COURSE OVERVIEW PE0429
Process Upsets, Troubleshooting & Optimisation

Course Title
Process Upsets, Troubleshooting & Optimisation

Course Date/Venue
September 08-12, 2024/Boardroom Meeting Room, Brand Hotel Amrath, Amsterdam, Netherlands

Course Reference
PE0429

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.

This course is designed to provide participants with a detailed and up-to-date overview of Process Upsets, Troubleshooting and Optimisation. It covers the types, common causes and examples of process upsets in various industries; the impact of process upsets covering safety implications, environmental impact and economic consequences; the systematic approach to problem-solving, effective data collection and data analysis; identifying the common issues with pumps, compressors and heat exchangers; the diagnostic techniques and tools, control loops and instrumentation; and diagnosing control system issues.

Further, the course will also discuss the common issues in chemical reactions and separation processes; diagnosing chemical process issues; the root cause analysis (RCA) and fault tree analysis (FTA); the impact of human error on process upsets and various strategies to mitigate human error; the process optimization, cost-benefit analysis, economic optimization and techniques for optimizing energy use in processes; and the Six Sigma methodology, Lean principles and their application to process optimization.

During this interactive course, participants will learn the statistical process control (SPC), design of experiments (DOE) and optimization of chemical reactions; the heat integration, energy recovery and reuse, process intensification and sustainability in process optimization; developing an integrated troubleshooting and optimization plan; identifying and managing risks and developing contingency plans for process upsets; the strategies for successful implementation, monitoring and measuring improvements and the tools and techniques for maintaining process gains; the importance of teamwork in troubleshooting and optimization; and effective communication strategies.

Course Objectives

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

- Apply and gain an in-depth knowledge on process upsets, troubleshooting and optimization
- Identify the types of process upsets including the common causes and examples of process upsets in various industries
- Discuss the impact of process upsets covering safety implications, environmental impact and economic consequences
- Carryout systematic approach to problem-solving, effective data collection and data analysis
- Identify the common issues with pumps, compressors and heat exchangers and the diagnostic techniques and tools
- Discuss control loops and instrumentation, diagnose control system issues and identify the common issues in chemical reactions and separation processes
- Diagnose chemical process issues and apply root cause analysis (RCA) and fault tree analysis (FTA)
- Discuss the impact of human error on process upsets and various strategies to mitigate human error
- Apply process optimization, cost-benefit analysis, economic optimization and techniques for optimizing energy use in processes
- Explain Six Sigma methodology and Lean principles and their application to process optimization
- Recognize statistical process control (SPC), design of experiments (DOE) and optimization of chemical reactions
- Apply heat integration, energy recovery and reuse, process intensification and sustainability in process optimization
- Develop an integrated troubleshooting and optimization plan, identify and manage risks and develop contingency plans for process upsets
- Employ strategies for successful implementation, monitor and measure improvements and identify the tools and techniques for maintaining process gains
- Discuss the importance of teamwork in troubleshooting and optimization and apply effective communication strategies

Who Should Attend
This course provides an overview of all significant aspects and considerations of process upsets, troubleshooting and optimization for managers, leaders, section heads, superintendents, supervisors, process engineers, production engineers, plant engineers and planning engineers.

