COURSE OVERVIEW PE0382
Heat Exchangers & Fired Heaters

Course Title
Heat Exchangers & Fired Heaters

Course Date/Venue
Please refer to page 3

Course Reference
PE0382

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 the participants with a detailed and up-to-date overview on the operation and troubleshooting of heat exchangers and fired heaters. Participants will be able to respond to typical heat exchanger and fired heater problems that may occur during operation. The course will also cover the principles of heat transfer and the factors affecting heat transfer; the flow arrangements of fluids inside heat exchangers; and the various types and its major components.

During this course, participants will learn to apply the proper procedure in taking out of service and putting in service of heat exchangers; identify the various types of furnaces and the major parts of a horizontal and vertical furnace; recognize the types of gas burner and its properties; apply combustion process; employ furnace start up, shutdown and troubleshooting; identify the thin tube, hot spot, tube fire side heater, furnace explosion, flame temperature, flame stability and combustion.

Course Objectives

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

- Operate and troubleshoot heat exchangers and fired heaters in a professional manner
- Discuss the principles of heat transfer and the factors affecting heat transfer
- Illustrate flow arrangements of fluids inside heat exchangers and identify the types and its major components
- Apply proper procedure in taking out of service and putting in service of heat exchangers
- List the various types of furnaces and identify the major parts of a horizontal and vertical furnace
- Enumerate the types of gas burner and describe its properties as well as combustion process
- Employ furnace start up, shutdown and troubleshooting
- Identify thin tube, hot spot, tube fire side heater, furnace explosion, flame temperature, flame stability and combustion

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 heat exchangers and fired heaters operation for process engineers, section heads, shift controllers, shift supervisors, operators and for those who are interested in heat exchangers and furnaces.

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 Date/Venue

Session(s)	Date	Venue
1	June 22-26, 2026	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom
2	August 02-06, 2026	Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey
3	October 12-16, 2026	Salon Expo, NH Hotel Plaza de Armas, Seville, Spain
4	November 22-26, 2026	Meeting Plus 9, City Centre Rotana, Doha, Qatar
5	December 20-24, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
6	January 10-14, 2027	Meeting Room 4, Four Seasons Hotel Cairo at Nile Plaza, Corniche El Nil, Garden City, Cairo, Egypt
7	February 07-11, 2027	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
8	March 15-19, 2027	Salon Expo, NH Hotel Plaza de Armas, Seville, Spain

Course Fee

Doha	**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.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**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.
London	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Seville	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	**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.

Accommodation

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

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:

Dr. Chris Kapetan, PhD, MSc, BSc, is a **Senior Process & Petroleum Engineer** with over **30 years** of international experience within the **onshore** and **offshore oil and gas** industry. His wide experience covers **Hydrogenation** & **Gasification** Technology, **Physical** & **Chemical** Solvents, Sulfide Stress Cracking (**SSC**), Hydrogen Induced Cracking (**HIC**), **Corrosion**, Steels & Alloys, **Fertilizer Manufacturing** Process Technology, **Directional Planning**, **Completion Design**, **Directional Surveying**, **Drilling Fluids**, **Matrix Acidizing**, **Hydraulic Fracturing**, **Well Completion Design** & **Operation**, **Fertilizer Storage** Management (Ammonia & Urea), **Process Calculation Methods**, **Cased Hole Formation Evaluation**, **Cased Hole Logs**, **Production Operations**, **Surface Facilities**, **Production Management**, **Drilling Operations**, **Directional Drilling**, **Gas Lift Operations**, **Petroleum Business**, **Petroleum Economics**, **Gas Lift Valve Changing** & **Installation**, **Horizontal & Multilateral Wells**, **Well Stimulation** & **Control** and **Workover Planning**, **Completions** & **Workover**, **Rig Sizing**, **Hole Cleaning** & **Logging**, **Well Completion**, **Servicing** and **Work-Over Operations**, Practical **Reservoir Engineering**, **X-mas Tree & Wellhead Operations**, **Maintenance** & **Testing**, **Advanced Petrophysics/Interpretation** of **Well Composite**, **Construction Integrity** & **Completion**, **Coiled Tubing Technology**, **Corrosion Control**, **Wireline & Coil Tubing**, **Pipeline Pigging**, **Corrosion Monitoring**, **Cathodic Protection** as well as **Root Cause Analysis** (**RCA**), **Root Cause Failure Analysis** (**RCFA**), **Gas Conditioning & Process Technology**, **Production Safety** and **Delusion of Asphalt**. Currently, he is the **Operations Manager** at **GEOTECH** and an independent **Drilling Operations Consultant** of various engineering services providers to the international clients as he offers his expertise in many areas of the **drilling discipline** and is well **recognized & respected** for his process and procedural expertise as well as ongoing participation, interest and experience in continuing to promote technology to producers around the world.

