COURSE OVERVIEW ME0160
Introduction to HVAC Design for Oil & Gas Industry

Course Title
Introduction to HVAC Design for Oil & Gas Industry

Course Date/Venue
August 10-14, 2025/Sur Meeting Room, Royal Tulip Muscat Hotel, Muscat, Oman

Course Reference
ME0160

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 in the class will be applied using the following practical methods:

(**1**) **Industrial Facility Visit:** Course participants will be taken to an industrial facility where they will practice testing, maintenance and troubleshooting. In case that this course is organized inside client premises (In-House), then client shall provide access to its HVAC and refrigeration workshop for practical sessions.

(**2**) **HVAC Simulator:** Participants will use in the class the state-of-the-art HVAC Simulator to practice some of the skills learnt.

The course is designed for engineers and other technical staff from a wide range of abilities and backgrounds. It will provide the participants with a complete and up-to-date overview of the area of heating, ventilation, air-conditioning HVAC) and refrigeration. It commences with a review of psychrometic charts and then examines the factors that influence design choices, indoor air quality, load calculations and heating/ventilation and airconditioning systems. Numerous tips and tricks throughout the course make it very practical and topical to your applications.

Course Objectives

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

- Design, install, maintain and troubleshoot HVAC and refrigeration systems
- Recognize and apply the psychrometic chart
- Design for good air quality
- Perform basic load calculations
- Initiate an effective inspection and maintenance program
- Minimize forced outages and prevent serious damage to HVAC equipment
- Provide an overview of the legislative requirements plus the essential steps and responsibilities for the maintenance and repair of HVAC Systems
- Employ technologies available for the efficient energy management using HVAC systems

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 complete and up-to-date overview of HVAC & refrigeration systems for HVAC, utilities, maintenance, plant, operation and inspection engineers and other technical staff who are involved in the design, installation, maintenance and troubleshooting of such equipment and system. Further, it is suitable for mechanical, design, electrical and consulting engineers.

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$ 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.

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.

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. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **30 years** of extensive industrial experience. His wide expertise includes **District Cooling**: **Plant**: **Design**, **Operation & Maintenance HVAC System**, **HVAC** Equipment Terminology, **HVAC System Block Load Calculation**, **HVAC System** Development of Drawings, **Air Distribution** System, **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (**PSV**), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

Course Program

The following program is planned for this course. However, the course instructors) 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, 10th of August 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	**PRE-TEST**
0830 – 0915	**Introduction** Introduction to HVAC Basics • HVAC Abbreviations • HVAC Codes and Standards • HVAC Definitions • Air Conditioning • Ventilation • Refrigeration • HVAC Overview
0915 – 0930	Break
0930 – 1030	**Basic Principals of HVAC** Air Properties • Dry Bulb Temperature • Wet Bulb Temperature • Dew Point • Humidity Ratio • Relative Humidity • Psychrometric Chart Definition • Properties of Psychrometry • Psychrometric Chart • Psychrometric Chart Application
1030 – 1115	**Principles of Heat Transfer** Heat Transfer • Method of Heat Transfer • Sensible and Latent Heat • Sensible Heat Definition • Latent Heat Definition • First Law of Thermodynamic
1115 – 1215	**Design Conditions** Outdoor Climate • Indoor Comfort • Solar Orientation • Indoor Air Quality
1215 – 1230	Break
1230 – 1330	**Air Purification Methods & Air Motion** Comfortable Velocity Ranges • Heat Gain From Occupants
1330 – 1420	**Moisture Removal, Design Conditions**
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, 11th of August 2025