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 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. John Petrus, PhD, MSc, BSc, is a **Senior Process Engineer** with over **30 years** of **onshore & offshore** experience within the **Oil & Gas**, **Refinery** and **Petroleum** industries. His wide experience covers in the areas of **De-Sulfurization** Technology, **Process Troubleshooting**, **Distillation Towers**, **Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation**, **Distillation Column** Operation & Control, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, Applied **Process Engineering** Elements, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & Plant Upset, **Process Plant** Start-up & Commissioning, **Clean Fuel** Technology & Standards, Flare, Blowdown & Pressure Relief Systems, **Oil & Gas Field Commissioning** Techniques, **Pressure Vessel** Operation, **Gas Processing**, **Chemical** Engineering, **Process Reactors** Start-Up & Shutdown, **Gasoline Blending** for Refineries, **Urea Manufacturing** Process Technology, Continuous Catalytic Reformer (**CCR**), Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting. Further he is also well versed in **Rotating Machinery** Principles & Applications, **Rotating Equipment** Selection, Operation, Maintenance, Inspection & Troubleshooting, **Rotating Machine/Equipment** in Industry, **Control Valves & Actuators**, **PSV** Maintenance & Testing, **Pump Selection**, Installation, Performance & Control, **Screw Compressor** Theory and Troubleshooting, **Reliability-Centered Maintenance** (**RCM**), **Preventive & Predictive Maintenance**, **Spare Parts Planning & Inventory** Management, Computerized Maintenance Management Systems (**CMMS**), **Process Plant Shutdown & Turnaround**, **Maintenance Optimization** & Best Practices, **Reliability Centered Maintenance** Principles & Application, Efficient Shutdowns, Turnaround & Outages, Effective Reliability Maintenance & Superior Maintenance Strategies, **Integrity & Asset** Management, **Total Plant Reliability** Maintenance, **Vibration** Measurement, **Advanced Analytics** in Oil & Gas, **Business Intelligence Data Analytics**, Audit Analytics & Computer-Assisted Audit Techniques (**CAATs**), **Basic Database** Concepts & Data Formats, **Data Analysis** Cycle & Best Practices, **Data Importing & Integrity** Verification, **Advanced Analytics Tools** in **Auditing**, Leveraging **AI & Machine Learning** in **Audits**, **Data Mining Techniques** for Auditors, **Data Analytics** for Managerial Decision Making, **Business Process Analysis**, Mapping & Modeling, **Research Methods & Analysis**, **Statistical Data Needs Analysis**, Oil & Gas Industry **Business Environment & Competitive Intelligence Gathering & Analysis**, Petroleum **Economics & Risk Analysis**, Certified **Data Analysis**, **Risk Management** & SWIFT Analysis, Best Practices Management System (**BPMS**), **GIS System** Management, **Database** Management, Strategic Planning, Best Practices and Workflow, **Quality** Management, **Project** Management and **Risk Assessment** & Uncertainty Evaluation. Further, he is also well-versed in **seismic interpretation**, **mapping** & **reservoir modelling tools** like **Petrel** software, **LandMark**, **Seisworks**, **Geoframe**, **Zmap** and has extensive knowledge in MSDos, Unix, **AutoCAD**, MAP, Overlay, Quicksurf, 3DStudio, **Esri ArcGIS**, Visual Lisp, Fortran-77 and Clipper. Moreover, he is a world **expert** in **analysis** and **modelling** of **fractured prospects** and **reservoirs** and a **specialist** and **developer** of **fracture modelling software tools** such as FPDM, FMX and DMX Protocols.

During his career life, Dr. Petrus held significant positions and dedication as the **Executive Director**, **Senior Geoscience Advisor**, **Exploration Manager**, **Project Manager**, **Manager**, **Process Engineer**, **Mechanical Engineer**, **Maintenance Engineer**, **Chief Geologist**, **Chief** of **Exploration**, **Chief** of **Geoscience**, **Senior Geosciences Engineer**, **Senior Explorationist**, **Senior Geologist**, **Geologist**, **Senior Geoscientist**, **Geomodeller**, **Geoscientist**, **CPR Editor**, **Resources Auditor**, **Project Leader**, **Technical Leader**, **Team Leader**, **Scientific Researcher** and **Senior Instructor/Trainer** from various international companies and universities such as the Dragon Oil Holding Plc., ENOC, MENA, ENI Group of Companies, Ocre Geoscience Services (OGS), Burren RPL, Ministry of Oil-Iraq, Eni Corporate University, Standford University, European Universities, European Research Institutes, NorskHydro Oil Company, Oil E&P Companies, just to name a few.

Dr. Petrus has a **PhD** in **Geology** and **Tectonophysics** and **Master** and **Bachelor** degrees in **Earth Sciences** from the **Utrecht University**, **The Netherlands**. Further, he is a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor/Internal Verifier** by the **Institute of Leadership & Management** (**ILM**), a Secretary and Treasurer of Board of Directors of Multicultural Centre, Association Steunfonds SSH/SSR and Founding Member of Sfera Association. He has further published several scientific publications, journals, research papers and books and 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 Fee

