COURSE OVERVIEW PE0100-4D
Process Plant Optimization Technology & Continuous Improvement

Course Title
Process Plant Optimization Technology & Continuous Improvement

Course Date/Venue
Session 1: August 12-15, 2024/Club B, Ramada Plaza By Wyndham Istanbul City Center, Istanbul, Turkey
Session 2: November 11-14, 2024/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
PE0100-4D

Course Duration/Credits
Four days/2.4 CEUs/24 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.

In a typical processing plant, such as a petrochemical plant or oil refinery, there are hundreds and even thousands of control loops. Each control loop is responsible for controlling one part of the process, such as maintaining a temperature, level or flow. If the control loop is not properly designed and tuned, the process runs below its optimum. The process will be more expensive to operate, and equipment will wear out prematurely. For each control loop to run optimally, identification of sensor, valve, and tuning problems is important. It has been well documented that over 35% of control loops typically have problems.

Process plant optimization is the set of adjustments of the various processes in order to optimize some specified set of parameters without violating some constraints. The most common goals are minimizing cost and maximizing throughput and efficiency. When optimizing a process, the goal is to maximize one or more of the process specifications, while keeping all others within their constraints. This can be done by using a process mining tool, discovering the critical activities and bottlenecks, and acting only on them.

Process plant optimization involves evaluating every process and interaction in order to determine the best possible outcome. It includes the optimization of process equipment, operating procedure and control systems. This can result in improved flexibility, modernization and the best use of equipment, improved automation, decreased production time, and increased innovation.

The aim of this course is to provide participants with a complete and up-to-date overview of process plant optimization. Upon the successful completion of this course, participant will gain a satisfactory understanding of the concepts of optimization fundamentals, process plant design optimization, process plant planning optimization, process plant operations optimization, process controls, optimizing reliability, optimizing offsite operations, continuous improvement and integrated supply chain optimization. Actual case studies from around the world will be demonstrated to highlight the topics discussed.

Course Objectives

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

- Apply and gain an in-depth knowledge on process plant optimization technology and continuous improvement
- Define and identify the basic optimization fundamentals and tools
- Illustrate breakeven analysis, graphical methods, numerical methods, incremental methods, linear programming, quadratic programming and non-linear optimization techniques
- Describe global and local optima, design optimization, NP maximization and configuration optimization
- Discuss integer programming, capacity creep and plant debottlenecking as well as optimize operations planning, unit performance and process operations
- Explain linear programs and non-linear models, scheduling by parameters for optimization, crude unit cut points, reformer severity, FCC conversion and other key parameters
- Integrate unit performance, describe the utilities and process controls and differentiate analogue controls versus digital controls as well as feed-back versus feed-forward controls
- Determine DCS and advanced controls, process analyzers, off-line optimization, multivariable process control and inferential controls and differentiate dynamic versus steady-state
- Discuss statistical process control, optimizing reliability, RCFA logic diagrams and fault trees, turnaround planning, materials inventory management, management and information systems
- Employ risk management and optimization, offsite operations optimization, offsites design, storage facilities operation, utilities management, inventory management, blending optimization and continuous improvement
- Acquire knowledge on the elements in supply chain, lean manufacturing, kaisan and six sigma, benchmarking and best practices
- Distinguish the difference between plant optimization versus supply chain optimization and discuss the summary of refinery and process plant optimization

Who Should Attend

This course provides an overview of all significant aspect and considerations of process plant optimization technology and continuous improvement for managers, leaders, section heads, superintendents, supervisors, process engineers, production engineers, plant engineers and planning 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

Istanbul	**US$ 5,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 4,500** 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 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:-

- USA International Association for Continuing Education and Training (IACET)

  Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, Virginia 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 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 1-2013 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 Association 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 **2.4 CEUs** (Continuing Education Units) or **24 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 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. Dimitry Rovas, CEng, MSc, PMI-PMP, is a **Senior Engineer** with extensive industrial experience in **Oil**, **Gas**, **Power** and **Utilities** industries. His expertise includes **Gas Conditioning & Processing**, **Process Plant** Optimization, Effective **Production Operations** in the Oil & Gas Fields, Advanced Process Safety Management (**PSM**), **Process Equipment** Design, Applied **Process** Engineering, **Oil Production & Processing** Facilities, Pr**ocess Plant Optimization & Rehabilitation**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Operations Abnormalities & Plant Upset**, **Glass Reinforced Plastics**, **GRP Resins**, **Pipe Products & Applications**, **Pipe** System Designs & Installation, **Steel & Fiberglass** Construction, **GRP Linings** & Method Application, **Rubber Com**pounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, **Heat Transfer**, **Vulcanization** Methods, **Energy Conservation**, **Energy Loss** Management in Electricity Distribution Systems, **Energy Saving**, **Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Gas & Steam Turbines**, **Turbine Operations**, **Heat Transfer**, **Machine Design**, **Fluid Mechanics**, **Heating & Cooling Systems**, **Heat Insulation** Systems, **Heat Exchanger & Cooling Towers**, **Mechanical Erection**, **Heavy Rotating Equipment**, **HAZMAT & HAZCOM**, **Hazardous Materials & Chemicals MSDS**, Modern Heating, Ventilation, Air-Conditioning (**HVAC**) **& Refrigeration** Systems, Emergency **Air Compressors**, **Gas Turbine** Condition Monitoring & Fault Diagnosis, Modern **Valve** Technology, **Pumps & Valves**, Detailed Engineering Codes & Standards, **Hydraulic** System Overhaul & Troubleshooting, **Hydraulic** System Design & Troubleshooting, **Boiler** Maintenance & Inspection, **Pipe Stress** Analysis, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He was the **Project Manager** wherein he was managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager**, **Field Engineer**, **Preventive Maintenance Engineer**, **Researcher**, **Instructor/Trainer**, **Telecom Consultant** and **Consultant** from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has **Master's** degrees in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens** (**NTUA**), **Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional** (**CMRP**) from the Society of Maintenance & Reliability Professionals (**SMRP**), **Certified Project Management Professional** (**PMI-PMP**), **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, Project Management Institute (**PMI**), **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.

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***
0815 – 0830	***Optimization Fundamentals***
0830 – 0845	***Definitions & Basic Optimization Tools***
0845 – 0900	***Breakeven Analysis***
0900 – 0915	***Graphical Solutions***
0915 – 0930	***Numerical Methods***
0930 – 0945	***Incremental Method***
0945 – 1000	*Break*
1000 – 1015	***Linear Programming (LP)***
1015 – 1030	***Quadratic Programming (QP)***
1030 – 1045	***Non-Linear Optimization Techniques***
1045 – 1100	***Global & Local Optima***
1100 – 1115	***Optimizing the Design***
1115 – 1200	***Maximizing NP***
1200 – 1215	*Break*
1215 – 1230	***Configuration Optimization***
1230 – 1245	***Integer Programming (IP)***
1245 – 1420	***Capacity Creep***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Plant Debottlenecking***
0800 – 0815	***Optimizing Operations Planning***
0815 – 0830	***Linear Programs (LP) & Non-Linear Models***
0830 – 0845	***Optimizing Unit Performance***
0845 – 0915	***Scheduling***
0915 – 0945	***Optimizing Process Operations***
0945 – 1000	*Break*
1000 – 1015	***Key Parameters for Optimization***
1015 – 1030	***Crude Unit Cut Points***
1030 – 1045	***Reformer Severity***
1045 – 1100	***FCC Conversion***
1100 – 1115	***Other Key Parameters***
1115 – 1140	***Integrating Unit Performance***
1140 - 1200	***Utilities***
1200 – 1215	*Break*
1215 – 1315	***Process Controls***
1315 – 1420	***Analogue Controls versus Digital Controls***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

