

COURSE OVERVIEW ME0630
The Layout of Piping Systems & Process Equipment

Course Title

The Layout of Piping Systems & Process Equipment

Course Reference

ME0630

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

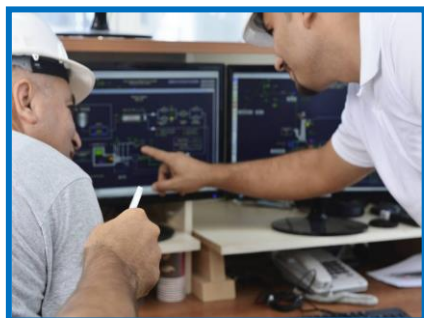


Session(s)	Date	Venue
1	April 21-25, 2024	Oryx Meeting Room, Doubletree By Hilton Doha-Al Sadd, Doha, Qatar
2	July 14-18, 2024	The KooH Al Noor Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE
3	November 10-14, 2024	Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey
4	February 03-07, 2025	Hampstead Meeting Room, London Marriott Hotel Regents Park, London, United Kingdom

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 will familiarize engineers, designers and construction personnel with layout, design procedures and practices involved in the location of equipment and layout of piping systems. Traditionally there has been little formal training in this area and design decisions have to be made based on practical considerations without formulae or code reinforcement.



Completing piping arrangements take up the majority of manhours in the design of a process plant and the designer is required to apply acceptable layout procedures. This is an intensive five day course that will give attendees the background required to complete a typical equipment layout and piping arrangement.

The course will also highlight the equipment layout and plot plans; civil, structural, electrical, instrumentation and maintenance considerations; distribution systems; pipe racks; pumps and piping, layout at horizontal centrifugal, vertical inline, double suction, positive displacement, performance characteristics, maintenance, cavitation, suction piping considerations, strainers, valving, parallel layouts, series layouts, supports, loads at nozzles.



During this interactive course, participants will learn the heat exchanger piping, maintenance requirements, shell and tube, plate, fin fan, valving, T.E.M.A. standards; horizontal and vertical vessels, placement, nozzle orientation, internals, platforms, ladders, manholes, maintenance requirements, valving, instrumentation, process considerations; and the process and utility piping.

Course Objectives

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

- Apply systematic techniques in the layout of piping systems and process equipment including design procedures and good international practices
- Implement the correct procedures involved in the layout of process equipment and piping system for a typical process unit containing pumps, valves, hangers, tanks, exchangers, horizontal drums and vertical towers
- Employ the requirements for the design and layout of piping system in order to achieve a well-structured installation of piping systems and process equipment
- Identify the factors that should be considered in the layout of equipment and plotting of plans including civil, structural, electrical and instrumentation aspects and other maintenance considerations
- Practice the various types of design and layout of piping system through workshops including process & utility piping, pump piping, storage tank piping, steam and condensate piping
- Implement nozzle orientation procedures in horizontal and vertical vessels
- Apply proper CAD techniques used in piping layout and piping stress analysis
- Perform the proper methodology for stress analysis using stress analysis programs and build flexible layouts

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 of the layout of piping systems & process equipment for piping, process and design engineers and designers entering the plant design field, senior draftsmen, piping and process draftsmen and practicing engineers requiring to expand their understanding of layout procedures. Further, it is suitable for piping fabricators, contractors and suppliers wishing to understand the relationship of manufacture and fabrication to the design, layout and construction of piping systems and piping design as well as analysis personnel wishing to expand their knowledge through this program which will offer practical solutions to design problems.

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: -

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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.

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. 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, 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, **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, 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, **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, **Process Gas Plant** Start-up, Commissioning & Problem Solving, **Process Liquid, Process Handling & Measuring** Equipment, **Steam Trap** Design, Operation, Maintenance & Troubleshooting, **Steam Trapping & Control, Column, Pump & Exchangers**, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, **Control & ESD** System, Root Cause Analysis (**RCA**), **Dangerous Goods, Production Optimization**, Permit to Work (**PTW**), Project Engineering, Data Analysis, **HAZOP** Study, Sampling & Analysis, **Job Analysis** Techniques, **Hazardous Material** Classification & Storage/Disposal, **Risk** Monitoring Authorized Gas Tester (**AGT**), Confined Space Entry (**CSE**), **Process Hazard** Analysis (**PHA**), 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.



