COURSE OVERVIEW ME0720
Enhance Energy Efficiency in Heating, Ventilation, and Air Conditioning (HVAC) Systems

Course Title
Enhance Energy Efficiency in Heating, Ventilation, and Air Conditioning (HVAC) Systems

Course Date/Venue
Session 1: July 20-24, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: December 22-26, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

3.0 CEUs (30 PDHs) AWARD
H-STK© INCLUDED

Course Reference
ME0720

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 participants with a detailed and up-to-date overview of Best Practices for Energy Efficient Operation of District Cooling Plants. It covers the key components and functions of district cooling systems and the principles of energy efficiency; the energy audits and benchmarking; the key elements of energy management systems (EnMS); chiller types and technologies, chiller performance metrics and chiller operation and maintenance; and the load management and optimization, advanced control strategies and best practices for pump selection and operation.

Further, the course will also discuss the cooling tower performance optimization and water treatment and maintenance practices; the distribution systems and thermal storage covering efficient operation of distribution networks and benefits and challenges of thermal energy storage; the importance of proper insulation and various techniques for minimizing thermal losses; the energy recovery, heat recovery systems, real-time monitoring and data analytics; and the integration of building management systems (BMS) and SCADA for energy efficiency.

During this interactive course, participants will learn the data analysis for performance improvement; the key metrics for energy management; the fault detection and diagnostics, predictive maintenance and reliability and renewable energy integration; the role of smart technologies in energy efficiency; enhancing sustainability through energy efficiency and reducing environmental impact of district cooling; and the relevant regulations and standards and ensuring compliance in energy management.

Course Objectives

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

- Apply and gain an in-depth knowledge on best practices for energy efficient operation of district cooling plants
- Discuss the key components and functions of district cooling systems and the principles of energy efficiency
- Conduct energy audits and benchmarking and recognize the key elements of energy management systems (ENMS)
- Discuss chiller types and technologies, chiller performance metrics and chiller operation and maintenance
- Carryout load management and optimization, advanced control strategies and best practices for pump selection and operation
- Optimize cooling tower performance and apply water treatment and maintenance practices
- Recognize distribution systems and thermal storage covering efficient operation of distribution networks and benefits and challenges of thermal energy storage
- Discuss the importance of proper insulation and apply various techniques for minimizing thermal losses
- Apply energy recovery, heat recovery systems, real-time monitoring and data analytics
- Integrate building management systems (BMS) and SCADA for energy efficiency
- Analyze data for performance improvement and apply key metrics for energy management
- Employ fault detection and diagnostics, predictive maintenance and reliability and renewable energy integration
- Discuss the role of smart technologies in energy efficiency, enhance sustainability through energy efficiency and reduce environmental impact of district cooling
- Discuss the relevant regulations and standards and ensure compliance in energy management

Who Should Attend

This course provides an overview of all significant aspects and considerations of best practices for energy efficient operation of district cooling plants for facility managers, operations and maintenance (O&M) staffs, energy managers, mechanical engineers, building services engineers, district cooling plant operators, energy auditors, project managers, regulatory and compliance officers, sustainability professionals and academic researchers. These attendees would benefit from learning about best practices, emerging technologies, and strategies for improving the energy efficiency of district cooling plants, ultimately leading to cost savings and enhanced sustainability.

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: -

- 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.

- 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 Maintenance & Reliability and Rotating Equipment Engineer** with over **20 years** of industrial experience within the **Oil**, **Gas**, **Refinery**, **Petrochemical** and **Power** industries. His specialization widely covers Heating, Ventilation, Air Conditioning (**HVAC**) **& Refrigeration Systems**; **Air Cooler Design**; **Chiller Equipment**, **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**; Mechanical Maintenance, **Reliability Maintenance** and **Corrective** & **Preventive Maintenance**. Further, he is well-versed in **Energy Efficient Operation** of **District Cooling Plants**, **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**.

During his career life, Mr. Fadel has gained his practical and field experience through his various significant positions and dedication as the **Mechanical Head**, **Project Manager**, **Mechanical Engineer HVAC&R Instructor** and **Technical Consultant** for international companies and university 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** with **Honours**. He is an active member of the American Society of Heating Refrigetaring and Air Conditioning Engineers (**ASHRAE**) in **USA**. Further, he is a **Certified Instructor/Trainer** and has delivered and participated numerous engineering and inspection projects, training courses and conferences globally.

