COURSE OVERVIEW PE0498
Advanced Oil and Gas Processing Technologies

Course Title
Advanced Oil and Gas Processing Technologies

Course Date/Venue
September 27-October 01, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE or Online Virtual Training

Course Reference
PE0498

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.

This course is designed to provide participants with a detailed and up-to-date overview of Advanced Oil and Gas Processing Technologies. It covers the oil and gas processing plants, separation technologies and gas processing technologies; the crude oil treatment systems, produced water treatment and processing equipment performance monitoring; the heat exchangers and thermal systems, compressors and pumps in processing plants and distillation and fractionation systems; and the membrane and advanced separation processes, catalytic processing units and equipment integrity monitoring.

During this interactive course, participants will learn the instrumentation in processing plants, distributed control systems (DCS) and SCADA and remote monitoring; the advanced process control (APC), data analytics and AI in monitoring and reliability engineering in processing plants; the process safety management (PSM), maintenance strategies for equipment and energy efficiency and optimization; the environmental control technologies and plant performance optimization; troubleshooting processing systems, turnaround and shutdown management, real-time operational monitoring and integration with upstream and downstream systems; and the future technologies in oil and gas processing.

Course Objectives

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

- Apply and gain an advanced knowledge on oil and gas processing technologies
- Discuss the oil and gas processing plants, separation technologies and gas processing technologies
- Recognize crude oil treatment systems and apply produced water treatment and processing equipment performance monitoring
- Describe heat exchangers and thermal systems, compressors and pumps in processing plants and distillation and fractionation systems
- Identify membrane and advanced separation processes, catalytic processing units and equipment integrity monitoring
- Determine instrumentation in processing plants, distributed control systems (DCS) and SCADA and remote monitoring
- Discuss advanced process control (APC), data analytics and AI in monitoring and reliability engineering in processing plants
- Apply process safety management (PSM), maintenance strategies for equipment and energy efficiency and optimization
- Explain environmental control technologies and carryout plant performance optimization, troubleshooting processing systems and turnaround and shutdown management
- Employ real-time operational monitoring and integration with upstream and downstream systems as well as discuss future technologies in oil and gas processing

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 aspects and considerations of advanced oil and gas processing technologies for process and chemical engineers, operations and production engineers, maintenance and facility engineers, mid- to senior-level engineers and other technical staff.

Accommodation

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

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.

Virtual Training (If Applicable)

If this course is delivered online as a Virtual Training, the following limitations will be applicable:-

Certificates	Only soft copy certificates will be issued to participants through Haward's Portal. This includes Wallet Card Certificates if applicable
Training Materials	Only soft copy Training Materials (PDF format) will be issued to participant through the Virtual Training Platform
Training Methodology	80% of the program will be theory and 20% will be practical sessions, exercises, case studies, simulators or videos
Training Program	The training will be for 4 hours per day starting at 0930 and ending at 1330
H-STK Smart Training Kit	Not Applicable
Hands-on Practical Workshops	Not Applicable
Site Visit	Not Applicable
Simulators	Only software simulators will be used in the virtual courses. Hardware simulators are not applicable and will not be used in Virtual Training

Course Fee

F2F Classroom: **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.

Online Virtual: **US$ 2,750** per Delegate + **VAT**.

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 indepth 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 04th of May 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Oil & Gas Processing Plants*** *Onshore vs Offshore Processing Facilities • Typical Plant Configurations (GOSP, CPF, Refinery, LNG) • Process Flow from Wellhead to Export • Integration with Upstream and Midstream Systems*
0930 – 0945	*Break*
0945 – 1030	***Separation Technologies*** *Two-Phase and Three-Phase Separators • Gravitational, Centrifugal and Cyclonic Separation • Separator Design Parameters • Performance Monitoring Indicators*
1030 – 1130	***Gas Processing Technologies*** *Gas Dehydration (TEG & Molecular Sieve) • Sweetening Processes (Amine Systems) • NGL Recovery Technologies • Acid Gas Removal (H_2S & CO_2 Removal)*
1130 – 1215	***Crude Oil Treatment Systems*** *Electrostatic Desalters • Water Content Reduction • Salt Removal Mechanisms • Emulsion Breaking Techniques*
1215 – 1230	*Break*
1230 – 1330	***Produced Water Treatment*** *Hydrocyclones and Flotation Units • Filtration and Membrane Systems • Reinjection vs Disposal • Environmental Compliance Requirements*
1330 – 1420	***Processing Equipment Performance Monitoring*** *Key Operating Parameters (Pressure, Temperature, Flow) • Efficiency and Throughput Evaluation • Early Fault Detection • Equipment Behavior Trending*
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, 05th of May 2025***

