

COURSE OVERVIEW ME0515 Chiller & Chiller Plant Design, Installation, Maintenance & Troubleshooting

Course Title

Chiller & Chiller Plant Design, Installation, Maintenance & Troubleshooting

Course Date/Venue

August 02-06, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Reference

ME0515

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes 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 chiller and chiller plant design, installation, maintenance and troubleshooting. It covers the primary system components; the application considerations, chiller design and chilled-water system variations; the system issues and challenges; the chiller problems and chiller control systems; the chiller servicing and safety; and the chiller installation, operation, testing, maintenance and preventive maintenance.



During this interactive course, participants will learn the chiller fault finding, troubleshooting, visual inspection, measurement, faults-improper adjustments and setting; the cause and effect diagram, troubleshooting tools, typical malfunctions and possible causes; the cooling tower types and performance; the efficient system operation; the flow-control strategies and energy saving opportunities; the cooling towers assessment and energy efficiency opportunities; the option checklist, worksheets and references; the principle of operation, application, design conditions and performance curves; the different types of cooling towers and thermal performance evaluation; and the materials of construction, cooling tower theory, selection considerations and tower coefficients.

Course Objectives

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

- Design, install, maintain and troubleshoot chillers and chiller plant in a professional manner
- Identify the primary system components comprising of chiller, loads, chilled-water distribution system, condenser, water system and unit-level controls
- Explain application considerations and describe chiller design and chilled-water system variations
- Recognize system issues and challenges covering low ΔT syndrome, amount of fluid in the loop, contingency, alternative energy sources, plant expansion, retrofit opportunities and applications outside the chiller's range
- Identify chiller problems and chiller control systems
- Employ chiller servicing and safety that include safety and regulations-handling refrigerants, handling of pressure containers, changing the compressor, adding oil to the compressor, etc.
- Carryout chiller installation, operation, testing and maintenance
- Implement preventive maintenance, inspection checklist and operating log
- Perform chiller fault finding, troubleshooting, visual inspection, measurement, faults-improper adjustments and setting
- Illustrate cause and effect diagram, use troubleshooting tools and identify the typical malfunctions and possible causes
- Evaluate cooling tower types and performance and apply efficient system operation
- Employ flow-control strategies and recognize energy saving opportunities
- Assess cooling towers and identify energy efficiency opportunities, option checklist, worksheets and references
- Explain the principle of operation, application, design conditions and performance curves
- Recognize the different types of cooling towers and evaluate their thermal performance
- Identify the materials of construction as well as explain the cooling tower theory, selection considerations and tower coefficients

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 the design, installation, maintenance and troubleshooting of chillers for HVAC engineers, utilities managers, maintenance/plant managers, mechanical engineers, electrical engineers design engineers, consulting engineers, inspection and repair engineers, operation, maintenance, managers, superintendents, supervisors, and other technical staff.

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:

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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**. 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.

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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.

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 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. Mustafa Fadel is a **Senior Mechanical Engineer** with over **25 years** of industrial experience within the **Power & Water Utilities** and other **Energy Sectors**. His specialization widely covers **District Cooling: Plant: Design, Operation & Maintenance HVAC System, HVAC Equipment Terminology, HVAC System Block Load Calculation, HVAC System Development of Drawings, Air Distribution System, Basic Chiller Water System Design & Selection, Pump Design & Selection, Rotating & Static Equipment, Cooling Tower Design, Boiler Design & Selection, Energy Management & Value Engineering for Mechanical System, Mechanical Ventilation, Smoke Ventilation, Staircase Pressurization, System Design & Development of Drawings, Data Center Design, Precision AC Equipment Selection, Refrigeration Systems, Air Cooler Design, Chillers, Mass & Heat Transfer, Electromechanical, Rotating & Static Equipment** including **Heat Exchangers, Piping & Pipeline, Pressure Vessels, Valves, Tanks Turbines, Compressors, Motors, Pumps, Evaporators, Condensers, Blowers and Fans, Maintenance Planning & Scheduling, Root Cause Failure Analysis, Performance Calculations, Reliability Maintenance and Corrective & Preventive Maintenance**. Further, he is also well-versed in **HSE Management, KPI's, CMMS and AutoCAD** as well as in various international standards such as the **ASHRAE, API, ASTM, ASME, AMCA, NFPA and SMACNA**. Currently, he is the **HVAC&R Specialist** in **SEGAS LNG Plant** wherein he is responsible for the implementation, construction and maintenance strategy for industrial HVAC&R equipment.

