COURSE OVERVIEW PE0100
Process Plant Optimization Technology & Continuous Improvement

Course Title
Process Plant Optimization Technology & Continuous Improvement



Course Date/Venue
Session 1: June 20-24, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 2: September 26-30, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar



Course Reference
PE0100

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.

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/Outcomes & Benefits for the Participants

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

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 conveniently saved in a **Tablet PC**.*

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

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Fee

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.

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

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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.

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. Henry Beer is a **Senior Process Engineer** with over **30 years** of in-depth industrial experience within the **Petrochemical**, **Oil & Gas** industries specializing in **Hydrocarbon Process** Equipment, **DOX Unit** Operation & Troubleshooting, **Polyethylene & Polypropylene** Processing, **Oil Movement** Storage & Troubleshooting, **Power Plant Chemistry**, **Fuel Quality** Monitoring System Fundamentals, **Liquid Bulk Cargo Handling**, **Oil Refinery Cost Management**, **Flare & Blowdown** Operation, **Pressure Relief Systems** Maintenance & Troubleshooting, Refinery **SRU**, **Tail Gas** Treating, **Sour Water & Amine Recovery** Units, **Propylene** Compressor and Turbine, **Clean Fuel** Technology & Standards, Principles of **Operations Planning**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Plastic Extrusion Technology** Operation & Troubleshooting, **Chemical Engineering** for Non-Chemical Engineers, **Process Plant** Troubleshooting, **Process Plant Optimization** Technology, **Engineering Problem Solving**, **Process Plant** Performance & Efficiency, **Process Plant** Start-up & Shutdown, **Process Plant** Commissioning, **Process Plant** Turn-around & Shutdown, **Pumps & Compressors** Troubleshooting, **Fired Heaters & Air Coolers** Maintenance, **Pressure Vessels & Valves** Repair, **Polymers**, **Plastics**, **Polyolefin** & **Catalysts**, **Polymerization**, **Thermal Analysis Techniques**, **Rheology**, **Thermoplastics**, **Thermosets**, **Coating Systems** and **Fibre Reinforced Polymer Matrix Composites**. Further, he is also well-versed in **Water Hydraulic Modelling**, **Efficient** Shutdowns, Turnaround & Outages, **Pump** Selection and Installation, Operation and Maintenance of **Pumps**, **Demand & Supply** Management, **Catalyst Manufacturing Techniques**, **Fuel Systems Management**, **Aviation Fuel**, **Diesel**, **Jet Fuel**, **Petrol** and **IP Octane**, **Cetane Control** and related Logistics, Road, Rail and Pipeline Distribution, **Process Design** and **Optimisation**, **Boiler Feed Water Preparation**, **Flocculation Sedimentation**, **Hot Lime Water Softening Processes**, **Desalination Processes**, **Reverse Osmosis**, **Molecular Sieves**, activated **Sludge Aerobic/Anaerobic**, **Sludge Removal** and **Incineration Process Control**, **Domestic Sewage Plants Optimisation**, **Process Cooling Water System**, **High Pressure** and **Low Pressure Tank Farm Management**, **Hydrocarbon** and **Chemical products** and **GTL** (**Gas to Liquids**).

During his career life, Mr. Beer holds significant key positions such as the **Director**, **Global Commissioning Manager**, **Process Engineering Manager**, **Senior Business Analyst**, **Process Engineer**, **Chemical Engineer**, **Senior Technician**, **Technical Sales Engineer**, **Entrepreneur**, **Financial Consultant**, **Business Analyst**, **Business Financial Planner** and **Independent Financial Planner** to various international companies such as the **Sasol**, **SASOLChem**, **TAG Solvents**, **Virgin Solvent Products**, **SARS** & **SAPIA** (**South African Petroleum Industry Association**) and **RFS Financial Services** (**Pty**) **Ltd**.

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 – 0845	***Optimization Fundamentals***
0845 – 0900	***Definitions & Basic Optimization Tools***
0900 – 0930	***Breakeven Analysis***
0930 – 0945	*Break*
0945 – 1000	***Graphical Solutions***
1000 – 1030	***Numerical Methods***
1030 – 1100	***Incremental Method***
1100 – 1130	***Linear Programming (LP)***
1130 – 1200	***Quadratic Programming (QP)***
1200 – 1230	***Non-Linear Optimization Techniques***
1230 – 1245	*Break*
1245 – 1300	***Global & Local Optima***
1300 – 1315	***Optimizing the Design***
1315 – 1330	***Maximizing NP***
1330 – 1345	***Configuration Optimization***
1345 – 1400	***Integer Programming (IP)***
1400 – 1415	***Capacity Creep***
1415 – 1420	***Plant Debottlenecking***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Optimizing Operations Planning***
0800 – 0830	***Linear Programs (LP) & Non-Linear Models***
0830 – 0900	***Optimizing Unit Performance***
0900 – 0930	***Scheduling***
0930 – 0945	*Break*
0945 – 1015	***Optimizing Process Operations***
1015 – 1045	***Key Parameters for Optimization***
1045 – 1115	***Crude Unit Cut Points***
1115 – 1200	***Reformer Severity***
1200 – 1215	*Break*
1215 – 1245	***FCC Conversion***
1245 – 1315	***Other Key Parameters***
1315 – 1345	***Integrating Unit Performance***
1345 – 1420	***Utilities***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0815	***Process Controls***
0815 – 0900	***Analogue Controls versus Digital Controls***
0900 – 0930	***Feed-back & Feed-forward Controls***
0930 – 0945	*Break*
0945 – 1030	***DCS (Distributed Control Systems) & Advanced Controls***
1030 – 1115	***Process Analyzers***
1115 – 1200	***Off-line Optimization***
1200 – 1230	***Real Time Online Optimization***
1230 – 1245	*Break*
1245 – 1315	***Multivariable Process Control & Inferential Controls***
1315 – 1345	***Dynamic versus Steady-State***
1345 – 1420	***Statistical Process Control***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0800	***Optimizing Reliability***
0800 – 0830	***Root Cause Failure Analysis***
0830 – 0900	***Logic Diagrams & Fault Trees***
0900 – 0930	***Turnaround Planning***
0930 – 0945	*Break*
0945 – 1015	***Materials Inventory Management***
1015 – 1100	***Management & Enterprise Information Systems***
1100 – 1130	***Risk Management & Optimization***
1130 – 1200	***Optimizing Offsites Operations***
1200 – 1215	*Break*
1215 – 1245	***Offsites Design***
1245 – 1315	***Storage Facilities Operation***
1315 – 1345	***Utilities Management***
1345 – 1415	***Inventory Management***
1415 – 1420	***Blending Optimization***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0815	***Continuous Improvement***
0815 – 0900	***Lean Manufacturing***
0900 – 0915	*Break*
0915 – 1000	***Kaisan & Six Sigma***
1000 – 1045	***Benchmarking & Best Practices***
1045 – 1130	***Plant Optimization versus Supply Chain Optimization***
1130 – 1200	***Elements in Supply Chain***
1200 – 1215	*Break*
1215 – 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*

Practical Sessions

This practical and highly-interactive course includes the following real-life case studies and exercises:-



Course Coordinator

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