

COURSE OVERVIEW PE0102
Certified Process Plant Operator Program

Course Title

Certified Process Plant Operator Program

Course Date/Venue

January 12-16, 2025/Meeting Plus 8, City Centre Rotana Doha, Doha, Qatar

Course Reference

PE0102

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 abnormal process situations cost the processing industry billions of dollars a year. 40% of this lost is directly attributable to human errors, with the failure to properly troubleshoot the condition being the leading contributor. The operations team is the first line of defense against process upsets and equipment problems. Failure to identify and resolve these situations quickly can lead to lost production, off-spec product, equipment loss, and even catastrophic accidents. Therefore, the ability to troubleshoot process operations is one of the most valuable skills operations personnel can possess. However, in order to troubleshoot the process or equipment, you have to understand the theory laying behind such process and equipment. This is what this course all about.



The course is designed to provide participants with the proper application, operation, maintenance and troubleshooting of the various types of process equipment such as compressors, pumps, motors, turbines, turbo-expanders, gears, heat exchangers, piping systems, distillation columns, reboilers, pressure vessels and valves.

The course will feature a unique blend of practical application experience and basic analysis methods. Its aim is to convey a thorough understanding of equipment operating principles and troubleshooting techniques.

The course covers the various process control and instrumentation methods such as pressure measurement, level measurement, temperature measurement, flow measurement, basic principles of control systems, P&ID, wiring schematics & diagrams, control valves and process considerations. It will equip participants with the basic tools and techniques for troubleshooting real-world problems. The use of the troubleshooting methodology defined in this course can greatly improve the ability of the operations team to troubleshoot effectively. With an improved understanding of troubleshooting principles, you will be better equipped to react to process upsets in order to prevent downtime and/or accidents.

The course includes a comprehensive e-book entitled “*Operator’s Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices*”, published by AuthorHouse, which will be given to the participants to help them appreciate the principles presented in the course.

Course Objectives

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

- Get certified as a “*Certified Process Plant Operator*”
- Apply a comprehensive knowledge and skills in process operations, process control and troubleshooting techniques
- Operate, maintain and troubleshoot process equipment such as centrifugal pumps, positive displacement & vacuum pumps, centrifugal compressors, displacement compressors, steam turbine & expanders, gas turbines & engines, fan & blowers, etc.
- Identify and differentiate various types of electric motors, gears & transmission equipment, heat exchangers, distillation columns, reboilers, condensers and explain how trays work
- Discuss the piping layout and components including the piping arrangements, specifications, fittings, etc.
- Distinguish the various measurement in process control such as pressure measurement, level measurement, temperature measurement and flow measurement and differentiate their corresponding principles
- Recognize the principles of control valves including its body types, cavitation, valve coefficient and characteristics and list the main types of actuators and accessories
- Apply systematic techniques in troubleshooting process operations and carryout successful troubleshooting activities
- Analyze the mental problem-solving process and demonstrate the use of the troubleshooter’s worksheet
- Practice the rules-of-thumb techniques for troubleshooting of process equipment

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 a wide understanding and deeper appreciation of process plant operations and control for technical and operational 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. This rate includes H-STK® (Haward Smart Training Kit), 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 Author House.

Accommodation


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

Course Certificate(s)

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Successful candidate will be certified as a “*Certified Process Plant Operator*”. Certificates are valid for 5 years.

Sample of Certificates


The following are sample of the certificates that will be awarded to courses participants: -

Certified Process Plant Operator

Certification Number: 74851
Certification Date: 15-Nov-2023
Expiration Date: 15-Nov-2028

This is to certify that **Waleed Al Habeeb** has successfully met the requirements to be certified as a **Process Plant Operator** under the Certified Process Plant Operator Program, PE0102.



Mr. Jaryl Castillo
Academic Director

Haward Technology is accredited by:




Process Plant Operator
Certification Program

This program is designed to assist companies in identifying professionals who have satisfied the minimum competencies specified in PE0102.

Haward Technology does not warrant or guarantee the performance of any professional certified under this program.

Haward Technology is accredited by:



74851

- (2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

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Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEUs

CEU Official Transcript of Records

TOR Issuance Date: 15-Nov-23
HTME No. 74851
Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
PE0102	Certified Process Plant Operator Program	November 11-15, 2023	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY



Jaryl Castillo
Academic Director

Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2018 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2018 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 Association 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 is accredited by




P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

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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.