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

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.
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.
Istanbul	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.
London	US\$ 8,800 per Delegate + VAT . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Piping Layout <i>P&ID's • Piping Arrangements • Isometrics • B.O.M.'s • Piping Specifications</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Piping Components & Valves <i>Fittings – Butt Weld • Socket Weld • Threaded, Valve Types & Application</i>
1100 – 1215	Equipment Layout & Plot Plans <i>Civil, Structural, Electrical, Instrumentation, Maintenance Considerations</i>
1215 – 1230	<i>Break</i>
1230 – 1420	Workshop (1) <i>Problem Set</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>



Day 2

0730 – 0830	Workshop (1) Review
0830 – 0930	Process & Utility Piping Design & Layout of Piping Containing Liquid • Vapour • Steam • Condensate • Slurries • Etc.
0930 – 0945	Break
0945 – 1100	Distribution Systems Plot Plans • Pipe Racks – Line Spacing • Pipe Spans • Alloy Lines • Vibrating Lines • Expansion Loops
1100 – 1215	Pipe Supports & Hangers Selection & Location • Anchors • Guides • Restraints • Variable Springs • Constant Load Springs
1215 – 1230	Break
1230 – 1420	Horizontal Vessels Placement • Nozzle Orientation • Internals • Platforms • Ladders
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 – 0830	Workshop (2) Review
0830 – 0930	Pumps & Piping Layout at Horizontal Centrifugal • Vertical Inline • Double Suction • Positive Displacement • Performance Characteristics • Maintenance
0930 – 0945	Break
0945 – 1100	Pumps & Piping (cont'd) Cavitation • Suction Piping Considerations • Strainers • Valving • Parallel Layouts • Series Layouts • Supports • API 610 Loads at Nozzles
1100 – 1215	Heat Exchangers Shell & Tube • Fin-Tube • Plate • Piping Layout Considerations • Nozzle Loading
1215 – 1230	Break
1230 – 1420	Fin Fans Locations • Types • Piping Arrangements
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Workshop (3) Review
0830 – 0930	Storage Tanks Tank Types • Fixed & Floating Roofs • Dyked Area Design • Fire Protection • Off Site Piping
0930 – 0945	Break
0945 – 1100	Instrumentation Level, Flow, Pressure & Temperature Variables • Control Valves & Sets • Relief Valves
1100 – 1215	Steam & Condensate Piping Steam Traps • Condensate Collection Systems • Drip Legs • Steam Tracing Manifolds





1215 - 1230	Break
1230 - 1420	Workshop (4) Problem Set
1420 - 1430	Recap
1430	Lunch & End of Day Four

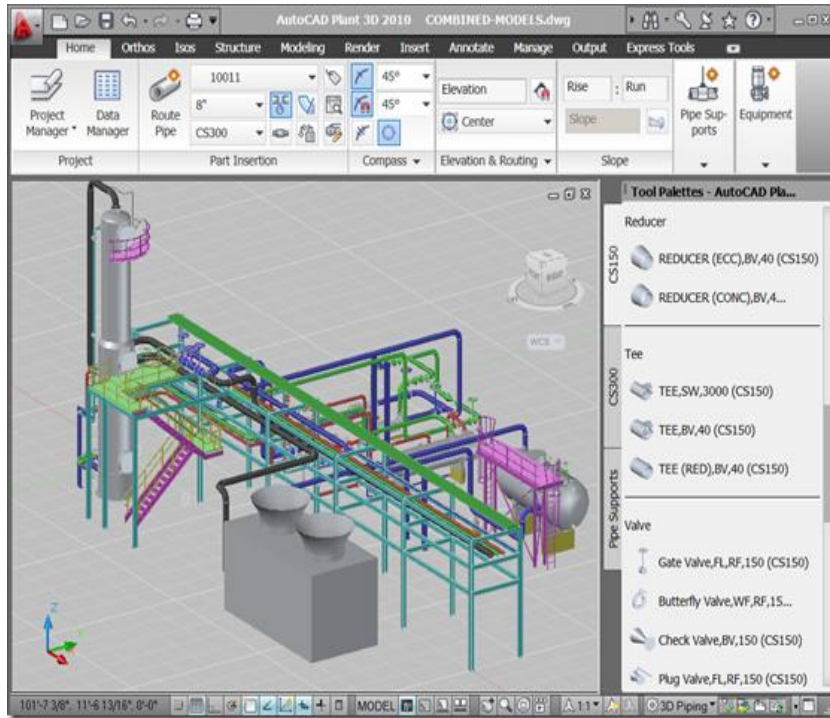
Day 5

0730 - 0830	Towers & Vertical Vessels Distillation Columns • Tower Internals • Trays • Packings • Reboilers • Nozzle Orientation • Piping at Towers • Supports
0830 - 0930	Towers & Vertical Vessels (cont'd) Platforms & Ladders • Piping Layout
0930 - 0945	Break
0945 - 1115	Compressors Reciprocating • Centrifugal • Piping at Compressors • Vibration Considerations
1115 - 1215	Purposes of Stress Analysis Methodology • Static Analysis • Using Stress Analysis Programs
1215 - 1230	Break
1230 - 1315	Stress Analysis Building Flexible Layouts
1315 - 1345	Static Stress Analysis Problem Set
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

