COURSE OVERVIEW ME0391
HVAC - District Cooling Plant - Design, Operations & Maintenance

Course Title
HVAC - District Cooling Plant - Design, Operations & Maintenance

Course Date/Venue
Session 1: July 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 21-25, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
ME0391

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of District Cooling Plant Design, Operation and Maintenance. It covers the advantages and disadvantages of district cooling systems and its role in energy efficiency and sustainability; the fundamentals of cooling systems covering the basics of thermodynamics and heat transfer, principles of refrigeration and types of cooling technologies and equipment; the load calculations and estimation, selection of cooling equipment and system layout and configuration; the piping design, hydraulic calculations, pumping systems and selection and control and automation considerations; and the district cooling plant components and efficiency.

Further, the course will also discuss the water treatment, quality management and district cooling plant operation; the energy management and optimization and district cooling plant maintenance; the district cooling plant economics; the project management and implementation and the regulations and standards; the customer relations and service quality including customer satisfaction and feedback management, service level agreements, customer expectations, complaint handling and dispute resolution; and the SCADA system components, architecture and applications in district cooling plants.

During this interactive course, participants will learn the importance of cybersecurity in district cooling plants; the vulnerabilities and threats in SCADA systems and data protection and privacy measures; the future trends in district cooling; and the emerging technologies, innovations, integration with smart grids and IoT and decentralized district cooling concepts.

Course Objectives

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

- Design, operate and maintain district cooling plant in a professional manner
- Discuss the advantages and disadvantages of district cooling systems and its role in energy efficiency and sustainability
- Explain the fundamentals of cooling systems covering the basics of thermodynamics and heat transfer, principles of refrigeration and types of cooling technologies and equipment
- Carryout load calculations and estimation, selection of cooling equipment and system layout and configuration
- Employ piping design, hydraulic calculations, pumping systems and selection and control and automation considerations
- Identify district cooling plant components and efficiency
- Apply water treatment, quality management and district cooling plant operation
- Implement energy management and optimization and district cooling plant maintenance
- Discuss district cooling plant economics and apply project management and implementation as well as the regulations and standards
- Implement customer relations and service quality including customer satisfaction and feedback management, service level agreements, customer expectations, complaint handling and dispute resolution
- Discuss SCADA system components, architecture and applications in district cooling plant
- Explain the importance of cybersecurity in district cooling plants, identify the vulnerabilities and threats in SCADA systems and apply data protection and privacy measures
- Discuss the future trends in district cooling covering the emerging technologies, innovations, integration with smart grids and IoT and decentralized district cooling concepts

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 design, operation and maintenance of district cooling plant for senior and experienced engineers, plant managers, energy managers, HVAC technicians, facility managers, energy consultants, project managers and engineers (DC) specialist.

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 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 Refrigetaring and Air Conditioning Engineers (**ASHRAE**), **USA**. He has further delivered and participated numerous engineering and inspection projects, trainings, courses, seminars and conferences globally.

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.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to District Cooling*** *District Cooling Systems • Advantages and Disadvantages • Role of District Cooling in Energy Efficiency and Sustainability*
0930 – 0945	*Break*
0945 – 1045	***Fundamentals of Cooling Systems*** *Basics of Thermodynamics and Heat Transfer • Principles of Refrigeration • Types of Cooling Technologies and Equipment*
1045 – 1215	***Designing a District Cooling Plant: Part 1*** *Load Calculations and Estimation • Selection of Cooling Equipment • System Layout and Configuration*
1215 – 1230	*Break*
1230 – 1420	***Designing a District Cooling Plant: Part 2*** *Piping Design and Hydraulic Calculations • Pumping Systems and Selection • Control and Automation Considerations*
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

0730 – 0930	***District Cooling Plant Components*** *Chiller Plant Design and Operation • Cooling Towers and Heat Rejection Systems • Thermal Energy Storage Systems*
0930 – 0945	*Break*
0945 – 1045	***District Cooling Plant Efficiency*** *Energy Optimization Techniques • Variable Flow and Temperature Strategies • System Controls and Monitoring*
1045 – 1215	***Water Treatment & Quality Management*** *Importance of Water Treatment in District Cooling • Water Quality Standards and Regulations • Chemical Treatment and Monitoring Practices*
1215 – 1230	*Break*

1230 – 1420	***District Cooling Plant Operation: Part 1*** *Start-Up and Shut-Down Procedures • Safety Protocols and Emergency Response • Routine Maintenance and Inspections*
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