0730 – 0830	**HVAC Design Criteria** Load Calculations • Load Components • Sensible Load • Latent Load • Load Categories • Skin Load • Internal Loads • People Load • Light Load • Equipment Load
0830 – 0945	**Room Load** Effective Load • Other Loads (Return Air Side Load –Supply Air Side Load) • Other Loads (Ventilation Load) • Grand Load • Refrigeration Load • Summer Air Conditioning System with Return Air (for Example)
0945 – 1000	Break
1000 – 1100	**Air Conditioning (Equipment- Systems)** Case Study: Manual Calculations • Design Calculations for Super Market in Egypt – Alexandria City • Load Calculations System • Manual Calculations • Room Load Calculations • Transmission Load • Sun Load Calculation • Persons Load • Light Load • Equipment Load

1100 – 1200	***Total Room Load*** *Plot Design Conditions on Psychrometric Chart ● Sensible Heat Factor ● Ventilation (Outside Air Load) Sensible Load Calculation ● Ventilation Latent Load Calculation ● Coil Load Calculation ● Mixing Point ● Supply Point ● Apparatus Dew Point*
1200 – 1215	*Break*
1215 – 1330	***Duct Design*** *Duct Design Methods ● Equal Friction Method ● Using Ductlator ● Duct Sizer Software ● Duct Design Procedures ● Duct Types ● Diffusers –Grills ● Duct Accessories – Case Study ● Cooling System Selection*
1330 – 1420	***Duct Insulation Material Selection & Sizing***
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, 12th of August 2025

0730– 0830	***KOTZA*** *System Data Input ● Output Report*
0830 – 0945	***Practical Calculations*** *Case Study ● Gymnasium in USA Data Input*
0945 – 1000	*Break*
1000 – 1100	***Refrigeration*** *Definition ● Systems ● Types ● Components ● P-H Chart ● Calculations ● Superheat Degrees ● Sub-Cooling Degrees ● Refrigerants ● COP Calculations ● EER Calculations*
1100 – 1215	***Refrigeration (cont'd)*** *Water System Calculations ● Case Study ● Ton of Refrigeration*
1215 – 1230	*Break*
1230 – 1330	***Chillers*** *Chiller Components ● Types of Compressors ● Reciprocating Compressor ● Screw Compressor ● Scroll Compressor ● Centrifugal Compressor*
1330 – 1420	***Chillers (cont'd)*** *Air Cooled Condensers ● Water Cooled Condensers ● Evaporative Condensers*
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, 13th of August 2025

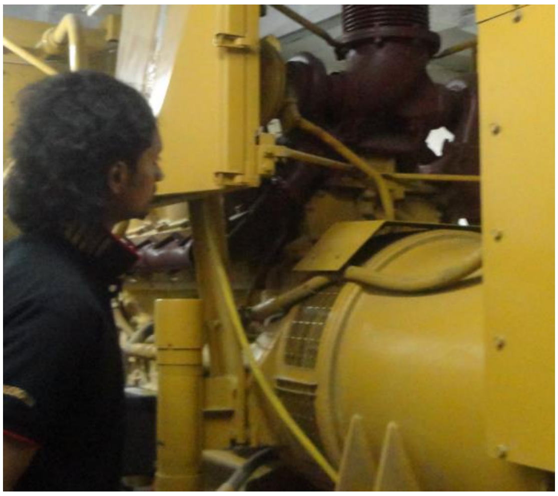
0730 – 0830	***Comparison Between Air Cooled & Water Cooled Condensers***
0830 – 0945	***Flooded Evaporators – DX Evaporators***
0945 – 1000	*Break*
1000 – 1100	***Absorption Refrigeration Cycle*** *Expansion Devices ● Pressure Gages ● Test Manifolds ● Recovery Units*
1100 – 1215	***Testing – Maintenance*** *Purging ● Pump Down ● Leak Test ● Adding Oil*
1215 – 1230	*Break*

1230 – 1330	***Testing – Maintenance (cont'd)*** *Commissioning*
1330 – 1420	***Maintenance*** *Definition ● Objectives ● Goals ● Equipment Life Cycle*
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: Thursday, 14th of August 2025