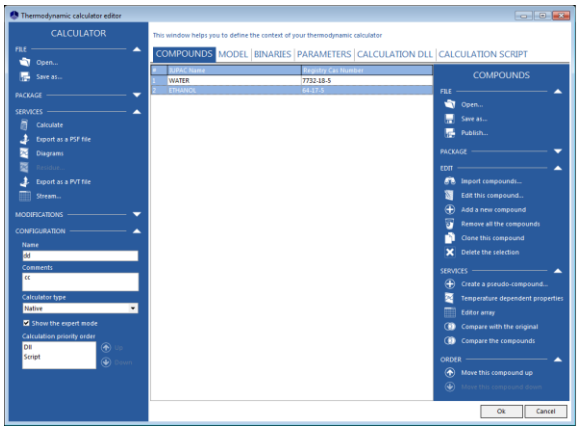
0730 – 0800	***Feed-back & Feed-forward Controls***
0800 – 0815	***DCS (Distributed Control Systems) & Advanced Controls***
0815 – 0830	***Process Analyzers***
0830 – 0845	***Off-line Optimization***
0845 – 0915	***Real Time Online Optimization***
0915 – 0945	***Multivariable Process Control & Inferential Controls***
0945 – 1000	*Break*
1000 – 1015	***Dynamic versus Steady-State***
1015 – 1030	***Statistical Process Control***
1030 – 1045	***Optimizing Reliability***
1045 – 1100	***Root Cause Failure Analysis***
1100 – 1115	***Logic Diagrams & Fault Trees***
1115 – 1200	***Turnaround Planning***
1200 – 1215	*Break*
1215 – 1230	***Materials Inventory Management***
1230 – 1245	***Management & Enterprise Information Systems***
1245 – 1420	***Risk Management & Optimization***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

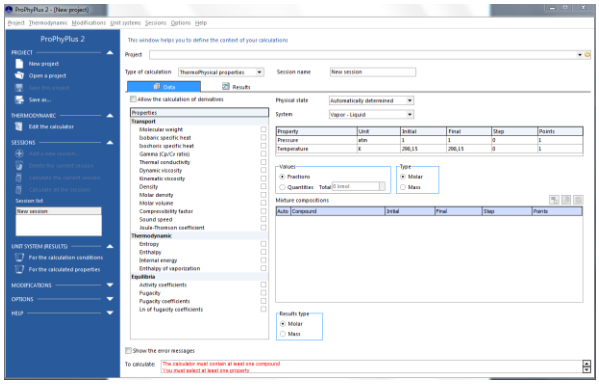
0730 – 0800	***Optimizing Offsites Operations***
0800 – 0820	***Offsites Design***
0820 – 0840	***Storage Facilities Operation***
0840 - 0900	***Utilities Management***
0900 – 0915	*Break*
0915 – 1000	***Inventory Management***
1000 – 1045	***Blending Optimization***
1045 – 1130	***Continuous Improvement***
1130 – 1200	***Lean Manufacturing***
1200 – 1215	***Kaisan & Six Sigma***
1215 – 1230	***Benchmarking & Best Practices***
1230 – 1245	***Plant Optimization versus Supply Chain Optimization***
1245 – 1300	*Break*
1300 – 1315	***Elements in Supply Chain***
1315 – 1330	***Summary of Refinery & Process Plant Optimization Trends***
1330 – 1345	***Crude Unit Optimization Case Study***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