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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

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. Andrew Ladwig is a **Senior Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation** for Engineers, **Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage**

Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Tank Farm Operations, Storage Tanks Operations & Measurements, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in **Compressors & Turbines Operation, Maintenance & Troubleshooting, **Heat Exchanger** Overhaul & Testing Techniques, Balancing of **Rotating Machinery (BRM), Pipe Stress Analysis, Valves & Actuators** Technology, Inspect & Maintain **Safeguarding Vent & Relief System**, Certified Inspectors for **Vehicle & Equipment**, Optimizing **Equipment Maintenance & Replacement Decisions**, Certified Maintenance Planner (**CMP**), Certified Planning and Scheduling Professional (**AACE-PSP**), **Tank Design**, Construction, Inspection & Maintenance, **Material Cataloguing**, Specifications, Handling & Storage, **Steam Trap Design**, Operation, Maintenance & Troubleshooting, **Steam Trapping & Control, Column, Pump & Exchangers**, Troubleshooting & Design, **Rotating Equipment** Operation & Troubleshooting, **Control & ESD System, Detailed Engineering Drawings, Codes & Standards, Budget Preparation, Allocation & Cost Control, Root Cause Analysis (RCA), Production Optimization, Permit to Work (PTW), Project Engineering, Data Analysis, Process Hazard Analysis (PHA), HAZOP Study, Sampling & Analysis, Training Analysis, Job Analysis Techniques, Storage & Handling of Toxic Chemicals & Hazardous Materials, Hazardous Material Classification & Storage/Disposal, Dangerous Goods, Environmental Management System (EMS), Supply Chain, Purchasing, Procurement, Logistics Management & Transport & Warehousing & Inventory, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.****

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer and Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and has delivered various trainings, workshops, seminars, courses and conferences internationally.

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, 12th of January 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0915	Introduction to Process Plant Process Overview • Plant Types • Plant Layout • Process Equipment • Piping System • Control & Instrumentation • Safety
0915 – 1000	Centrifugal Pumps Configurations & Styles • Application Ranges and Constraints • Construction Features & Options • Pump Auxiliaries • Wear Components • Canned Motor & Magnetic Drive Pumps • High Speed/Low Flow Pumps • Servicing & Condition Monitoring • Operation • Control • Troubleshooting
1000 – 1015	Break
1015 – 1100	Positive Displacement & Vacuum Pumps Reciprocating Steam & Power Pumps • Diaphragm Pumps • Plunger Pumps • Gear Screw & Progressive Cavity Pumps • Peristaltic Pumps • Conventional & Special Vacuum Pumps • Liquid Jet & Liquid Ring Pumps • Combination & Staged Vacuum Pumps • Operation • Control • Troubleshooting
1100 – 1215	Centrifugal Compressors Types, Styles & Configurations of Centrifugal & Axial Compressors • Construction Features • Mode of Operation • Compressor Auxiliaries and Support Systems • Condition Monitoring • Application Criteria • Performance Capabilities & Limitations • Operation • Control • Troubleshooting
1215 – 1230	Break
1230 – 1330	Displacement Compressors Classification • Reciprocating Compressors vs. Rotary Screw Compressors • Application Ranges & Limitations • Compression Processes • Construction Features & Components • Capacity Control • Operation • Troubleshooting
1330 – 1420	Steam Turbines & Expanders Impulse Turbines • Reaction Turbines • Application Ranges • Turbine Configurations • Applications Constraints • Maintenance • Turbo-expander Construction Features • Applications • Operation • Control • Troubleshooting
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, 13th of January 2025

0730 – 0900	Gas Turbines & Engines Simple Cycle • Heat Recovery Cycles • Type Selection • Maintenance • Two- & Four-Cycle Gas Engines • Gas Engine Compressor Auxiliary Systems • Operation • Control • Troubleshooting
0900 – 1000	Fans and Blowers Types & Configurations • Performance & System Effects • Performance Correction • Capacity Control Options • Operation • Troubleshooting
1000 – 1015	Break