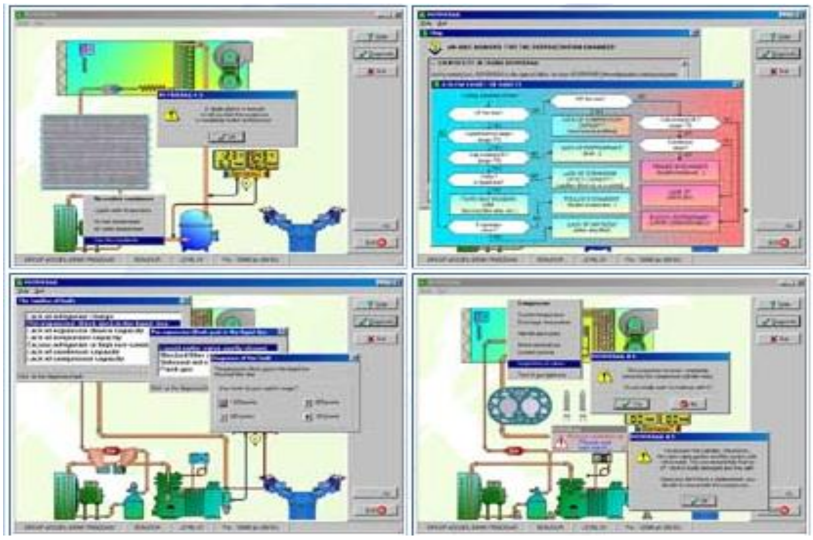
0730 – 0845	***Maintenance (cont'd)*** *Types of Maintenance ● Chiller Maintenance*
0845 – 0915	***Fault Finding*** *Objectives ● Introduction ● Faults*
0915 – 0930	*Break*
0930 – 1100	***Troubleshooting Skills*** *Troubleshooting Tools ● Technical Equipment*
1100 – 1215	***Troubleshooting Procedures*** *Equipment Failure*
1215 – 1230	*Break*
1230 – 1300	***Troubleshooting Analysis***
1300 – 1345	***Maintenance Case Studies***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions/Site Visit
Site visit will be organized during the course for delegates to practice the theory learnt:-

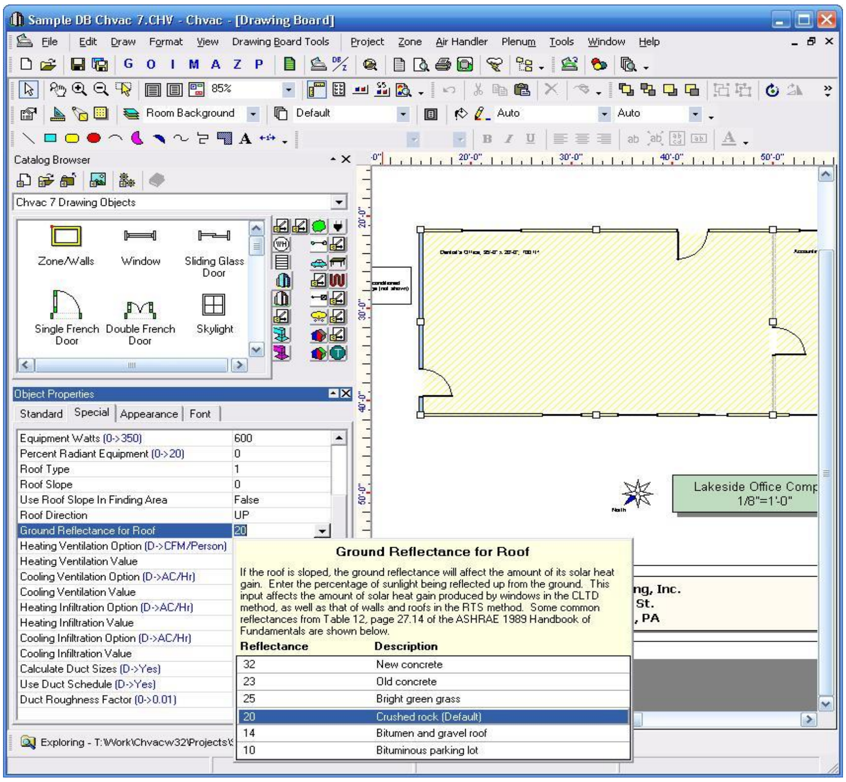


Simulators (Hands-on Practical Sessions)