During his career life, Mr. Fadel has gained his practical and field experience through his various significant positions and dedication as the **Section Head, Project Manager, HVAC System Consultant Engineer, Mechanical Engineer, HVAC&R Instructor** and **Senior Technical Consultant** for international companies and universities like the **Foster Wheeler, Technip-Italy, Borner Company, Union FENOSA Gas, Asphalt Bitumen, King Khalid University, Alexandria Petroleum Company, FAWAZ Company, Marium Corporation** and many more.

Mr. Fadel has a **Bachelor's degree in Power Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and an active member of the American Society of Heating Refrigerating and Air Conditioning Engineers (**ASHRAE**), **USA**. He has further delivered and participated numerous engineering and inspection projects, trainings, courses, seminars and conferences globally.

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.

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, 02nd of August 2026

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Primary System Components Chiller • Loads • Chilled-Water Distribution System • Condenser • Water System • Unit-Level Controls
0930 - 1000	Break
1000 – 1100	Application Considerations Small Chilled-Water Systems (1-2 chillers) • Mid-Sized Chilled-Water Systems (3-5 Chillers) • Large Chilled-Water Systems (6+ Chillers, District Cooling) • Chiller Plant System Performance
1100 – 1130	Chiller Design Types of Chillers • Vapor-Compression Cycle • Variable-Speed Drives • Packaged Air-Cooled Chiller
1130 – 1200	Chiller Design (cont'd) Absorption Refrigeration Cycle • Chilled-Water System Components • Single-Chiller Systems • Multiple-Chiller Systems
1200 – 1215	Break
1215 – 1420	Chilled-Water System Variations Heat Recovery • Condenser “Free Cooling” or Water Economizer • Preferential Loading • Series-Counterflow Application • Unequal Chiller 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 One



Day 2: Monday, 03rd of August 2026

0730 – 0930	System Issues & Challenges <i>Low ΔT Syndrome • Amount of Fluid in the Loop • Contingency • Alternative Energy Sources</i>
0930 – 0945	<i>Break</i>
0945 – 1100	System Issues & Challenges (cont'd) <i>Plant Expansion • Retrofit Opportunities • Applications Outside the Chiller's Range</i>
1100 – 1130	Chiller Problems <i>Introduction • Scale Control • Corrosion Control</i>
1130 – 1200	Chiller Problems (cont'd) <i>Blowdown-Intentional Water Loss from Cooling Systems • Chemical Scale Inhibitor Use • Biological Control-Biocide Dangers</i>
1200 – 1215	<i>Break</i>
1215 – 1420	Chiller Control Systems <i>Understand the Concept of Control • Types of Control • Elements of Control • Methods of Control • Instrumentation</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 04th of August 2026

0730 – 0930	Chiller Servicing & Safety <i>Safety and Regulations-Handling Refrigerants, Handling of Pressure Containers • Changing the Compressor • Adding Oil to the Compressor</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Chiller Servicing & Safety (cont'd) <i>Replacing the Air Cooled Condenser • Changing the Evaporator • Air Purging • Pump Down of the Refrigeration System</i>
1100 – 1200	Chiller Servicing & Safety (cont'd) <i>Leakage Test • System Check • Cleaning-Air Cooled Containers, Evaporative Condensers • Evacuating Procedure</i>
1200 – 1215	<i>Break</i>
1215 – 1420	Chiller Installation, Operation, Testing & Maintenance <i>Installation Guidelines • Commissioning • Air Volume Measurements • Balancing Procedures</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Three</i>





Day 4: Wednesday, 05th of August 2026

0730 – 0930	Chiller Installation, Operation, Testing & Maintenance (cont'd) Air Balancing • Commissioning Report • Maintenance-Coils, Air-Cooled Condensers, Cooling Towers, Fans
0930 – 0945	Break
0945 – 1100	Preventive Maintenance Inspection Checklist • Operating Log
1100 – 1200	Chiller Fault Finding & Troubleshooting Introduction • Requirements • Troubleshooting Procedures-Refrigerant, Plant Layout, Visual Inspection, Measurement • Faults-Improper Adjustments and Setting, Poor Design and Installation, Equipment Failure, Limitations in Operation
1200 – 1215	Break
1215 – 1420	Chiller Fault Finding & Troubleshooting (cont'd) Troubleshooting Guide to Electrical Faults • Finding Electrical Faults • Troubleshooting Skills
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