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.

Accommodation

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

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 – 0900	***Overview of District Cooling Systems*** *Key Components and Functions ● Importance of Energy Efficiency*
0900 – 0930	***Principles of Energy Efficiency*** *Basic Concepts and Terminology ● Benefits of Energy Efficiency in District Cooling*
0930 – 0945	*Break*
0945 - 1100	***Energy Consumption Patterns*** *Understanding Energy Use in District Cooling Plants ● Identifying Major Energy Consumers*
1100 - 1230	***Energy Audits & Benchmarking*** *Conducting Energy Audits ● Benchmarking Energy Performance*
1230 – 1245	*Break*
1245 – 1330	***Energy Management Systems (EnMS)*** *Introduction to ISO 50001 ● Key Elements of an Effective EnMS*
1330 - 1420	***Case Studies: Successful Energy Efficiency Projects*** *Real-World Examples of Energy Savings ● Lessons Learned and Best Practices*
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	*End of Day One*

Day 2

0730 – 0830	***Chiller Types & Technologies*** *Overview of Different Chiller Technologies ● Selection Criteria for Energy Efficiency*
0830 – 0930	***Chiller Performance Metrics*** *Key Performance Indicators (KPIs) ● Methods for Measuring and Monitoring Performance*
0930 – 0945	*Break*
0945 – 1130	***Chiller Operation & Maintenance*** *Best Practices for Efficient Chiller Operation ● Routine Maintenance for Optimal Performance*
1130 – 1230	***Load Management & Optimization*** *Techniques for Load Matching and Management ● Strategies for Reducing Peak Demand*
1230 – 1245	*Break*

1245 – 1330	***Advanced Control Strategies*** *Use of Variable Speed Drives (VSDs) ● Implementing Advanced Control Algorithms*
1330 - 1420	***Workshop: Chiller Optimization Techniques*** *Hands-On Exercises in Chiller Optimization ● Applying Techniques to Real-World Scenarios*
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	*End of Day Two*

Day 3

0730 – 0830	***Pumping Systems & Energy Efficiency*** *Best Practices for Pump Selection and Operation ● Use of VSDs for Pump Efficiency*
0830 – 0930	***Cooling Towers & Heat Rejection*** *Optimizing Cooling Tower Performance ● Water Treatment and Maintenance Practices*
0930 – 0945	*Break*
0945 – 1130	***Distribution Systems & Thermal Storage*** *Efficient Operation of Distribution Networks ● Benefits and Challenges of Thermal Energy Storage*
1130 – 1230	***Insulation & Thermal Loss Reduction*** *Importance of Proper Insulation ● Techniques for Minimizing Thermal Losses*
1230 – 1245	*Break*
1245 – 1330	***Energy Recovery & Reuse*** *Identifying Opportunities for Energy Recovery ● Implementing Heat Recovery Systems*
1330 - 1420	***Workshop: Auxiliary System Optimization*** *Practical Exercises in Optimizing Auxiliary Systems ● Case Studies of Successful Implementations*
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	*End of Day Three*

Day 4

0730 – 0830	***Real-Time Monitoring & Data Analytics*** *Importance of Continuous Monitoring ● Tools and Technologies for Data Collection*
0830 – 0930	***Building Management Systems (BMS) & SCADA*** *Integrating BMS and SCADA for Energy Efficiency ● Best Practices for Effective Integration*
0930 – 0945	*Break*
0945 – 1130	***Data Analysis & Performance Metrics*** *Analyzing Data for Performance Improvement ● Key Metrics for Energy Management*

