COURSE OVERVIEW PE0140
Surface Facilities Operations & Process

Course Title
Surface Facilities Operations & Process

Course Reference
PE0140

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

Course Date/Venue

Session(s)	Date	Venue
1	August 11-15, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	November 04-08, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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 covers the basic concepts and techniques necessary to design, specify and manage oil and gas field production facilities. It provides a clear understanding of the equipment and processes used in common separation and oil and water treating systems as well as the selection of piping and pumping systems.

The course will cover gas dehydration, gas processing and the selection of compressor system. The gathering, separation and final treatment systems for crude oil and natural gas, before transport to refinery is discussed. The concepts of export quality crude oil and natural gas, field and fiscal measurements error is explained. Hydrocarbon reconciliation and allocation of produced fluids to the contributing reservoirs are explained. Exercises are used to cement the learning of the various topics treated.

This course will enable participant to develop a “feel” for the important parameters of designing and operating a production facility. The participant will understand the uncertainties and assumptions inherent in designing and using the equipment in these systems and the limitations, advantages and disadvantages associated with their use.

Course Objectives

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

- Apply and gain an in-depth knowledge on surface production operations within oil and gas field production facilities
- Enumerate the different types and functions of a petroleum production facility and how to make equipment work
- Implement the proper methodology of choosing a process that would be applicable to the system and identify the system configuration
- Describe the basic principles of fluid properties, its flash calculations and characterization as well as the principles of pressure drop in piping and calculate fluid flow equations
- Discuss the factors affecting two-phase oil and gas separation including equipment description, difference between horizontal and vertical vessel selection, identify potential operating problems and cite examples
- Explain and demonstrate the process of oil and water separation and gas dehydration including the equipments used in each process
- Explain crude oil treating systems through the emulsion treating theory, gravity separation, treating equipment and equipment sizing and theory
- Employ the theory of produced-water treating systems through listing the information required for design and implementing the equipment selection procedure with its specification by taking into consideration the criteria of measurement
- Identify the different classification of pumps, principles, selection criteria, installation and specific speed in accordance with related codes and standards
- Apply the proper methodology of gas processing including absorption and refrigeration
- Enumerate the different types of compressors and explain the components, sizing and process consideration of each type
- Employ the role of optimization and its practical application in the upstream industry

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course covers systematic techniques and methodologies on surface production operations in oil and gas field production facilities for newly engaged production engineers, process engineers, facility engineers and petroleum engineers. It is also suitable for technical and operations staff from other disciplines, who require a cross-training to or a basic understanding of the surface production operation in oil and gas fields. Further, this course is suitable for all technical and operational staff who are working in onshore and offshore oil/gas fields.

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$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Instructor

This course will be conducted by the following instructor. However, we have the right to change the course instructor prior to the course date and inform participants accordingly:

Mr. Mervyn Frampton is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Utilities** industries. His expertise lies extensively in the areas of **Fluid Properties**, **Oil & Water Separation**, **Crude Oil Treatment**, **Gas Dehydration**, **Gas Processing**, **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**), **De-Sulfurization** Technology, Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting, **Hazardous Waste Management & Pollution Prevention**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Energy Conservation** Skills, **Catalyst Technology**, **Refinery & Process Industry**, **Chemical Analysis**, **Process Plant**, **Commissioning & Start-Up**, **Alkylation**, **Hydrogenation**, **Dehydrogenation**, **Isomerization**, **Hydrocracking & De-Alkylation**, **Fluidized Catalytic Cracking**, **Catalytic Hydrodesulphuriser**, **Kerosene Hydrotreater**, **Thermal Cracker**, **Catalytic Reforming**, **Polymerization**, **Polyethylene**, **Polypropylene**, Pilot Water Treatment Plant, **Gas Cooling**, **Cooling Water Systems**, Effluent Systems, Material Handling Systems, **Gasifier**, **Gasification**, Coal Feeder System, **Sulphur Extraction Plant**, **Crude Distillation Unit**, **Acid Plant Revamp** and **Crude Pumping**. Further, he is also well-versed in HSE Leadership, Project and Programme Management, Project Coordination, Project Cost & Schedule Monitoring, Control & Analysis, Team Building, Relationship Management, Quality Management, Performance Reporting, Project Change Control, Commercial Awareness and Risk Management.

