COURSE OVERVIEW PE0115
Process Plant Performance & Efficiency

Course Title
Process Plant Performance & Efficiency

Course Date/Venue
March 04-08, 2024/Mayfair Meeting Room,
London Marriott Hotel Park Lane, London, UK

Course Reference
PE0115

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

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of process plant performance and efficiency. It covers the characterization of catalyst; ideal reactor and their performance; the various thermal and mechanical separation processes; the performance of crystallization, adsorption, chemisorption, and ion exchange; performance of pipelines, pumps, and compressors; the efficiency of off-site utilities such as the electrical energy, cooling water, steam, and refrigeration; and the importance of proper waste disposal and its impact on plant performance and efficiency.

At the completion of the course, participants will be able to employ systematic methodology in measurements and control technology and their major role in plant performance and efficiency; identify the various optimization tools used in process plant performance; determine the refinery and process plant optimization trends; discuss the continuous improvement, benchmarking and best practices for process plant performance and efficiency; carryout troubleshooting procedures and identify the different performance analysis software used in process plant performance in relation to process optimization and performance monitoring.

Course Objectives

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

- Apply and gain an in-depth knowledge on various elements of process plant performance in order to improve the efficiency
- Enumerate the characterization of catalyst and the ideal reactor and identify their performance
- Discuss the various thermal and mechanical separation processes and determine the performance of crystallization, adsorption, chemisorption, and ion exchange
- Recognize the performance of pipelines, pumps, and compressors as well as the efficiency of off-site utilities such as the electrical energy, cooling water, steam, and refrigeration
- Discuss the importance of proper waste disposal and its impact on plant performance and efficiency
- Employ systematic methodology in measurements and control technology and their major role in plant performance and efficiency
- Enhance knowledge on collecting various process data such as chemical data, mass balance, physicochemical data, and processing variables as inputs for process optimization procedure
- Identify the various optimization tools used in process plant performance and determine the refinery and process plant optimization trends
- Discuss the continuous improvement, benchmarking and best practices for process plant performance and efficiency
- Carryout troubleshooting procedures and identify the different performance analysis software used in process plant performance in relation to process optimization and performance monitoring

Who Should Attend

This course is intended for those concerned with the process plant performance and efficiency including planning staff, instrumentation & control staff, production & operation staff, process, electrical, mechanical and project engineers. Management can also appreciate the importance of the new tools available to achieve the plant objectives of today and meet the challenges of tomorrow.

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 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

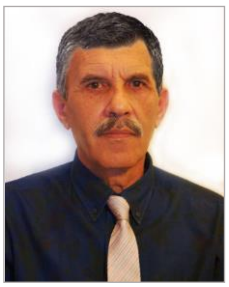
US$ 8,800 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 Performance** & **Efficiency**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & **Plant** Upset, **Process Plant** Start-up & Commissioning, **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**.

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***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction*** *Components of the Process Plant ● Performance for Management, Engineering, Operation ● Most Common Performance Index ● Performance for Maintenance, Operation, Equipment*
0930 – 0945	*Break*

0945 – 1100	***The Catalyst & the Reactor*** *Catalyst Performance ● Characterization of Catalyst ● Kinetics of Heterogeneous Catalyst ● Fundamentals of Chemical Reaction Technology ● Ideal Reactors*
1100 – 1230	***Product Processing (Thermal & Mechanical Separation Processes)*** *Heat Transfer, Evaporation & Condensation ● Distillation, Rectification ● Absorption & Desorption, Stripping, Vapor-Entrainment Distillation ● Extraction ● Crystallization ● Adsorption, Chemisorption ● Ion Exchange ● Drying ● Special Processes For Fluid Phases ● Mechanical Processes*
1230 – 1245	*Break*
1245 – 1420	***Pipelines, Pumps, & Compressors*** *Fundamentals of Hydrodynamics ● One-phase Flow in Pipelines ● Pumps ● Compressors*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

