



COURSE OVERVIEW PE0221

Operation of Process Equipment

Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Crude Desalter, Pressure Vessels & Valves

Course Title

Operation of Process Equipment: *Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Crude Desalter, Pressure Vessels & Valves*

Course Date/Venue

August 11-15, 2024/Safir Meeting Room, Divan Istanbul Sisli, Istanbul, Turkey

Course Reference

PE0221

Course Duration/Credits

Five days/3.0 CEUs/30 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.

The course is designed to provide delegates with a detailed and up-to-date overview on the operation of the hydrocarbon process equipment that includes fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves.



It covers the characteristics of crude oil and function of chemicals used in the process such as composition of petroleum, hydrocarbon properties, salt concentration and emulsions.

At the completion of the course, participants will be able to apply oil treating; dehydration and desalting; process and equipment operations; and employ the sequence of desalter plant start-up.



The course will also cover the different types and function of direct fired heaters; safety aspects; air coolers; heat exchangers; pumps; compressors; process vessels; valves; and troubleshooting of different equipment and processes.



Course Objectives

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

- Apply proper techniques and procedures on the operation of the hydrocarbon process equipment such as fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves
- Enumerate the characteristics of crude oil and identify the function of chemicals used in the process such as composition of petroleum, hydrocarbon properties, salt concentration and emulsions
- Discuss oil treating, dehydration and desalting including the process and equipment operations
- Employ the sequence of desalter plant start-up and identify the different types and function of direct fired heaters including the safety aspects
- Differentiate the various types of air coolers, heat exchangers, pumps and compressors
- Describe the types and functions of process vessels and valves including the troubleshooting of different equipments and processes

Who Should Attend

This course provides an overview of all operational aspects of the hydrocarbon process equipment for engineers and other technical staff who are involved in the operation and troubleshooting of various process equipment including fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves. The course is also beneficial for design engineers and maintenance staff.

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\$ 6,000 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

In addition to the Course Manual, participants will receive an e-book “*Operator’s Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices*”, published by AuthorHouse.






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.

Accommodation

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





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. Yasser Almasood is a **Senior Process & Petroleum Engineer** with almost **20 years** of industrial experience within the, **Oil & Gas, Refinery and Petrochemical** industries. His wide expertise covers in the areas of **Gas Processing Calculation, Process Reactor Operation & Troubleshooting, Catalytic Reactors, Heat Exchanger, Distillation Columns, Pumps, Distributed Control System (DCS), Catalytic Reformer Unit, Polymerization, Dehydrogenation, Gas Processing Plant Operations & Control, Gas Processing Monitoring & Troubleshooting, Process Plant Start-up Commissioning & Troubleshooting, Process Plant Optimization & Energy Conservation, Process Equipment Design & Troubleshooting, Advanced Operation Skills, Refinery Process Yield Optimization, Oil & Gas Processing, Troubleshooting Oil & Gas Processing Facilities, Polymers & Polymerization, Applied Process Engineering, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance & Efficiency, Flare Blowdown & Pressure Relief Systems, Polypropylene Manufacturing, Polyethylene & Process Troubleshooting, Ammonia, Ethylene, Solvents, Gas Feed, EDC, VCM, PP, PVC, Chlorine, Fluidized Bed Reactor, Oil Movement & Storage, Power Plant Chemistry, Catalyst Manufacturing Techniques, Fuel Systems Management, Process Design & Optimization, Desalination Processes, Reverse Osmosis and Molecular Sieves**. Further, he is also well-versed in **HAZOP, Advanced Process Hazard Analysis, Safety Management, Environmental Safety Management, LOPA & SIL, Process Safety Management (PSM), Incident investigation & Root Cause Analysis, Emergency & Crisis Management, Safety Audit & Site, Inspection, Inspection of Fire Equipment & Tools, Fire Protection & Prevention, Worker Protection from Radiation Work Permits, IGC International General Certificate in Occupational Safety & Health, Risk Assessment, Risk Associated with Low Level Radiation Exposure, Hydrogen Sulfide (H₂S) Safety, Personal Protective Equipment, Lock-Out & Tag-Out, OSHA Occupational Safety & Health, Radiation & Contamination, Scientific Notation, Exposure Rate & Shielding Calculations, Excavations & Trenching, Permit-to-Work, Aspentech, Aspen HYSYS, Pro II, exSILentia, OLGA, Flare System Analyzer, Aspen PIMS, DYN SIM, RiskWISE, MS Office and IBM Maximo**.

During his career life, Mr. Yasser has gained his practical and field experience through his various significant positions and dedication as the **Senior Process Engineer, Process Engineer, Oil & Gas Process & Safety Instructor, On-Job Instructor, Process Senior Operator, Acting DCS Operator** and **Shift Controller** for various multi-national companies such as the **ADNOC Gas Processing (GASCO), Conoco Phillips Gas Plant** and **Syrian Gas Company (SGC)**.