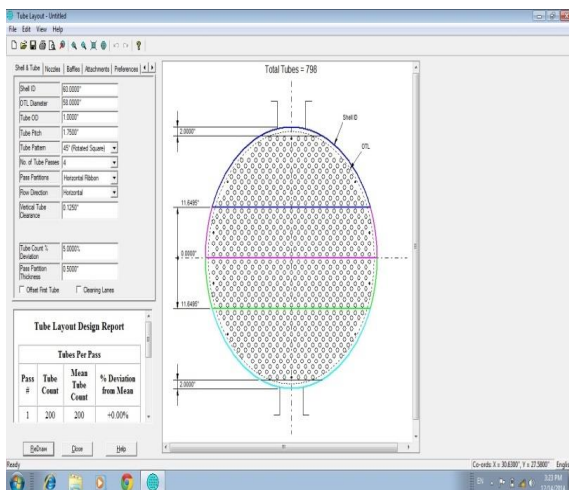


Simulator (Hands-on Practical Sessions)

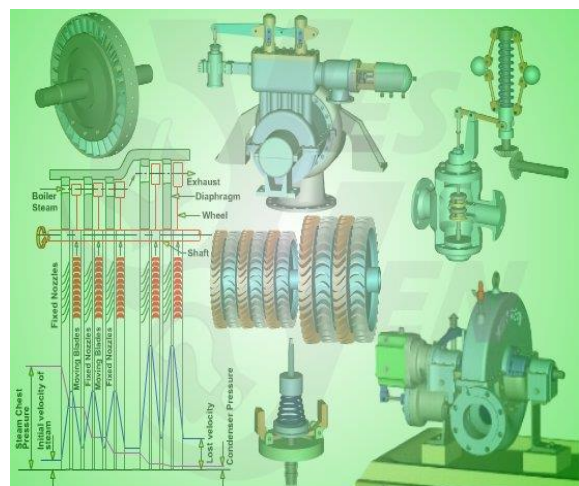
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators “Autocad Piping Software”, “Heat Exchanger Tube Layout Simulator”, “Steam Turbines & Governing System CBT”, “Single Shaft Gas Turbine Simulator” and “Two Shaft Gas Turbine Simulator”.



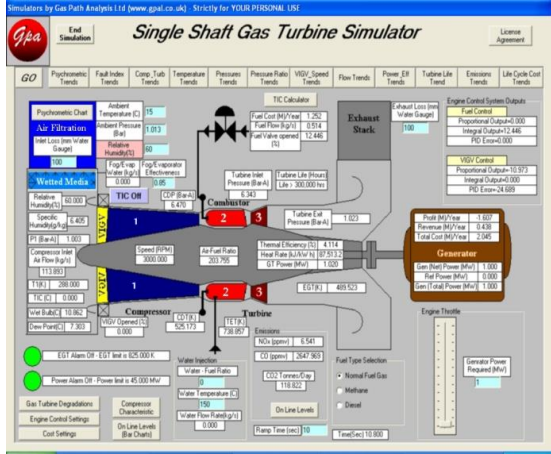
Autocad Piping Software



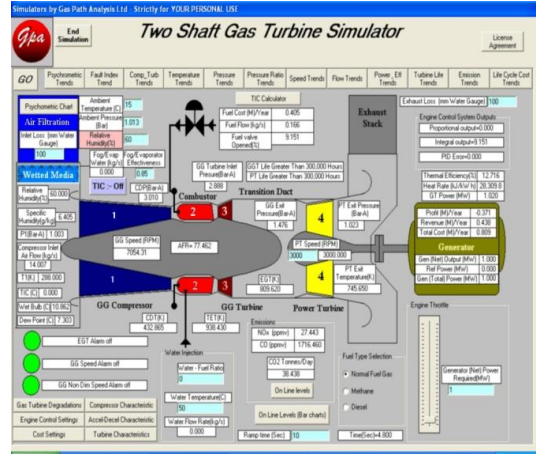
Heat Exchanger Tube Layout Simulator



Steam Turbines & Governing System CBT



Single Shaft Gas Turbine Simulator



Two Shaft Gas Turbine Simulator

Course Coordinator

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