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

0730 – 0900	***Energy Supply*** *Steam & Condensate System ● Electrical Energy ● Cooling Water ● Refrigeration ● Compressed Air*
0900 – 0915	*Break*
0915 – 1045	***Product Supply & Storage***
1045 – 1230	***Waste Disposal*** *Off-gas Collection System & Flares ● Combustion Plants for Gaseous & Liquid Residues ● Special Processes For Off-Gas Purification ● Wastewater Purification & Disposal ● Slop System*
1230 – 1245	*Break*
1245 – 1420	***Measurement & Control Technology*** *Metrology ● Control Technology*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

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

0730 – 0900	***Plant Safety***
0900 – 0915	*Break*
0915 – 1045	***Materials Selection*** *Important Materials & their Properties ● Metallic Materials ● Nonmetallic Materials*
1045 – 1230	***Process Data*** *Chemical Data ● Mass Balance ● Physicochemical Data ● Processing*
1230 – 1245	*Break*
1245 – 1420	***Optimization Fundamentals*** *What can Optimization Achieve ● Cost Versus Capacity ● Pareto Principle ● Operational Economics ● Investment Economics ● Financial Returns*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

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

0730 – 0900	***Optimization Fundamentals (cont'd)*** *Basic Optimization Tools ● Graphical, Analytical Methods ● Advanced Optimization Tools ● Linear Quadratic Programming ● Non-linear Optimization*
0900 – 0915	*Break*

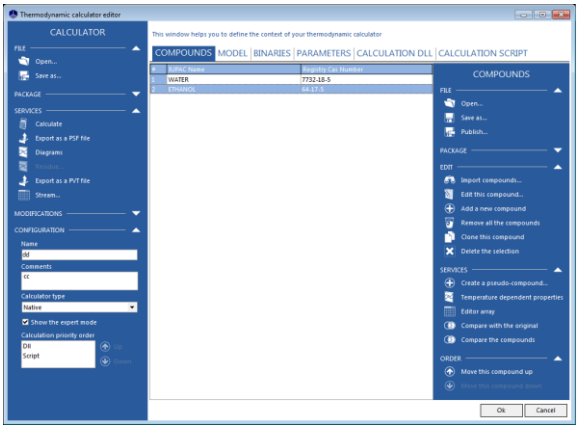
0915 – 1045	***Refinery & Process Plant Optimization Trends*** *Optimization Trends ● Overall Goal ● Unit Optimization – Case Study*
1045 – 1230	***Continuous Improvement*** *Total Quality Management ● Kaizen ● "Just in Time" ● Six Sigma ● Balanced Scorecard*
1230 – 1245	*Break*
1245 – 1420	***Benchmarking & Best Practices*** *Performance Measures & Profitability ● Relative Energy Intensity Index ● Relative Maintenance Index ● Key Performance Indicators ● Best Practices*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Friday, 08th of March 2024***

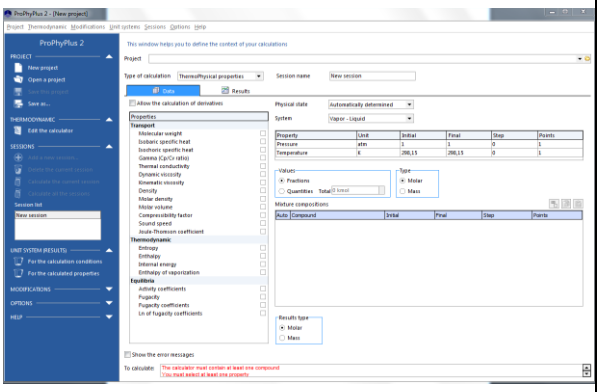
0730 – 0830	***Benchmarking & Best Practices (cont'd)*** *Model Validation ● Back Casting*
0830 – 0930	***Troubleshooting*** *Worst Loops ● Biggest Payback loops*
0930 – 0945	*Break*
0945 – 1230	***Troubleshooting (cont'd)*** *Detecting Oscillations ● Drilling down*
1230 – 1245	*Break*
1245 – 1345	***Performance Analysis Software*** *Processing Optimization ● Performance Monitoring ● Commercial Software*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