0730 – 0830	***Heat Exchangers & Thermal Systems*** *Shell & Tube, Plate, and Air-Cooled Exchangers • Fouling Mechanisms and Impact • Efficiency Monitoring Techniques • Temperature Control Strategies*
0830 – 0930	***Compressors and Pumps in Processing Plants*** *Centrifugal versus Reciprocating Compressors • Pump Types and Applications • Common Failure Modes • Condition Monitoring Indicators*
0930 – 0945	*Break*
0945 – 1100	***Distillation & Fractionation Systems*** *Atmospheric and Vacuum Distillation • Column Internals and Efficiency • Reflux and Reboiler Systems • Monitoring Column Performance*

1100 – 1215	***Membrane & Advanced Separation Processes*** *Permeation Principles • Polymer and Ceramic Membranes • Advantages Over Traditional Systems • Monitoring Membrane Performance*
1215 – 1230	*Break*
1230 – 1330	***Catalytic Processing Units*** *Reforming, Hydrotreating, Cracking • Catalyst Activity & Deactivation • Regeneration Techniques • Reaction Monitoring & Optimization*
1330 – 1420	***Equipment Integrity Monitoring*** *Vibration Analysis • Thermal Imaging • Acoustic Emission Testing • Oil and Gas Quality Sampling*
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, 06th of May 2025***

0730 – 0830	***Instrumentation in Processing Plants*** *Pressure, Temperature, Flow and Level Sensors • Analyzer Systems (GC, H2S, Water Content) • Sensor Selection Criteria • Calibration and Accuracy*
0830 – 0930	***Distributed Control Systems (DCS)*** *Architecture and Components • Process Control Loops • Human Machine Interface (HMI) • Alarm Management*
0930 – 0945	*Break*
0945 – 1100	***SCADA & Remote Monitoring*** *Data Acquisition Systems • Communication Protocols • Remote Asset Monitoring • Cybersecurity Principles*
1100 – 1215	***Advanced Process Control (APC)*** *Model Predictive Control (MPC) • Multivariable Control Systems • Constraint Optimization • Performance Tuning*
1215 – 1230	*Break*
1230 – 1330	***Digital Twins & Simulation*** *Virtual Plant Models • Real-Time Data Integration • Predictive Behavior Modeling • Use in Maintenance & Optimization*
1330 – 1420	***Data Analytics & AI in Monitoring*** *Predictive Maintenance Using AI • Anomaly Detection • Big Data Trends Analysis • Decision-Support Systems*
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, 07th of May 2025***

0730 – 0830	***Reliability Engineering in Processing Plants*** *Failure Modes Analysis (FMEA) • MTBF and MTTR Calculations • Reliability Modeling • Preventive Strategies*
0830 – 0930	***Process Safety Management (PSM)*** *HAZID & HAZOP Concepts • Layers of Protection (LOPA) • Safety Instrumented Systems (SIS) • Emergency Shutdown Systems*

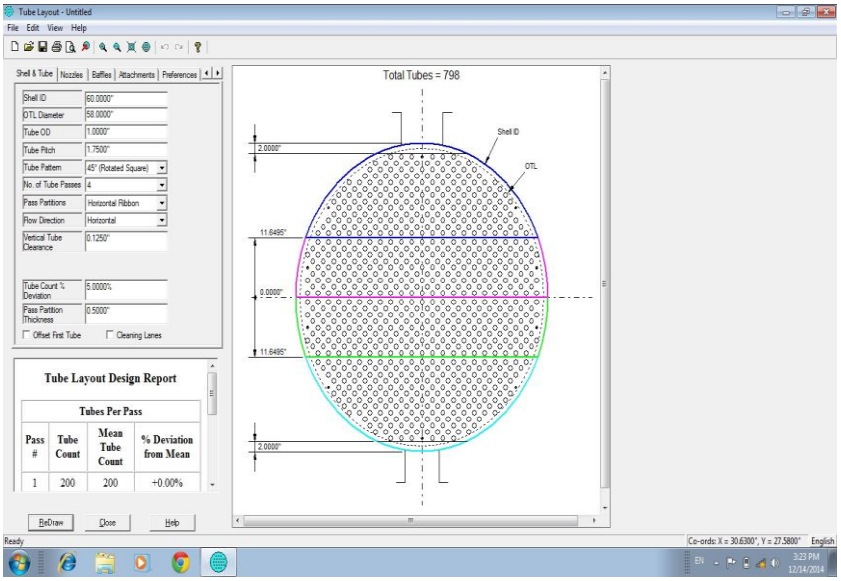
0930 – 0945	*Break*
0945 – 1100	***Maintenance Strategies for Equipment*** *Preventive vs Predictive Maintenance • Condition-Based Maintenance • Shutdown and Turnaround Planning • Spare Parts Management*
1100 – 1215	***Energy Efficiency & Optimization*** *Heat Integration and Recovery • Pinch Analysis Overview • Reducing Energy Losses • Optimizing Utility Systems*
1215 – 1230	*Break*
1230 – 1330	***Environmental Control Technologies*** *Flare Gas Recovery • Emissions Monitoring • Waste Minimization • Water Reuse Technologies*
1330 – 1420	***Plant Performance Optimization*** *Bottleneck Identification • Debottlenecking Techniques • Throughput Maximization • Cost Reduction Strategies*
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, 08th of May 2025***