1015 – 1100	Electric Motors Design • Controls • Wiring Systems • Standard Motors • Special Designs • Major Components • The Motor as Part of a System • Adjustable Frequency Motors • Operation • Control • Troubleshooting
1100 – 1215	Gears & Transmission Equipment Types of Gears • Applications Constraints • Maintenance • Troubleshooting
1215 – 1230	Break
1230 – 1330	Heat Exchangers Heat Exchangers • Shell-&-Tube Exchangers • Double-Pipe Exchangers • Plate-&-Frame Exchangers • Aerial Coolers • Fired Heater • Heat Recovery Units • Heat Exchanger Example Problem • Operation • Control • Troubleshooting
1330 – 1420	Distillation Column Flash Stages • Process Design Basic • Reflux Ratio • Minimum Reflux Ratio • Minimum Number of Plates • Optimum Reflux
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3: Tuesday, 14th of January 2025

0730 – 0900	How Trays Work Down Common Backup & Flooding • Dumping & Weeping • Optimizing Tower Pressure
0900 – 1000	Reboilers Reboilers Function • The Reboiler • Heat-Balance Calculations • Thermosyphon, Gravity Feed, & Forced • Thermosyphon Reboilers • Forced Circulation Reboilers • Kettle Reboilers • Don't Forget Fouling
1000 – 1015	Break
1015 – 1100	Condensers Flooded Condenser Control • Subcooling, Vapor Binding, & Condensation • Condensation and Condenser Design • Pressure Control
1100 – 1215	Introduction to Piping Layout P&ID's • Piping Arrangements • Isometrics • B.O.M.'s • Piping Specifications
1215 – 1230	Break
1230 – 1330	Piping Components & Valves Fittings – Butt Weld • Socket Weld • Threaded, Valve Types and Application
1330 – 1420	Process & Utility Piping Design & Layout of Piping Containing Liquid • Vapour • Steam • Condensate • Slurries • Etc.
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three





Day 4: Wednesday, 15th of January 2025

0730 – 0900	Valves Valve Theory • Valve Types • Applications • Functions • Operation • Maintenance • Troubleshooting
0900 – 1000	Process Control Control History • Basic Measurement Concepts • Performance Terms • Basic Control Theory
1000 – 1015	Break
1015 – 1100	Pressure Measurement Basic Principles • Pressure Transducers–Mechanical • Pressure Transducers–Electrical • Installation Considerations
1100 – 1215	Level Measurement Main Types • Simple Sight Glass • Gauging Rods • Buoyancy Tape Systems • Hydrostatic Pressure • Ultrasonic Measurement • Radar Measurement • Vibration Switches • Radiation Measurement • Electrical Measurement • Installation Considerations
1215 – 1230	Break
1230 – 1330	Temperature Measurement Principles • Thermocouples • Resistance Temperature Detectors (RTD’s) • Thermistors • Non-Contact Types
1330 – 1420	Flow Measurement Basic Flow Theory • Differential Pressure Flow Measurement • Oscillatory Flow Measurement • Magnetic Flowmeters • Ultrasonic Flow Measurement • Mass Flow Meters • Installation Considerations • Impact on Overall Loop
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, 16th of January 2025

0730 – 0900	Control Valves–Body Types Principles of Control Valves • What Happens Inside a Control Valve? • Choked Flow • Cavitation • Flashing • Valve Coefficient (Cv) • Control Valve Types • Valve Characteristics • Trim Characteristics • Control Valve Selection • Leakage Rates
0900 – 1000	Control Valves–Actuators & Accessories Main Types of Actuators • Linear Actuators • Rotary Actuators • Actuator Forces • Positioners • Fail Safe Actuators
1000 – 1015	Break
1015 – 1100	P & ID, Wiring Schematics & Diagrams Block Flow Diagrams • Process Flow Diagrams • Mass Balance • Piping & Installation Diagrams • P & ID Symbols • HAZOP • P & ID Standards • Valves • Standardization of Symbols • Schedules • Layout Drawings
1100 – 1215	What is Troubleshooting? Characteristics of a Troubleshooting Problem • Characteristics of the Process Used to Solve Troubleshooting Problems
1215 – 1230	Break
1230 – 1245	The Mental Problem-Solving Process Problem Solving • Troubleshooting • Overall Summary of Major Skills & a Worksheet • Example Use of the Trouble-shooter’s Worksheet