US$ 12,500 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

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

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: **Sunday, 08th of September, 2024**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	**PRE-TEST**
0830 – 0930	**Introduction to Process Upsets & Troubleshooting**
0930 – 0945	Break
0945 – 1030	**Fundamentals of Process Upsets** Definition & Types of Process Upsets • Common Causes & Examples of Process Upsets in Various Industries
1030 – 1130	**Impact of Process Upsets** Safety Implications • Environmental Impact • Economic Consequences
1130 – 1215	**Troubleshooting** Basic Principles of Troubleshooting • Systematic Approach to Problem-Solving
1215 – 1230	Break
1230 – 1330	**Data Collection & Analysis** Importance of Data in Troubleshooting • Techniques for Effective Data Collection • Tools for Data Analysis (e.g., Statistical Methods, Root Cause Analysis)
1330 – 1420	**Case Studies: Real-World Examples of Process Upsets** Analysis of Past Incidents • Lessons Learned & Best Practices
1420 – 1430	**Recap** Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Monday, 09th of September, 2024

0730 – 0830	***Troubleshooting Process Equipment*** *Identifying Common Issues with Pumps, Compressors, & Heat Exchangers • Diagnostic Techniques & Tools*
0830 – 0930	***Troubleshooting Process Control Systems*** *Understanding Control Loops & Instrumentation • Techniques for Diagnosing Control System Issues*
0930 – 0945	*Break*
0945 – 1100	***Troubleshooting Chemical Processes*** *Common Issues in Chemical Reactions & Separation Processes • Techniques for Diagnosing Chemical Process Issues*
1100 – 1215	***Root Cause Analysis (RCA)*** *Introduction to RCA Methodologies (e.g., Fishbone Diagram, 5 Whys) • Practical Application of RCA*
1215 – 1230	*Break*
1230 – 1330	***Fault Tree Analysis (FTA)*** *Understanding FTA & Its Applications • Building & Analyzing Fault Trees*
1330 – 1420	***Human Factors in Troubleshooting*** *Impact of Human Error on Process Upsets • Strategies to Mitigate Human Error*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 10th of September, 2024

0730 – 0830	***Process Optimization*** *Definition & Objectives of Process Optimization • Key Concepts & Principles*
0830 – 0930	***Economic Optimization*** *Understanding Cost-Benefit Analysis • Techniques for Economic Optimization (e.g., Break-Even Analysis, Marginal Cost Analysis)*
0930 – 0945	*Break*
0945 – 1100	***Energy Optimization*** *Importance of Energy Efficiency • Techniques for Optimizing Energy Use in Processes*
1100 – 1230	***Six Sigma & Lean Principles*** *Overview of Six Sigma Methodology • Lean Principles & their Application to Process Optimization*
1230 - 1245	*Break*
1245 – 1420	***Case Studies: Successful Process Optimization Projects*** *Review of Real-World Optimization Projects • Analysis of Strategies & Outcomes*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 11th of September, 2024

0730 – 0830	***Statistical Process Control (SPC)*** *Introduction to SPC & Control Charts • Application of SPC in Process Optimization*
0830 – 0930	***Design of Experiments (DOE)*** *Understanding DOE Methodology • Application of DOE for Process Optimization*
0930 – 0945	*Break*
0945 – 1100	***Optimization of Chemical Reactions*** *Techniques for Optimizing Reaction Conditions • Catalysts & their Role in Process Optimization*
1100 – 1215	***Heat Integration & Energy Recovery*** *Principles of Heat Integration • Techniques for Energy Recovery & Reuse*
1215 – 1230	*Break*
1230 – 1330	***Process Intensification*** *Introduction to Process Intensification • Techniques & Technologies for Intensifying Processes*
1330 – 1420	***Sustainability & Green Chemistry*** *Principles of Sustainability in Process Optimization • Application of Green Chemistry Principles*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: Thursday, 12th of September, 2024

0730 – 0830	***Developing an Integrated Troubleshooting & Optimization Plan*** *Combining Troubleshooting & Optimization Techniques • Steps to Develop a Comprehensive Plan*
0830 – 0930	***Risk Management & Contingency Planning*** *Identifying & Managing Risks • Developing Contingency Plans for Process Upsets*
0930 – 0945	*Break*
0945 – 1100	***Implementing Process Improvements*** *Strategies for Successful Implementation • Monitoring & Measuring Improvements*
1100 – 1230	***Continuous Improvement*** *Principles of Continuous Improvement • Tools & Techniques for Maintaining Process Gains*
1230 – 1245	*Break*
1245 – 1345	***Team Collaboration & Communication*** *Importance of Teamwork in Troubleshooting & Optimization • Effective Communication Strategies*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org