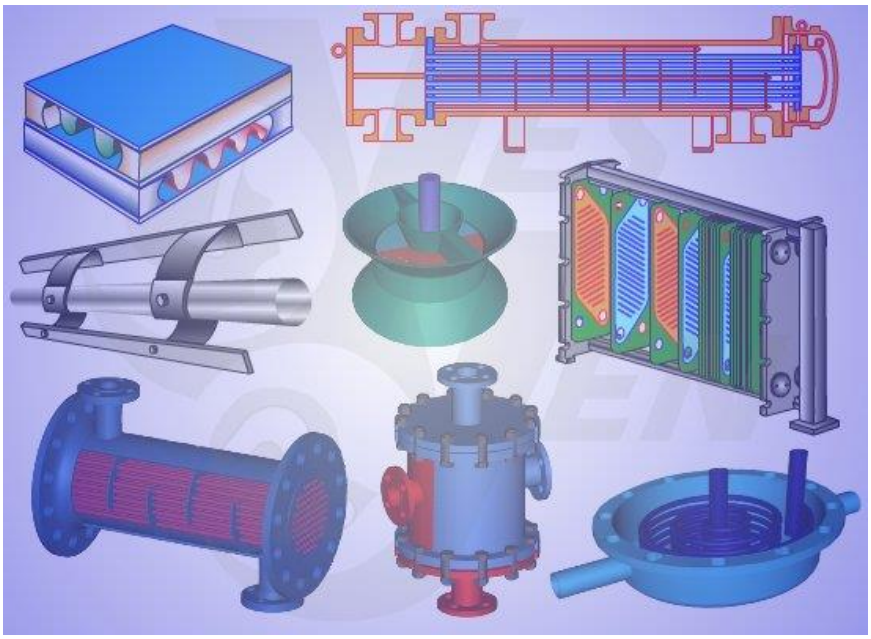
0730 – 0830	***Troubleshooting Processing Systems*** *Diagnosing Unstable Operations • Root Cause Identification • Quick Response Strategies • Documentation of Problems*
0830 – 0930	***Turnaround & Shutdown Management*** *Planning Stages • Critical Path Activities • Resource Coordination • Post-Shutdown Evaluation*
0930 – 0945	*Break*
0945 – 1100	***Real-Time Operational Monitoring*** *Live Dashboards and KPIs • Alarm Rationalization • Performance Deviation Alerts • Operator Decision Support*
1100 – 1230	***Integration with Upstream & Downstream Systems*** *Production Interface • Pipeline and Terminal Connectivity • Supply-Demand Balancing • Communication Protocols*
1230 – 1245	*Break*
1245 – 1300	***Future Technologies in Oil & Gas Processing*** *Hydrogen Integration • Carbon Capture (CCS/CCUS) • Advanced Materials • Automation & Robotics*
1300 - 1345	***Capstone Case Study Workshop*** *Real Processing Plant Scenario • Equipment Performance Analysis • Monitoring Improvement Plan • Group Presentation & Evaluation*
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)