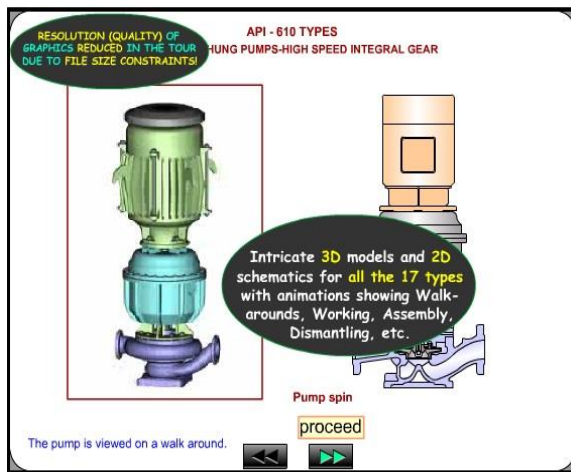




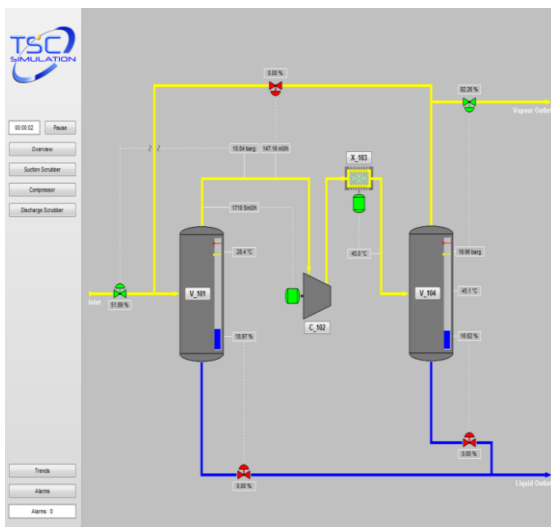
1245 – 1300	Rules of Thumb for Troubleshooting <i>Overall • Transportation Problems • Energy Exchange • Homogenous Separation • Heterogenous Separations • Reactor Problems • Mixing Problems • Size-Decrease Problems • Size Enlargement • Vessels, Bins, Hoppers & Storage Tanks • "Systems" Thinking • Health, Fire & Stability</i>
1300 - 1315	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1315 – 1415	COMPETENCY EXAM
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Simulator (Hands-on Practical Sessions)

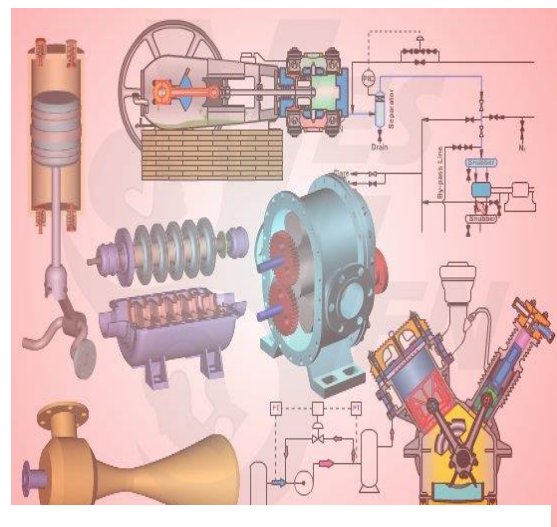
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators.



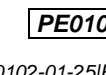
Centrifugal Pumps and Troubleshooting Guide 3.0