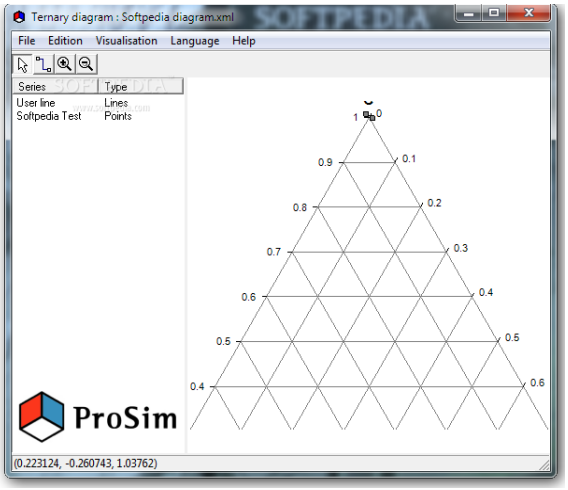
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Simulis Thermodynamics", ProPhyPlus", "ProSim Ternary Diagram", "Simulis Conversions" simulators and "ASPEN HYSYS"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



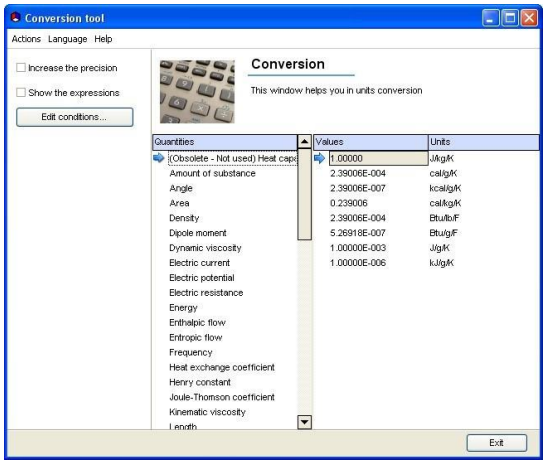
Simulis® Thermodynamics



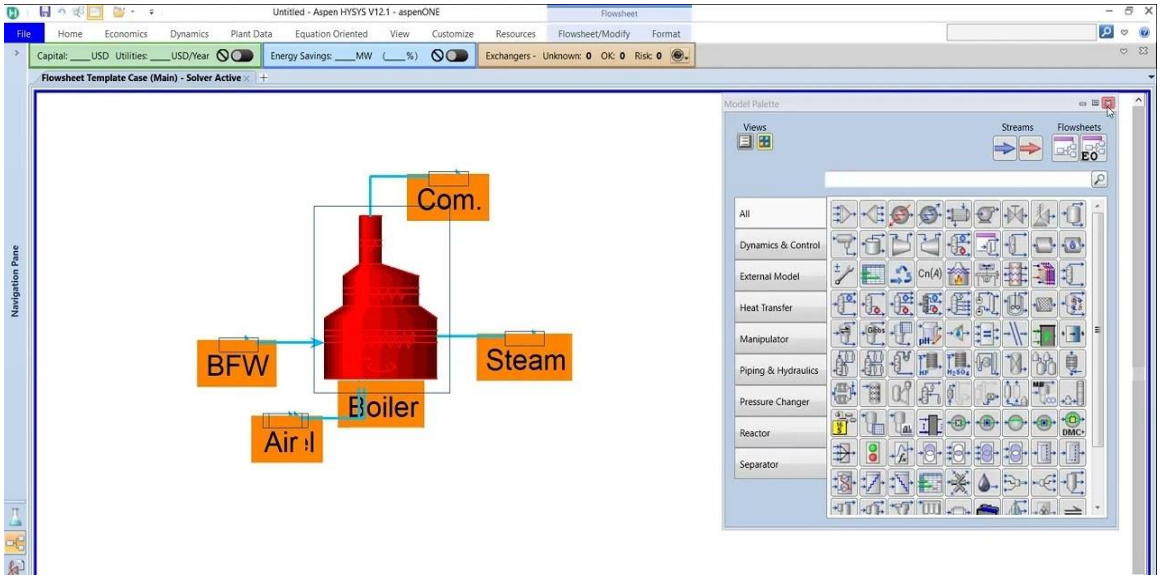
ProPhyPlus



ProSim Ternary Diagram



Simulis Conversions



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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