

COURSE OVERVIEW PE0115 Process Plant Performance & Efficiency

Course Title

Process Plant Performance & Efficiency

Course Reference

PE0115

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	September 01-05, 2024	Horus Meeting Room, Holiday Inn & Suites Maadi, Cairo, Egypt
2	November 10-14, 2024	
3	January 05-09, 2025	



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.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee


US\$ 5,500 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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:



Dr. Hesham Abdou, PhD, MSc, BSc, is a Senior Mechanical & Petroleum Engineer with over 35 years of integrated industrial and academic experience as a University Professor. His specialization widely covers in the areas of Crude Oil Testing & Water Analysis, Crude Oil & Water Sampling Procedures, Equipment Handling Procedures, Crude & Vacuum Process Technology, Gas Conditioning & Processing, Cooling Towers Operation & Troubleshooting, Sucker Rod Pumping, ESP & Gas Lift, PCP & Jet Pump, Pigging Operations, Electric Submersible Pumps (ESP), Progressive Cavity Pumps (PCP), Natural & Artificial Flow Well Completion, Well Testing Procedures & Evaluation, Well Performance, Coiled Tubing Technology, Oil Recovery Methods Enhancement, Well Integrity Management, Well Casing & Cementing, Acid Gas Removal, Heavy Oil Production & Treatment Techniques, Water Flooding, Water Lift Pumps Troubleshooting, Water System Design & Installation, Water Networks Design Procedures, Water Pumping Process, Pipelines, Pumps, Turbines, Heat Exchangers, Separators, Heaters, Compressors, Storage Tanks, Valves Selection, Compressors, Tank & Tank Farms Operations & Performance, Oil & Gas Transportation, Oil & Gas Production Strategies, Artificial Lift Methods, Piping & Pumping Operations, Oil & Water Source Wells Restoration, Pump Performance Monitoring, Rotor Bearing Modelling, Hydraulic Repairs & Cylinders, Root Cause Analysis, Vibration & Condition Monitoring, Piping Stress Analysis, Amine Gas Sweetening & Sulfur Recovery, Heat & Mass Transfer and Fluid Mechanics.

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager, Petroleum Engineering Assistant General Manager, Workover Assistant General Manager, Workover Department Manager, Artificial Section Head, Oil & Gas Production Engineer and Senior Instructor/Lecturer** from various companies and universities such as the Cairo University, Helwan University, British University in Egypt, Banha University and Agiba Petroleum Company.

Dr. Hesham has a **PhD and Master** degree in **Mechanical Power Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is a member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, seminars and conferences internationally.

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

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

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

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

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

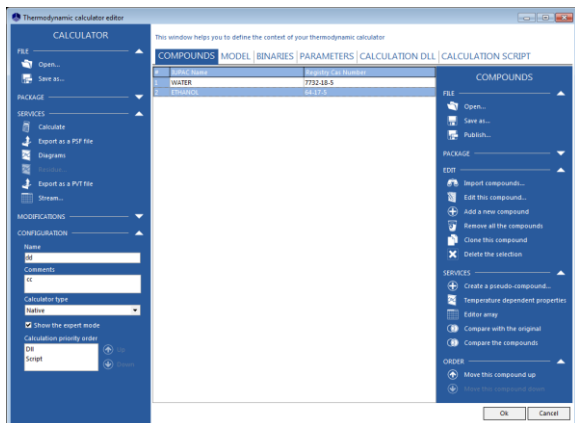
Day 5

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

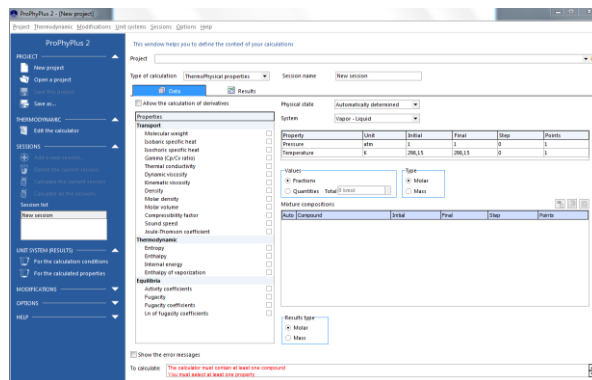


Simulator (Hands-on Practical Sessions)