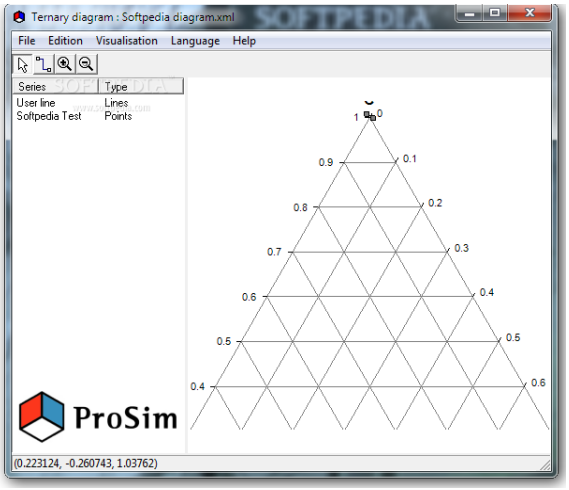
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Simulis Thermodynamics", "ProPhyPlus", "ProSim Ternary Diagram", "Simulis Conversions" simulators and "ASPEN HYSYS" simulator.



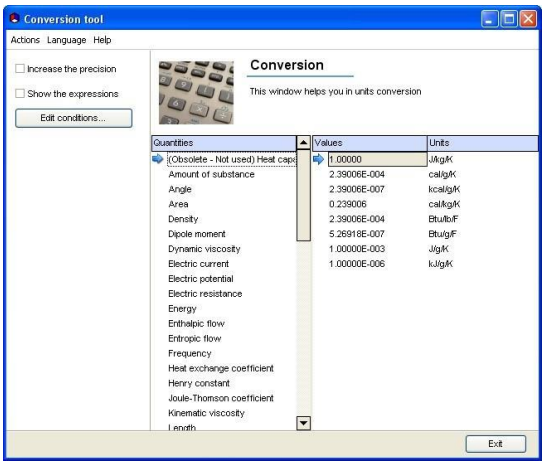
Simulis® Thermodynamics



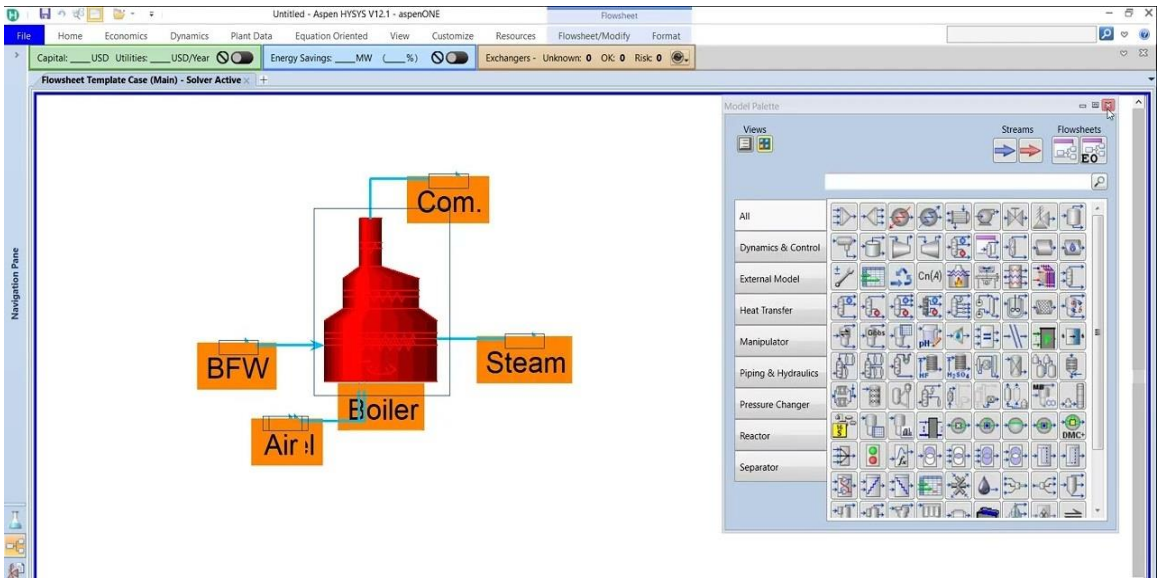
ProPhyPlus



ProSim Ternary Diagram



Simulis Conversions



ASPEN HYSYS V12.1 Simulator

Course Coordinator
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