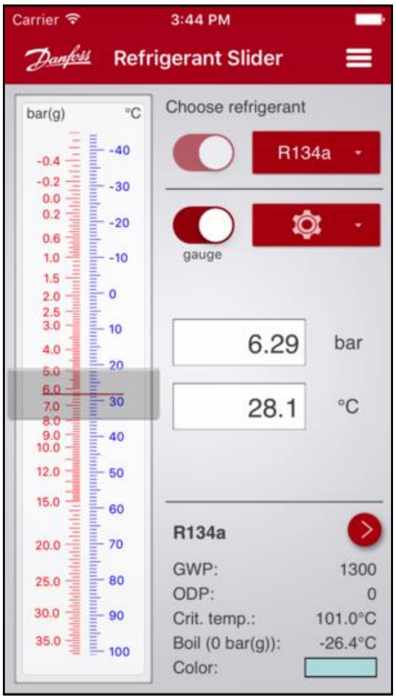
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators “Elite CHVAC Simulator”, “KOTZA HVAC Simulator”, “Danfoss Refrigerant Slider App”, “Danfoss Trouble Shooter App” and “Air Lite Psychrometric Calcs”.



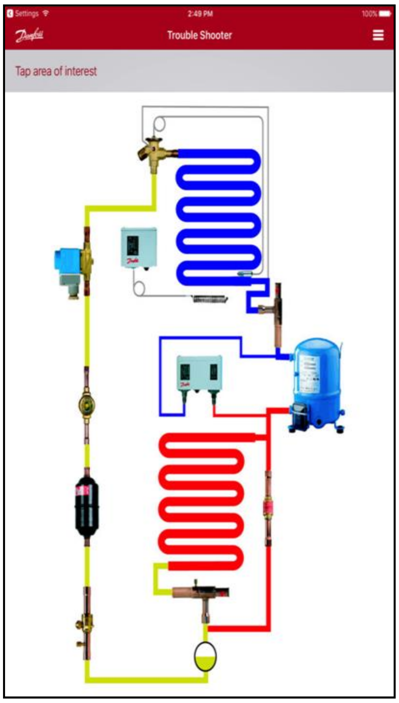
KOTZA HVAC Simulator



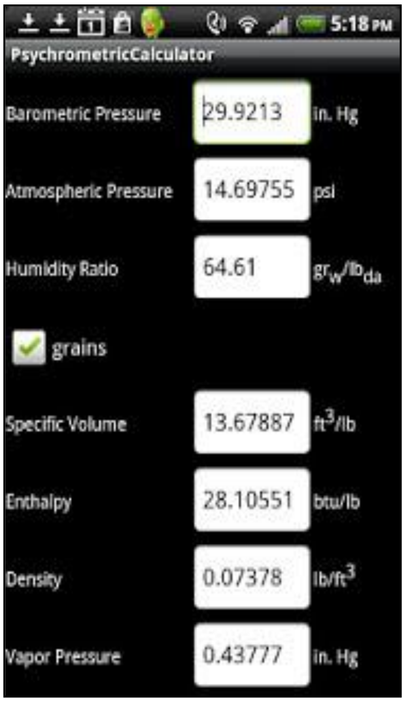
Elite CHVAC Simulator



Danfoss Refrigerant Slider App



Danfoss Trouble Shooter App



Air Lite Psychrometric Calcs

Course Coordinator
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