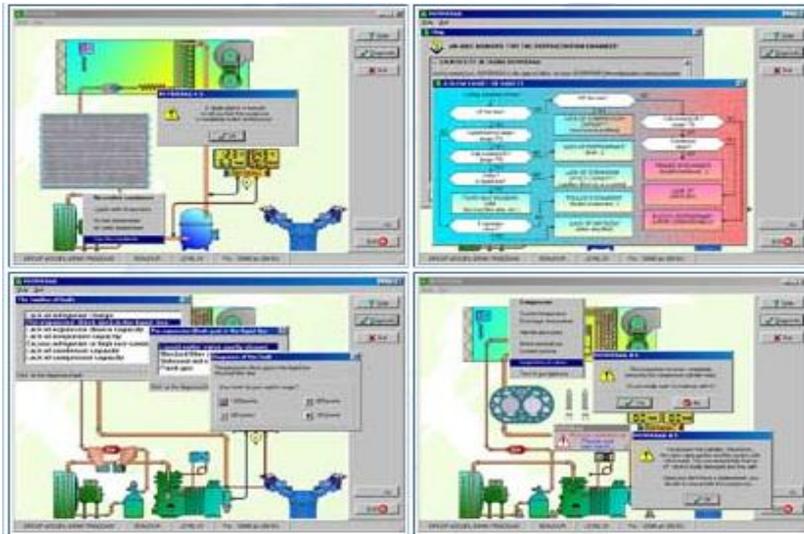
Day 5: Thursday, 06th of August 2026

0730 – 0930	Chiller Fault Finding & Troubleshooting (cont'd) Cause and Effect Diagram • Troubleshooting Tools • Typical Malfunctions and Possible Causes
0930 – 0945	Break
0945 – 1100	Cooling Towers Types and Performance Evaluation • Efficient System Operation • Flow-Control Strategies and Energy Saving Opportunities • Assessment of Cooling Towers • Energy Efficiency Opportunities • Option Checklist
1100 – 1200	Cooling Towers (cont'd) Worksheets • References • Principle of Operation • Application • Design Conditions • Performance Curves
1200 – 1215	Break
1215 – 1345	Cooling Towers (cont'd) Types of Cooling Towers • Cooling Tower Thermal Performance • Materials of Construction • Cooling Tower Theory • Selection Considerations • Tower Coefficients
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

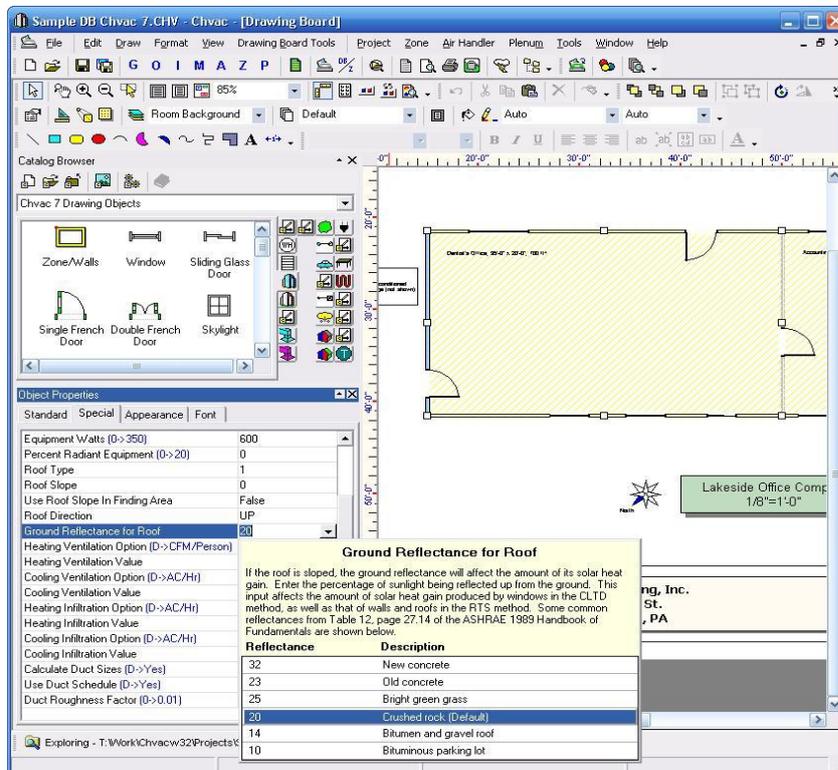


Simulator (Hands-on Practical Sessions)