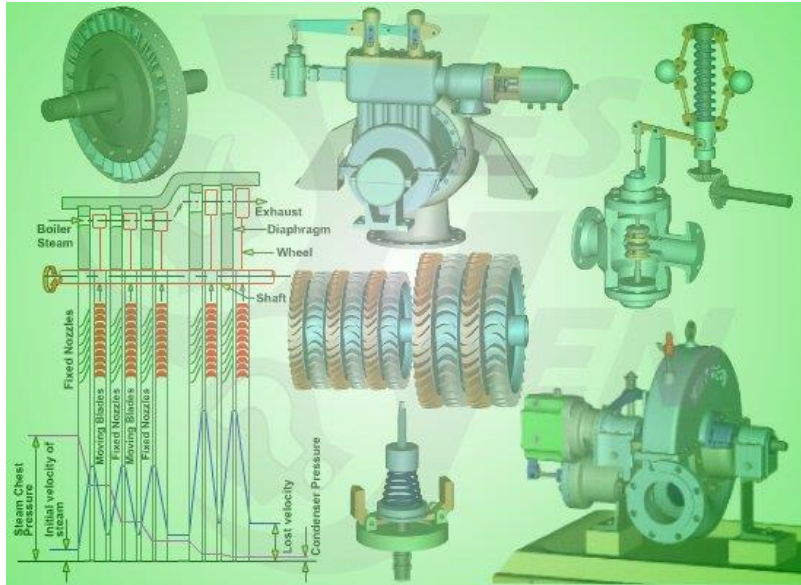


SIM 3300 Centrifugal Compressor Simulator

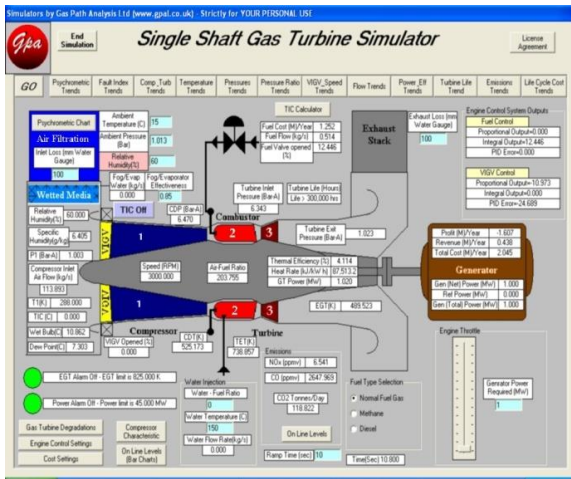


CBT on Compressors

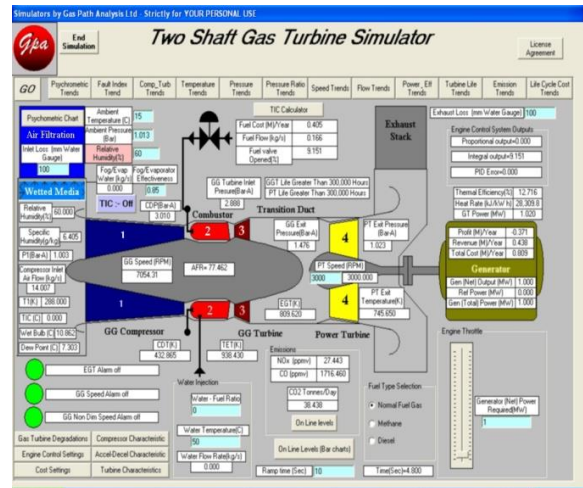




Steam Turbines & Governing System CBT

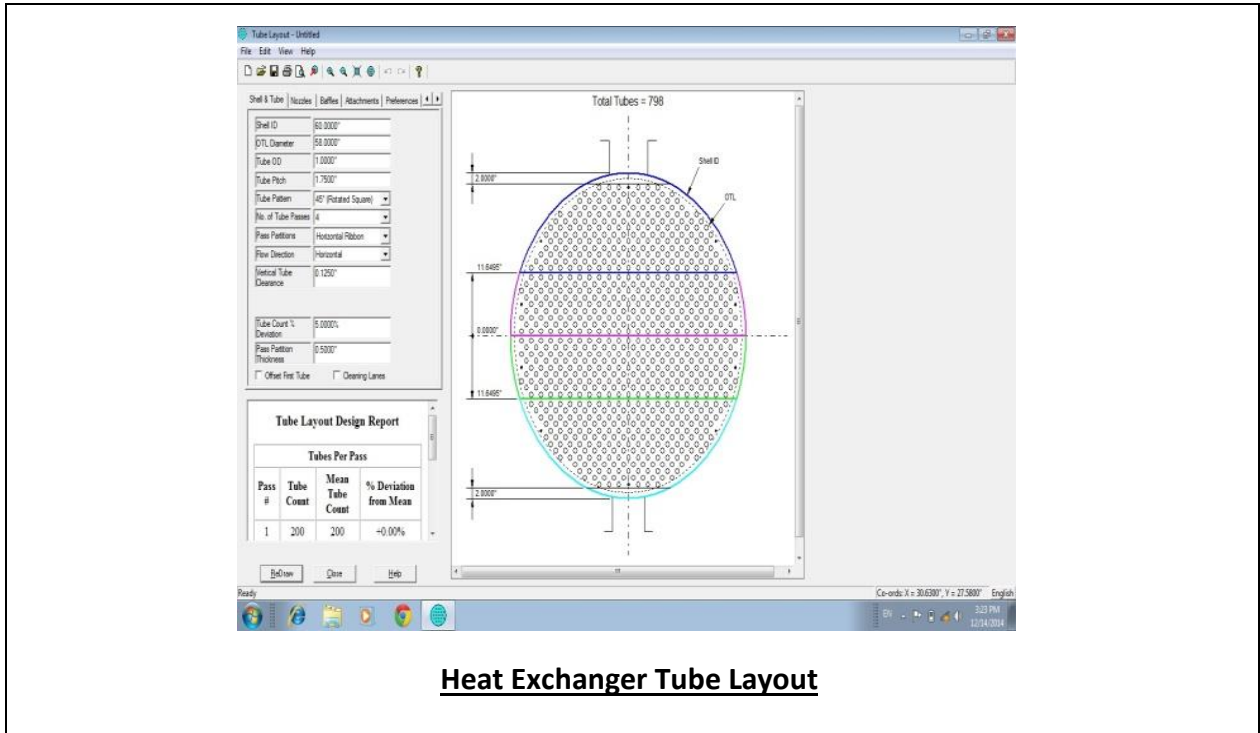


Single Shaft Gas Turbine Simulator