Throughout his long career life, Dr. Chris has worked for many international companies and has spent several years **managing** technically **complex wellbore interventions** in both **drilling** & **servicing**. He is a **well-regarded** for his **process** and **procedural expertise**. Further, he was the **Operations Manager** at **ETP Crude Oil Pipeline Services** where he was fully responsible for optimum operations of crude oil pipeline, **workover** and **directional drilling**, **drilling rigs** and equipment, drilling of various geothermal deep wells and **exploration wells**. Dr. Chris was the **Drilling** & **Workover Manager** & **Superintendent** for **Kavala Oil** wherein he was responsible for supervision of **drilling operations** and **offshore exploration**, quality control of performance of **rigs**, **coiled tubing**, crude oil transportation via pipeline and abandonment of **well** as per the API requirements. He had occupied various key positions as the **Drilling Operations Consultant**, **Site Manager**, **Branch Manager**, **Senior Drilling** & **Workover Manager** & **Engineer** and **Drilling** & **Workover Engineer** in several petroleum companies responsible mainly on an **offshore** sour oil field (under water flood and gas lift) and a gas field. Further, Dr. Chris has been a **Professor** of the **Oil Technology College**.

Dr. Chris has **PhD** in **Reservoir Engineering** and a **Master's** degree in **Drilling & Production Engineering** from the **Petrol-Gaze Din Ploiesti University**. Further, he is a **Certified Surfaced BOP Stack Supervisor** of **IWCF**, a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has conducted **numerous short courses**, **seminars** and **workshops** and has published several technical books on **Production Logging**, **Safety Drilling Rigs** and **Oil Reservoir**.

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 – 0915	***Heat Exchangers*** *Introduction to Heat Exchangers • Principles of Heat Transfer • Factors Affecting Heat Transfer (Conduction, Convection & Radiation) • Flow Arrangement of Fluids Inside Heat Exchanger • Types of Heat Exchangers • Major Components*
0915 – 0930	*Break*
0930 – 1030	***Heat Exchangers (cont'd)*** *Shell & Tube • Fixed Tube Sheet • Floating Tube Sheet • Return Bend Heat Exchanger • Plate Type Heat Exchanger*
1030 – 1200	***Heat Exchangers (cont'd)*** *Double Type Heat Exchanger • Parallel Flow • Counter Flow • Temperature Approach in Heat Exchanger • LMTD • Correction Factor*
1200 – 1215	*Break*
1215 – 1420	***Heat Exchangers (cont'd)*** *Allocation of Fluid in Heat Exchanger • Shell & Tube Passes • Cross Flow Heat Exchanger • Overall Heat Transfer Coefficient*
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 One*

Day 2

0730 – 0915	***Heat Exchangers (cont'd)*** *Principles of Heat Allocation • Corrosion • Fouling • Temperature • Pressure*
0915 – 0930	*Break*
0930 – 1030	***Heat Exchangers (cont'd)*** *Differential Pressure • Viscosity • Design Considerations • Hair Pin Heat Exchanger • Aerial Cooler*
1030 – 1200	***Heat Exchangers (cont'd)*** *Main Components • Draft • Louvers • Blades • Vibration*
1200 – 1215	*Break*
1215 – 1420	***Heat Exchangers (cont'd)*** *Causes & Correction • Fouling Factor • Factors Affecting Heat Transfer • Procedure to Take Heat Exchanger Out of Service • Procedure to Put Heat Exchanger in Service*
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