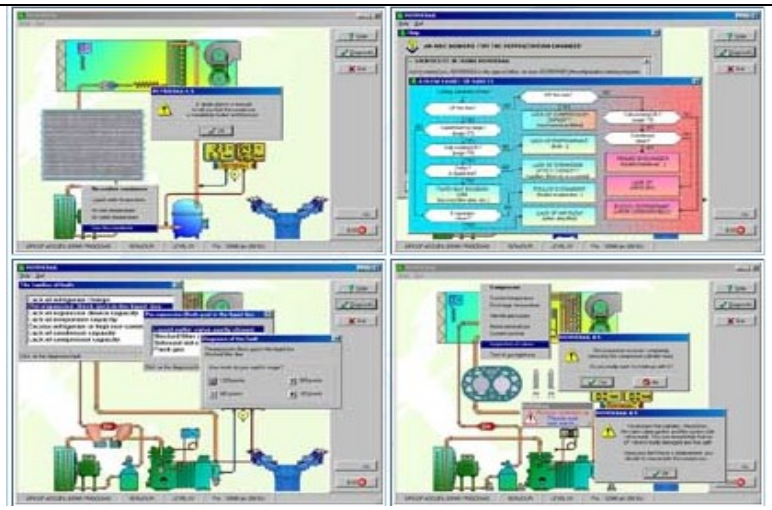
1130 – 1230	***Fault Detection & Diagnostics*** *Techniques for Early Fault Detection ● Diagnostic Tools and Software*
1230 – 1245	*Break*
1245 – 1330	***Predictive Maintenance & Reliability*** *Implementing Predictive Maintenance Programs ● Benefits of Predictive Maintenance*
1330 - 1420	***Workshop: Data-Driven Decision Making*** *Hands-On Exercises in Data Analysis and Interpretation ● Developing Actionable Insights from Data*
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	*End of Day Four*

Day 5

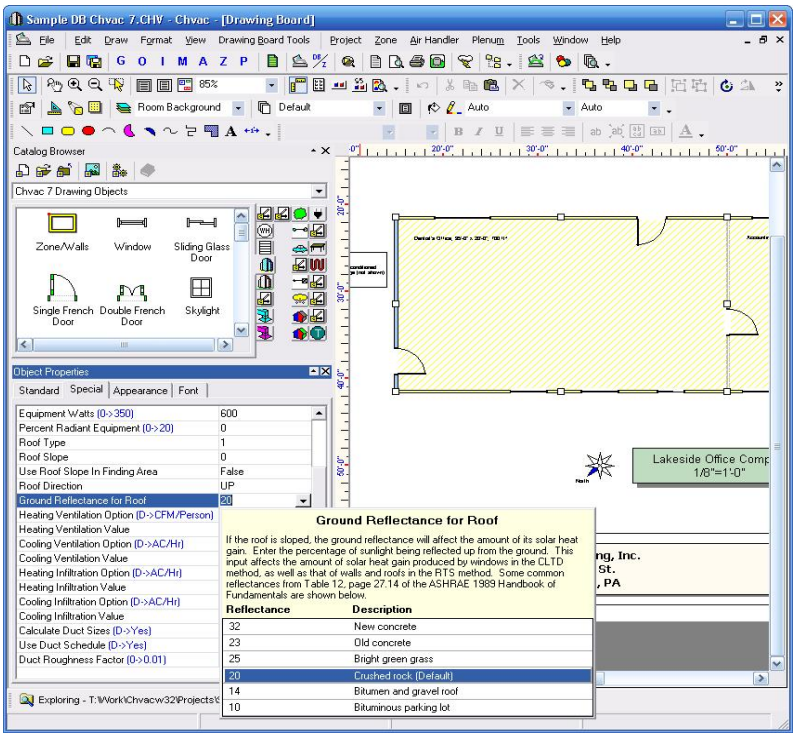
0700 – 0830	***Renewable Energy Integration*** *Opportunities for Integrating Renewables ● Benefits and Challenges of Renewable Energy*
0830 – 0930	***Smart Technologies & IoT*** *Role of Smart Technologies in Energy Efficiency ● Implementing IoT Solutions for District Cooling*
0930 – 0945	*Break*
0945 – 1130	***Sustainability & Environmental Impact*** *Enhancing Sustainability through Energy Efficiency ● Reducing Environmental Impact of District Cooling*
1130 – 1230	***Regulatory Compliance & Standards*** *Understanding Relevant Regulations and Standards ● Ensuring Compliance in Energy Management*
1230 – 1245	*Break*
1245 – 1345	***Emerging Trends & Innovations*** *Latest Developments in District Cooling ● Future Directions for Energy Efficiency*
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	*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 one of our state-of-the-art simulators "KOTZA HVAC Simulator", and "Elite CHVAC Simulator".



KOTZA HVAC Simulator



Elite CHVAC Simulator

Course Coordinator

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