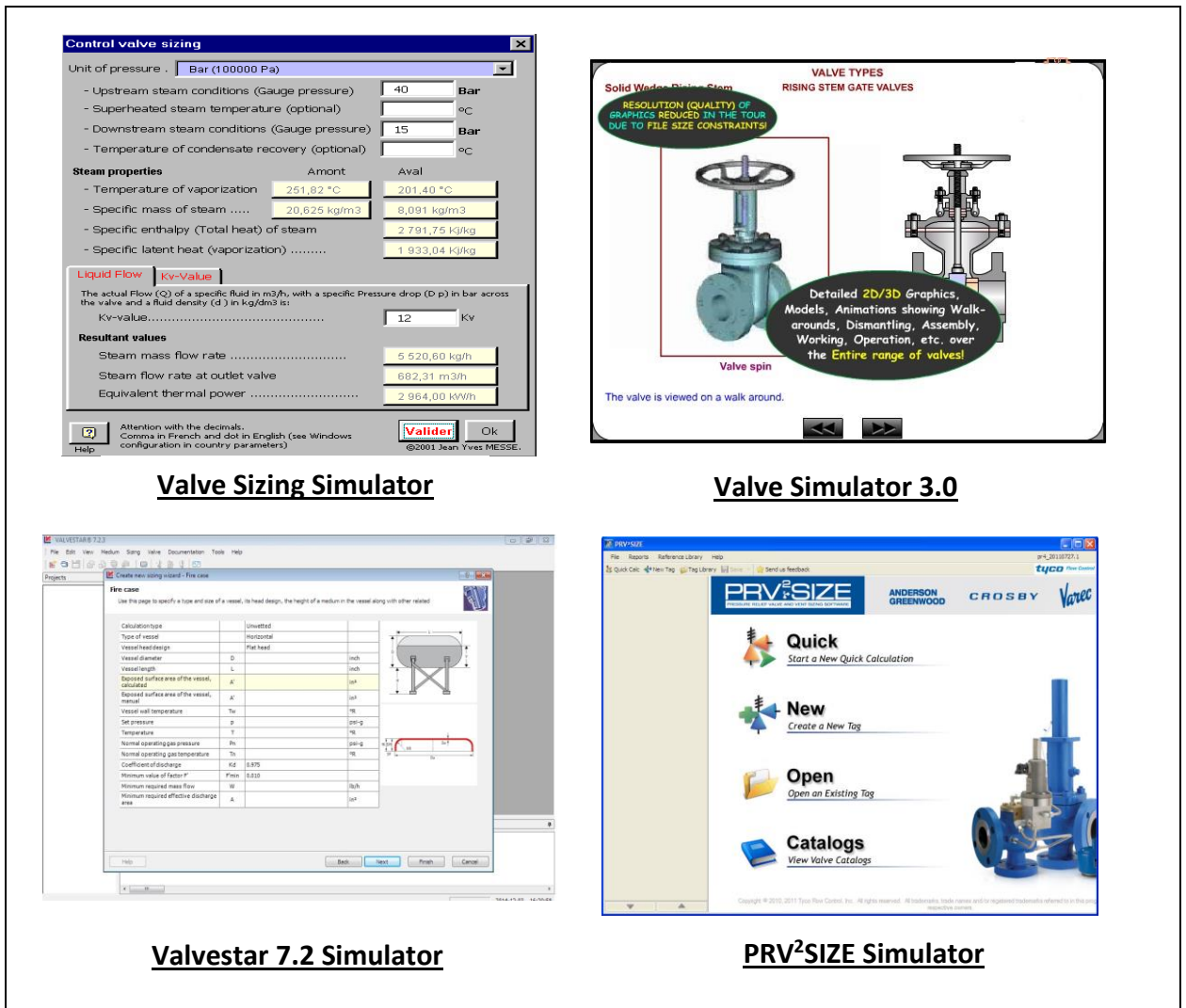


Two Shaft Gas Turbine Simulator





Heat Exchanger Tube Layout

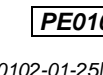


Valve Sizing Simulator

Valve Simulator 3.0

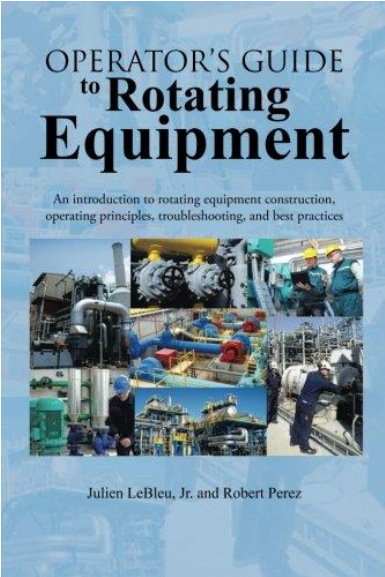
Valvestar 7.2 Simulator

PRV²SIZE Simulator



Book(s)

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