0730 – 0915	***Fired Heaters*** *Type of Furnaces • Major Parts of a Horizontal Furnace • Major Parts of a Vertical Furnace • Fire Box • Shock Tubes • Radiant Cone*
0915 – 0930	*Break*
0930 – 1030	***Fired Heaters (cont'd)*** *Convection Section • Stack Temperature • Causes of High Stack Temperature • Flue Gas Composition • Burners • Effect of Excess Air on Combustion*
1030 – 1200	***Fired Heaters (cont'd)*** *Fuel - Air Ratio • Types of Burners • Gas Burner Construction • Draft Inside Gas Burner • Pre-Mix Gas Burner • Non-Pre-Mix Gas Burner*
1200 – 1215	*Break*
1215 – 1420	***Fired Heaters (cont'd)*** *Properties of Gas Burner • Draft Inside Gas Burner • Flash Back • Fuel Oil Burner • Steam - Air Atomising Burner • Combination Burner • Pilot Burner • Burner Management System*
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

0730 – 0915	***Fired Heaters (cont'd)*** *Combustion Process • Fuel & its Flame Colour • Combustion Losses • Ignition Temperature*
0915 – 0930	*Break*
0930 – 1030	***Fired Heaters (cont'd)*** *Flame Temperature • Excess Air • Combustion Control • NOX Burner*
1030 – 1200	***Fired Heaters (cont'd)*** *NOX Formation • Furnace Operation • Furnace Draft • Coking*
1200 – 1215	*Break*
1215 – 1420	***Fired Heaters (cont'd)*** *Ignition • Furnace Operation • High Pressure Fir - Box Furnace • Furnace Tube Life*
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 Four*

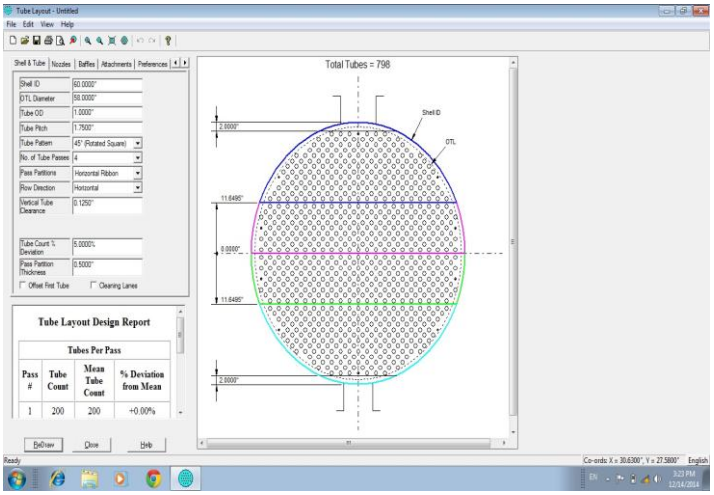
Day 5

0730 – 0915	***Fired Heaters (cont'd)*** *Furnace Start Up • Maximum Skin Temperature • Flame Distribution • Balance of Flow • Pre-Start Up • Ignition of Burner Under Pressure • Furnace Shut Down*
0915 – 0930	*Break*