Mr. Yasser has a **Bachelor's** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and has further delivered numerous training, courses, workshops, seminars and conferences worldwide.



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: Sunday, 11th of August 2024

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|-------------|---|
| 0730 – 0800 | Registration & Coffee |
| 0800 – 0815 | Welcome & Introduction |
| 0815 – 0830 | PRE-TEST |
| 0830 – 0930 | Characteristics of Crude Oil Composition of Petroleum • Hydrocarbon Gases Properties |
| 0930 – 0945 | Break |
| 0945 – 1100 | Characteristics of Crude Oil (cont'd) Salts Concentration • Emulsions • Function of Chemicals Used in the Process |
| 1100 – 1230 | Oil Treating, Dehydration & Desalting Emulsion Formation & Breaking • Vertical & Horizontal Theater Operation • Electrostatic Theatre Design/Operation • The Desalting Process/Equipment • Emulsion Treating |
| 1230 – 1245 | Break |
| 1245 – 1420 | Oil Treating, Dehydration & Desalting (cont'd) Separators – Free Water Knockout • Hetear Theatres – Other Treating Methods • Chemical – Electrical – Crude Oil Coolers (Heat Exchangers) • Control Valves Principles • Pumps Operation • Air Compressor Operation |
| 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, 12th of August 2024

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|-------------|---|
| 0730 – 0930 | Sequence of Desalter Plant Start-up |
| 0930 – 0945 | Break |
| 0945 – 1100 | Sequence of Desalter Plant Start-up (cont'd) |
| 1100 – 1230 | Direct-Fired Heaters Design Considerations – Process & Combustion |
| 1230 – 1245 | Break |
| 1245 – 1420 | Direct-Fired Heaters (cont'd) Control System |
| 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, 13th of August 2024

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|-------------|---|
| 0730 – 0930 | Air Coolers Types – Forced and Induced Air • Key Operational Considerations |
| 0930 – 0945 | Break |
| 0945 – 1100 | Air Coolers (cont'd) Air vs Water Cooling • Troubleshooting |





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|-------------|---|
| 1100 – 1230 | Heat Exchangers Types • Shell-and-Tube |
| 1230 – 1245 | Break |
| 1245 – 1420 | Heat Exchangers (cont'd) Heat Transfer Relation |
| 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 Three |

Day 4: Wednesday, 14th of August 2024

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|-------------|--|
| 0730 – 0930 | Pumps Development of Static and Dynamic Head in the Operating Volume of Pumps for Efficiency and Control Operation • The Affinity Laws as Tools for Efficient Operation • Pump Auxiliaries |
| 0930 – 0945 | Break |
| 0945 – 1100 | Pumps (cont'd) Wear Components • Canned Motor and Magnetic Drive Pumps • High Speed/Low Flow Pumps • Servicing and Condition Monitoring |
| 1100 – 1230 | Compressors Types, Styles and Configurations of Centrifugal and Axial Compressors • Construction Features • Mode of Operation |
| 1230 – 1245 | Break |
| 1245 – 1420 | Compressors (cont'd) Compressor Auxiliaries and Support Systems • Analyse Operating Curves for Surge, Stall and Choke • Define Appropriate Equipment for Safe Operation |
| 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 Four |