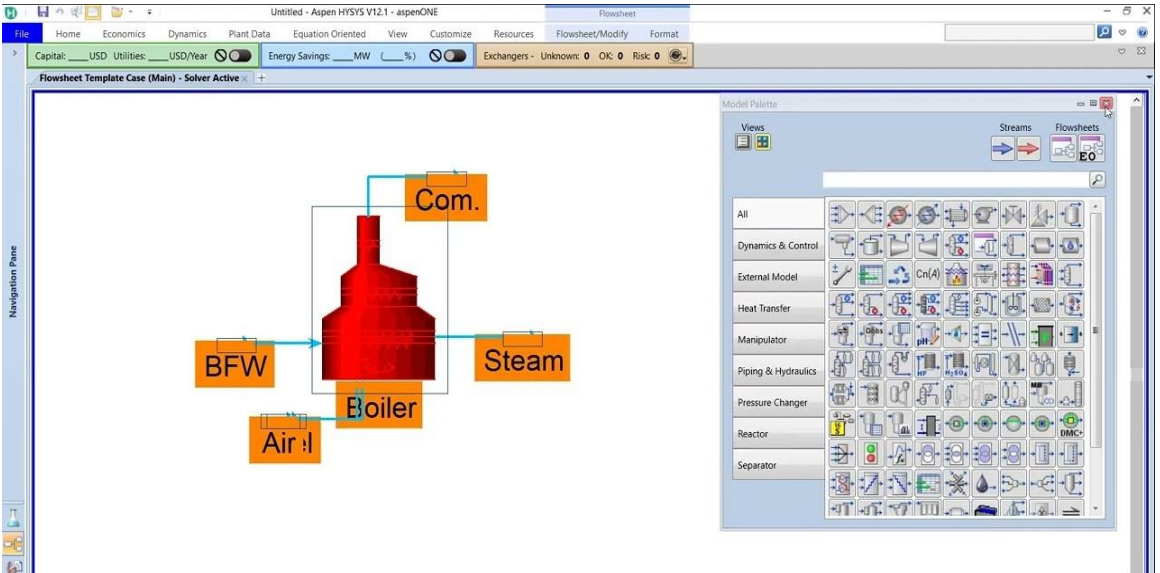


Title : Operator's Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices

ISBN : 978-1-49690-868-1

Authors : Julien LeBleu
Robert Perez

Publisher : AuthorHouse



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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