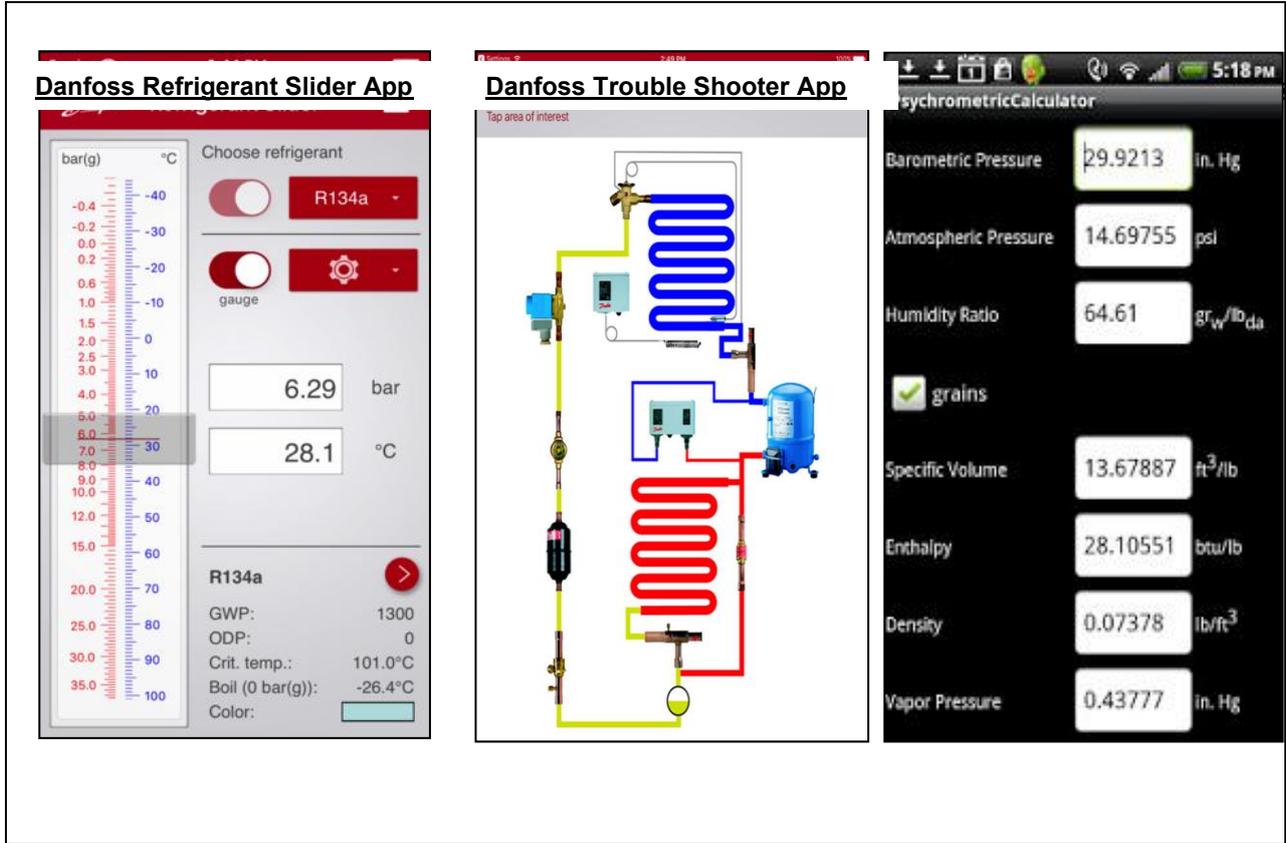
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulator “KOTZA HVAC Simulator”, “Elite CHVAC Simulator”, “Danfoss Refrigerant Slider App”, “Danfoss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



KOTZA HVAC Simulator



Elite CHVAC Simulator



Course Coordinator

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