation & Entrapment*** |
| 0830 – 0930 | ***Tower Scan & Inspection*** |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Refinery Economics*** |
| 1100 – 1130 | ***Residue Reduction*** |
| 1130 – 1145 | ***Asphalt & Residual Fuel*** |
| 1145 – 1215 | ***Refinery Complexity & Netback*** |
| 1215 – 1230 | ***Economic Evaluation*** |
| 1230 – 1245 | *Break* |
| 1245 – 1315 | ***Cost Estimation*** |
| 1315 – 1345 | ***Case Study – Example*** |
| 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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