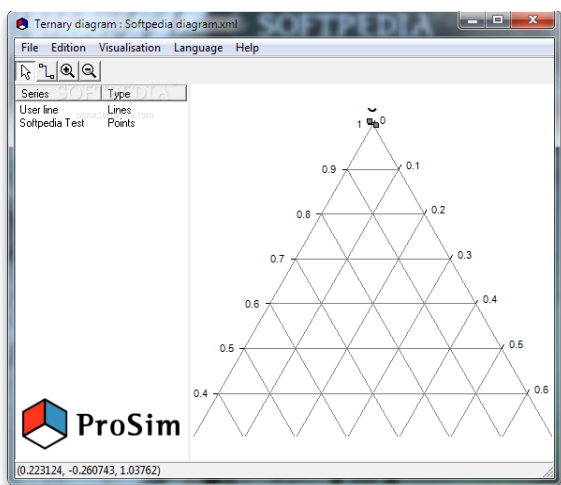
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the “Simulis Thermodynamics”, “ProPhyPlus”, “ProSim Ternary Diagram”, “Simulis Conversions” simulators and “ASPEN HYSYS”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



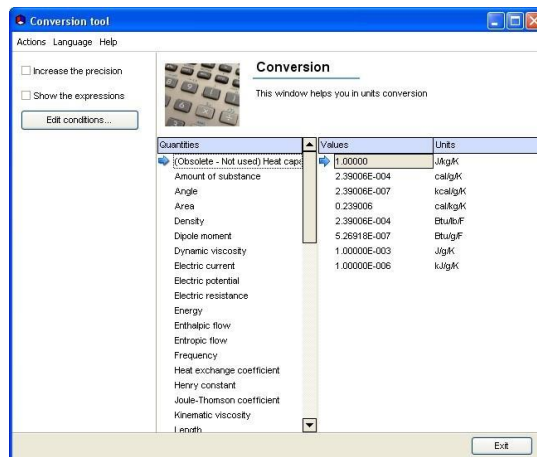
Simulis® Thermodynamics



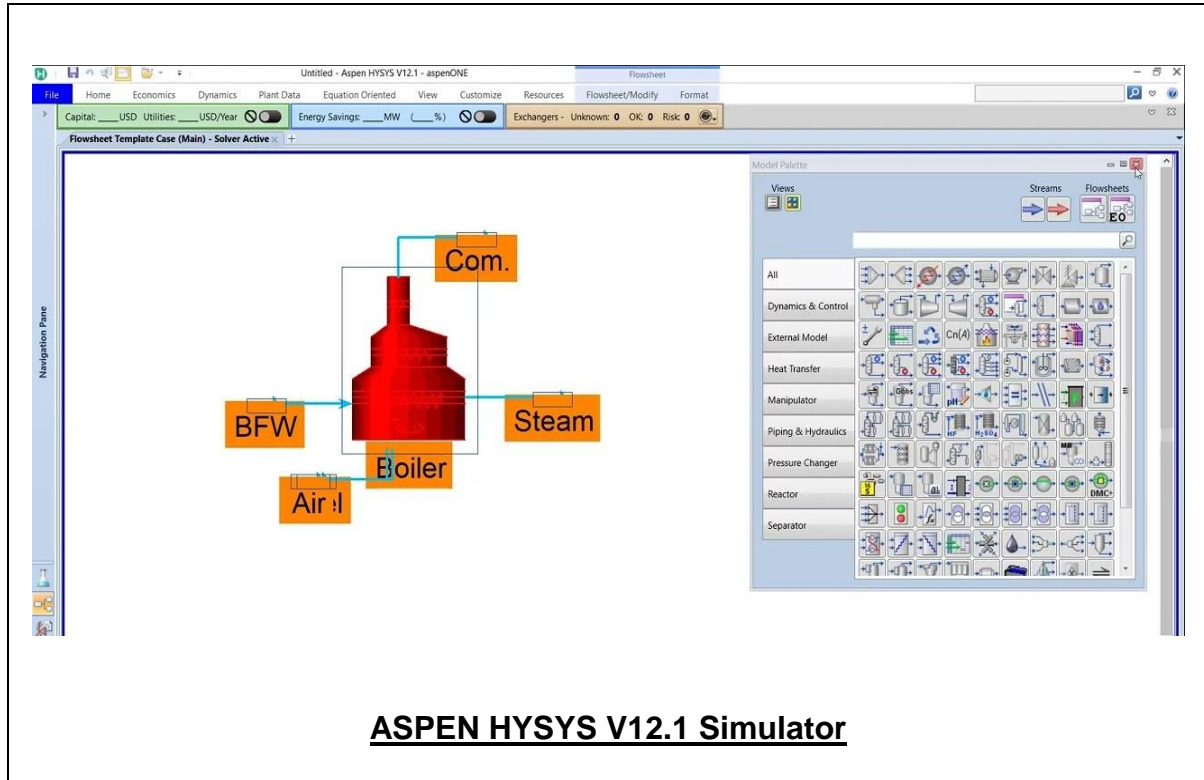
ProPhyPlus



ProSim Ternary Diagram



Simulis Conversions



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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