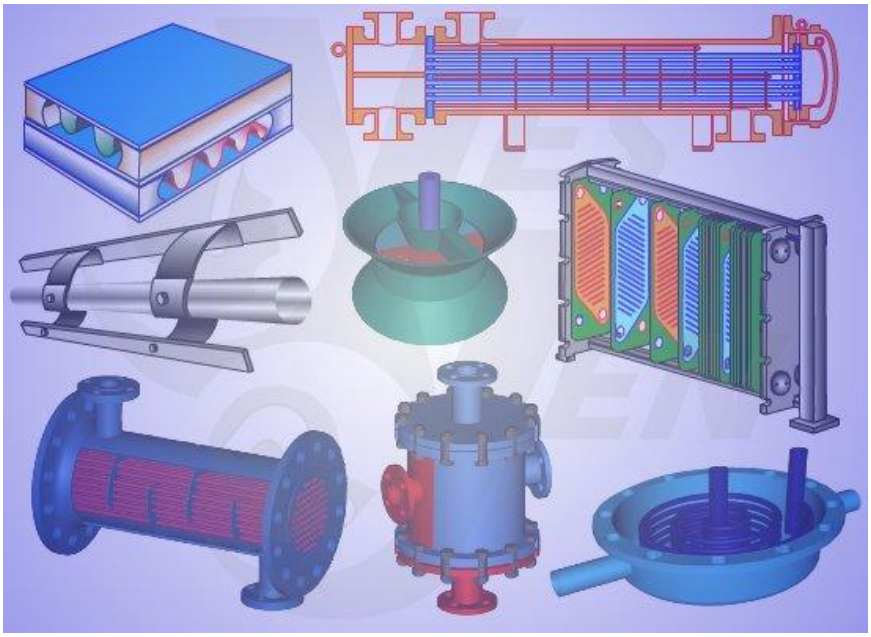
0930 – 1100	***Fired Heaters (cont'd)*** *Furnace Heat – Off • Furnace Emergency Shut Down • Action in the Event of Tube Rupture • Minor Tube Leak • Furnace Typical Operating Problems • Effect of Reduced Air • Absolute Combustion*
1100 – 1200	***Fired Heaters (cont'd)*** *Oxygen Starvation • Fir Box & Flame Appearance • Secondary Combustion • Furnace Troubleshooting • Loss of Flame • Flame Control • Heater Tube Failure*
1200 – 1215	*Break*
1215 – 1345	***Fired Heaters (cont'd)*** *High Temperature Creep • Purge Steam • Identifying Thin Tube & Hot Spot • Tube Fire Side Heater • Furnace Explosion • Flame Temperature • Flame Stability • Combustion*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

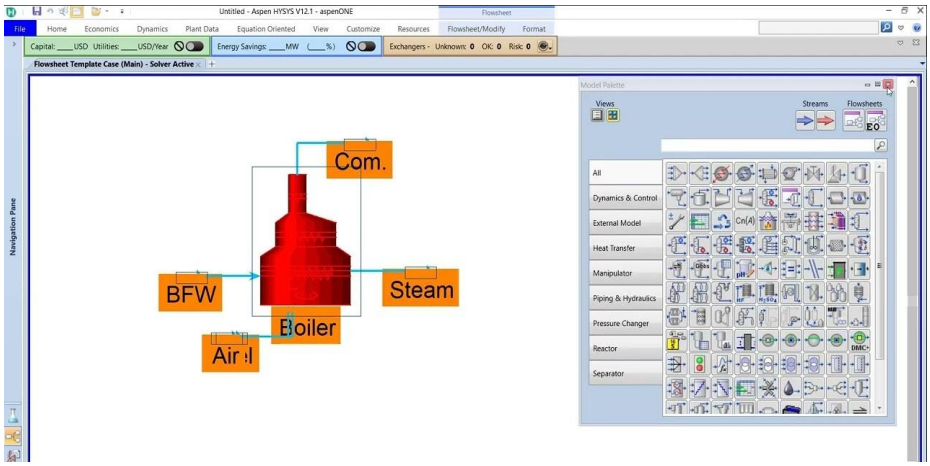
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulator "Heat Exchanger Tube Layout", " Heat Exchanger CBT" and "ASPEN HYSYS V12.1" simulator.



Heat Exchanger Tube Layout Simulator



Heat Exchanger CBT



ASPEN HYSYS V12.1 Simulator

Course Coordinator
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