0730 – 0930	***District Cooling Plant Operation: Part 2*** *System Performance Monitoring and Analysis • Troubleshooting Common Issues • Maintenance Planning and Scheduling*
0930 – 0945	*Break*
0945 – 1045	***Energy Management & Optimization*** *Energy Audits and Efficiency Assessments • Energy Management Strategies • Retrofitting and Upgrading Options*
1045 – 1215	***District Cooling Plant Maintenance*** *Preventive & Predictive Maintenance Strategies for District Cooling Plants • Techniques for Monitoring & Detecting Leaks in the Distribution System • Troubleshooting Common Issues in Chillers, Pumps & Other Plant Equipment • Creating an Effective Maintenance Schedule*
1215 – 1230	*Break*
1230 – 1420	***District Cooling Plant Economics*** *Cost Analysis and Financial Considerations • Tariff Structures and Pricing Models • Return on Investment and Payback Periods*
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

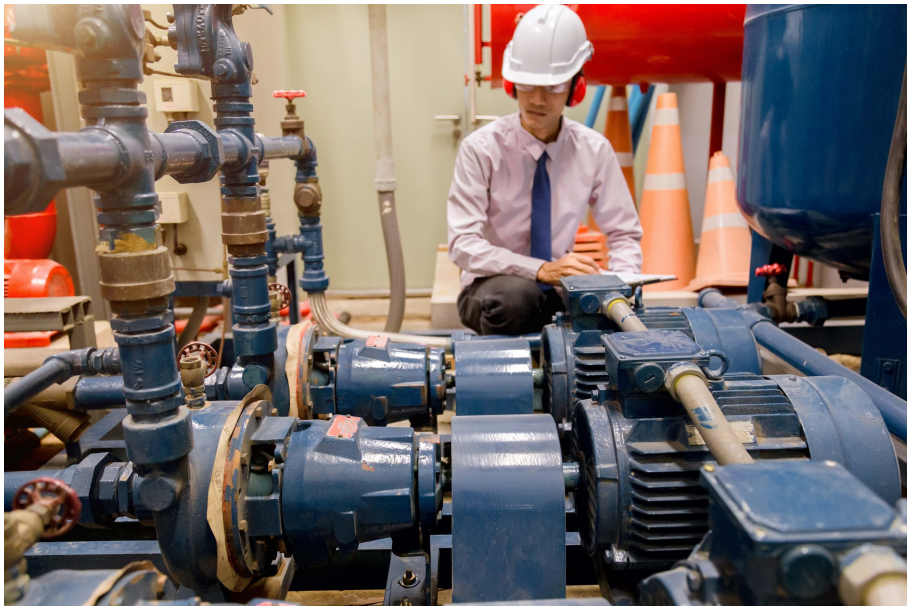
0730 – 0930	***Project Management & Implementation*** *Project Planning and Execution • Stakeholder Engagement and Coordination • Risk Assessment and Mitigation*
0930 – 0945	*Break*
0945 – 1045	***Regulations & Standards*** *Regulatory Frameworks and Compliance • Industry Standards and Guidelines • Permitting and Licensing Requirements*
1045 – 1215	***Case Studies & Best Practices*** *Real-world Examples of District Cooling Plants • Lessons Learned and Success Stories • Best Practices for Design, Operation, and Maintenance*
1215 – 1230	*Break*
1230 – 1420	***Customer Relations & Service Quality*** *Customer Satisfaction and Feedback Management • Service Level Agreements and Customer Expectations • Complaint Handling and Dispute Resolution*
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

0730 – 0930	***Training on SCADA Systems*** *Supervisory Control and Data Acquisition (SCADA) Basics • SCADA System Components and Architecture • Scada Applications in District Cooling Plants*
0930 – 0945	*Break*
0945 – 1045	***Cybersecurity & Data Protection*** *Importance of Cybersecurity in District Cooling Plants • Vulnerabilities and Threats in SCADA Systems • Data Protection and Privacy Measures*
1045 – 1215	***Future Trends in District Cooling*** *Emerging Technologies and Innovations • Integration with Smart Grids and IoT • Decentralized District Cooling Concepts*
1215 – 1230	*Break*
1230 – 1345	***Final Assessment & Conclusion*** *Recap of Key Concepts and Learning Outcomes • Final Assessment to Evaluate Participants' Knowledge • Course Wrap-Up and Closing Remarks*
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*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org