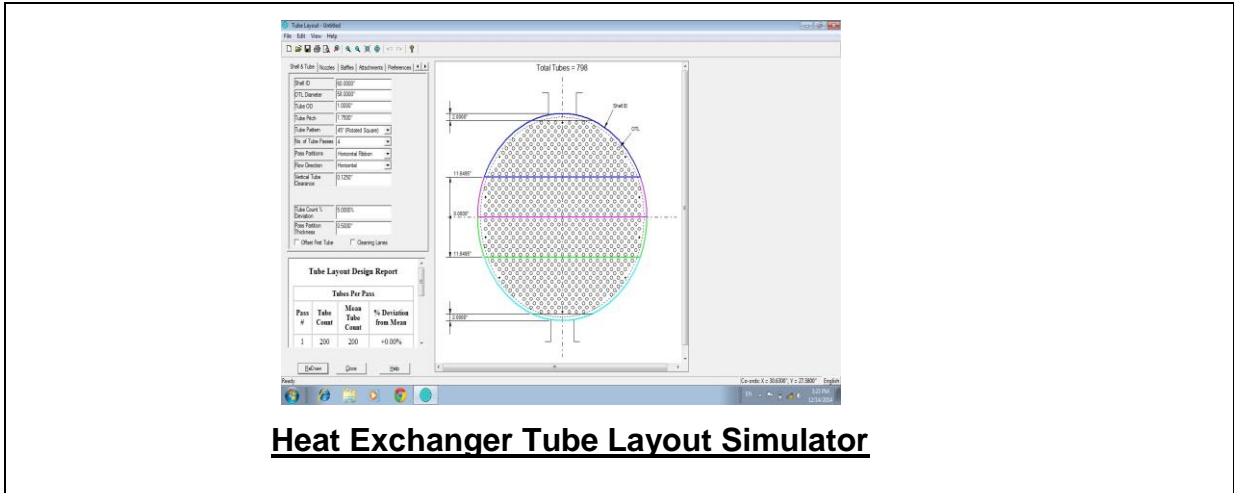
Day 5: Thursday, 15th of August 2024

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|-------------|---|
| 0730 – 0930 | Process Vessels Types and Functions • Safety Aspects |
| 0930 – 0945 | Break |
| 0945 – 1100 | Valves Valve Theory • Valve Types • Applications • Function • Operation • Troubleshooting |
| 1100 – 1230 | Troubleshooting of Different Equipment & Processes |
| 1230 – 1245 | Break |
| 1245 – 1345 | Troubleshooting of Different Equipment & Processes (cont'd) |
| 1345 – 1400 | Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course |
| 1400 – 1415 | POST-TEST |
| 1415 – 1430 | Presentation of Course Certificates |
| 1430 | Lunch & End of Course |

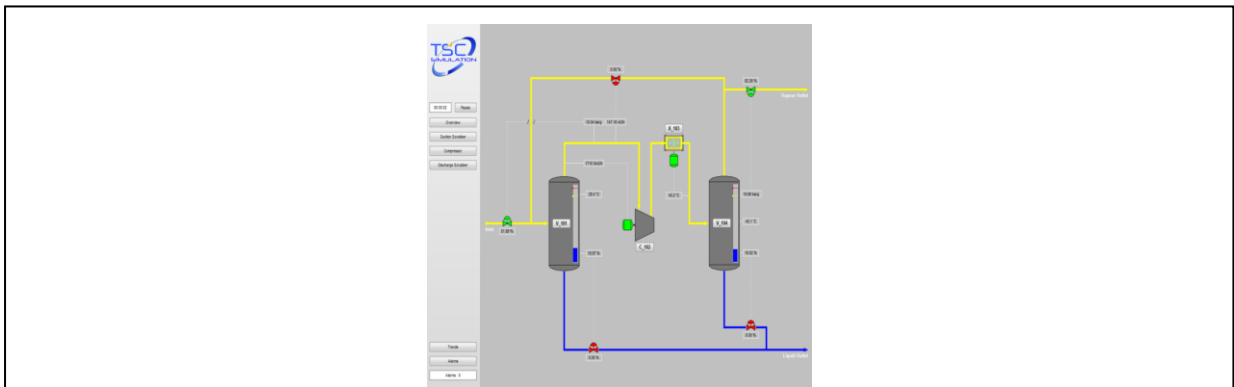


Simulator (Hands-on Practical Sessions)

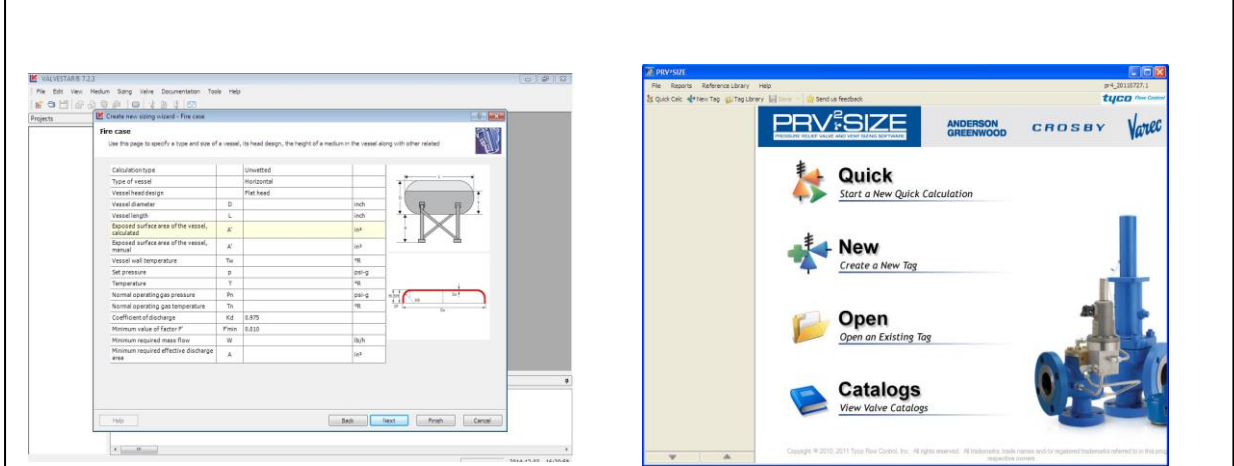
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators “Heat Exchanger Tube Layout”, “SIM 3300 Centrifugal Compressor”, “Valvestar 7.2 Simulator”, “PRV²SIZE Simulator”, and “ASPEN HYSYS V12.1” simulator.