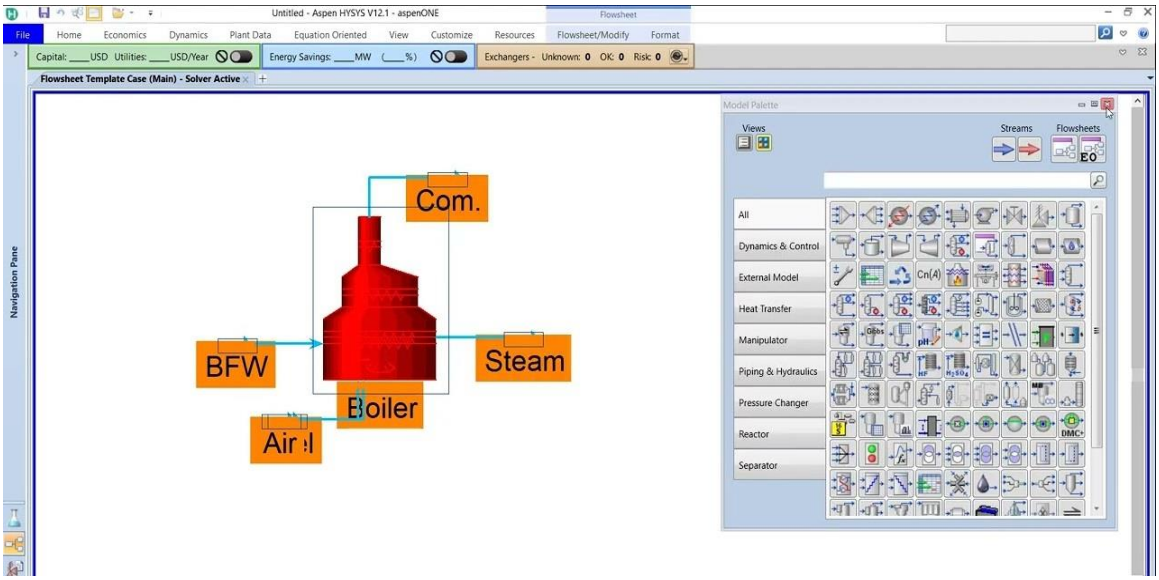
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators “Heat Exchanger Tube Layout”, “Heat Exchanger CBT”, “ASPEN HYSYS V12.1”, “Centrifugal Pumps and Troubleshooting Guide 3.0”, “SIM 3300 Centrifugal Compressor” and “CBT on Compressors”.



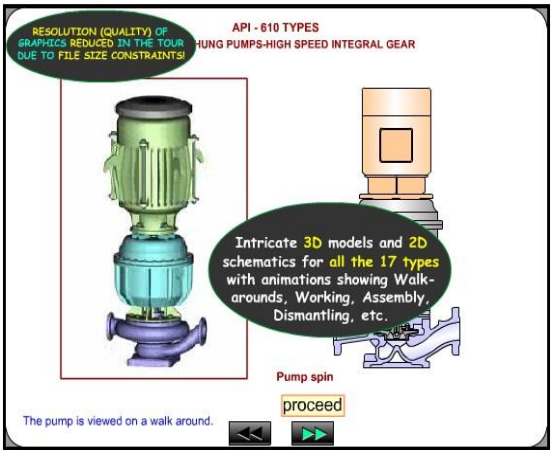
Heat Exchanger Tube Layout Simulator



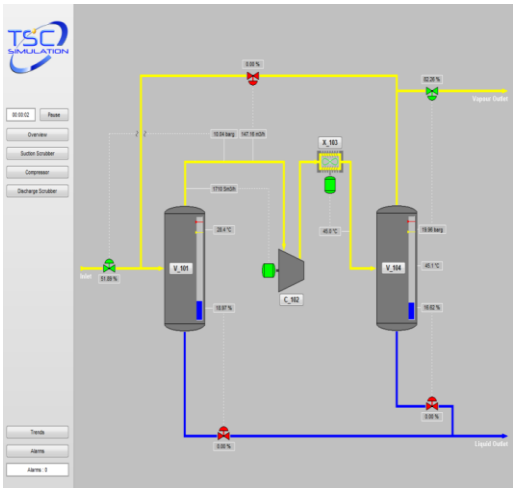
Heat Exchanger CBT



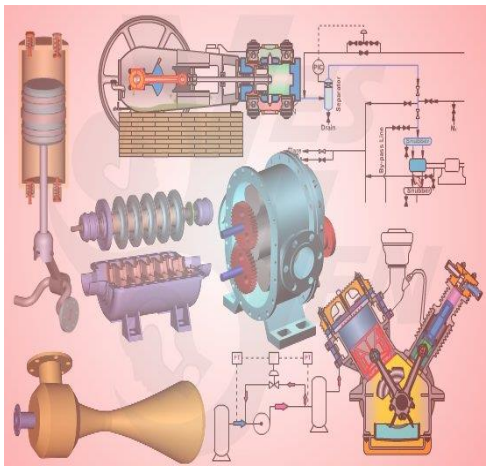
ASPEN HYSYS V12.1 Simulator



Centrifugal Pumps and Troubleshooting Guide 3.0



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors

Course Coordinator

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