During his career life, Mr. Frampton held significant positions as the **Site Engineering Manager**, **Senior Project Manager**, **Process Engineering Manager**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project Engineer**, **Process Engineer**, **Project Engineer**, **Assistant Project Manager**, **Handover Coordinator** and **Engineering Coordinator** from various international companies such as the **Fluor Daniel**, **KBR** South Africa, **ESKOM**, MEGAWATT PARK, CHEMEPIC, PDPS, CAKASA, **Worley Parsons**, Lurgi South Africa, **Sasol**, **Foster Wheeler**, **Bosch** & **Associates**, **BCG** Engineering Contractors, Fina Refinery, Sapref Refinery, Secunda Engine Refinery just to name a few.

Mr. Frampton has a **Bachelor's degree** in **Industrial Chemistry** from **The City University** in **London**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, conferences and seminars 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.

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 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	***The Petroleum Production Facility*** *Facility Description ● Making the Equipment Work ● Facility Types*
0930 – 0945	*Break*
0945 – 1100	***Choosing a Process*** *Process Selection ● Controlling the Process*
1100 – 1230	***Choosing a Process (cont'd)*** *Basic System Configuration ● Well Testing ● Gas Lift ● Offshore Platform Considerations*
1230 – 1245	*Break*
1245 – 1330	***Fluid Properties*** *Basic Principles ● Flash Calculations ● Characterizing the Flow Stream ● Approximate Flash Calculations ● Other Properties*
1330 – 1420	***Project Assignment***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***Two-Phase Oil & Gas Separation*** *Factors Affecting Separation ● Equipment Description ● Horizontal vs. Vertical Vessel Selection ● Vessel Internals*
0900 – 0915	*Break*
0915 – 1045	***Two-Phase Oil & Gas Separation (cont'd)*** *Potential Operating Problems ● Theory ● Separator Sizing ● Examples*
1045 – 1200	***Oil & Water Separation*** *Equipment Description ● Vessel Internals ● Emulsions*

1200 – 1215	*Break*
1215 – 1330	***Oil & Water Separation (cont'd)*** *Theory ● Separator Sizing ● Examples*
1330 – 1420	***Project Assignment***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0900	***Crude Oil Treating Systems*** *Emulsion Treating Theory ● Gravity Separation ● Treating Equipment ● Equipment Sizing & Theory ● Design Procedure ● Examples*
0900 – 0915	*Break*
0915 – 1045	***Produced-Water Treating Systems*** *System Description ● Theory ● Treating Equipment*
1045 – 1215	***Produced-Water Treating Systems (cont'd)*** *Drain Systems ● Information Required for Design ● Influent Water Quality ● Equipment Selection Procedure ● Equipment Specification ● Examples: Design the Produced-Water Treating System for the Data Given*
1215 – 1230	*Break*
1230 – 1330	***Pressure Drop in Piping*** *Basic Principles ● Fluid Flow Equations ● Head Loss in Valves & Pipe Fittings ● Example Pressure Drop Calculations*
1330 – 1420	***Project Assignment***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0900	***Choosing a Line Size & Wall Thickness*** *Line Size Criteria ● Wall Thickness Criteria ● Pressure Rating Classes ● Examples*
0900 – 0915	*Break*
0915 – 1100	***Pumps*** *Pump Classification ● Centrifugal Pumps ● Reciprocating Pumps ● Diaphragm Pumps ● Rotary Pumps ● Multiphase Pumps ● Basic Principles ● Basic Selection Criteria*
1100 – 1215	***Centrifugal Pumps*** *Multiples Pump Installations ● Pump Specific Speed ● Codes and Standards ● Generic Types of Centrifugal Pumps ● Bearings, Seals & Wear Rings ● Installation Considerations*
1215 – 1230	*Break*
1230 – 1330	***Reciprocating Pumps*** *Controlling Pulsating Flow ● Bearings, Valves and Packing ● Codes and Standards ● Piping Hookup ● Operation*
1330 – 1420	***Project Assignment***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0900	***Gas Dehydration*** *Water Content Determination ● Glycol Dehydration ● Glycol Dehydration Example ● Solid Bed Dehydration ● Dry Desiccant Design Example*
0900 – 0915	*Break*
0915 – 1045	***Gas Processing*** *Absorption/Lean Oil ● Refrigeration ● Choice of Process*
1045 – 1200	***Compressors*** *Types of Compressors ● Specifying a Compressor ● Reciprocating Compressors-Process Considerations ● Centrifugal Compressors – Surge Control and Stonewalling ● Centrifugal Compressors Process Considerations*
1200 – 1215	*Break*
1215 – 1300	***Reciprocating Compressors*** *Components ● Cylinder Sizing ● Rod Load ● Cooling and Lubrication Systems ● Pipe Sizing Considerations ● Example Problem*
1300 - 1345	***Optimization in Upstream Industry***
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 real-life case studies and exercises:-

Course Coordinator

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