Heat Exchanger Tube Layout Simulator

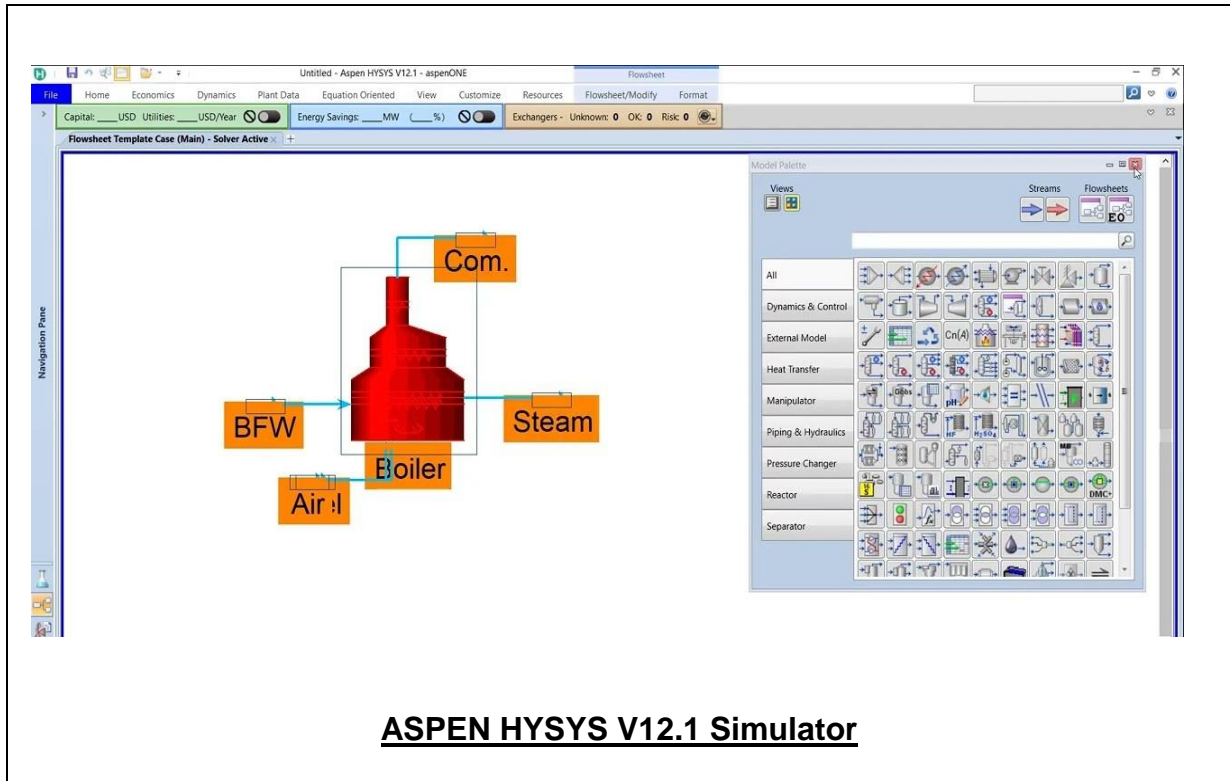


SIM 3300 Centrifugal Compressor Simulator



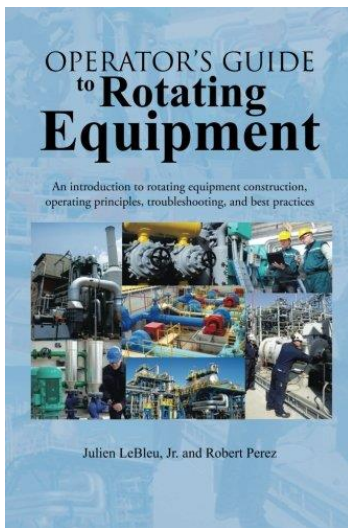
Valvestar 7.2 Simulator

PRV²SIZE Simulator



Book(s)

As part of the course kit, the following e-book will be given to all participants:



Title : Operator's Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices

ISBN : 978-1-49690-868-1

Authors : Julien LeBleu
Robert Perez

Publisher : Author House

Course Coordinator

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