

Scandinavian Academy
Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Advanced HVAC Design, Maintenance & Operation Techniques

Code	City	hotel	Start	End	price	Language - Hours
CM-515SA	Al Baha	Hotel Meeting	2027-10-24	2027-10-28	13950 SR	En - 25

Objectives

This is a specialized course concentrating on two important subjects as follows:

The details of heat load calculations, selection of appropriate equipment/system and the design of the ducts and piping networks.
After sale service including testing, commissioning, putting into commercial operation, operation and maintenance.
To have those who attend and actively participate in the discussions and case study leave the course with enough knowledge to implement their daily assignments correctly and professionally.

Who should attend

HVAC Engineers, Engineers involved in specialties such as consultants, contractors specialized engineers and end users Engineers

Daily Outlines

Day 1: HVAC systems design

Heat load

- Using the equation of each heat load for analysis and possible reduction in the

heat load.

- Air treatment and human comfort
- Evaluating and studying the outside and inside design conditions to meet the human comfort
- Daily and monthly heat load profiles, how they affect the heat load
- Selecting the type of AC system
- According to the size of total heat load
- According to type of compressors
- According to condensing method.
- According to type of usage (Big centralized systems servicing complexes & multi buildings).
- The C.O.P./EER with examples.

Day 2: The piping system for chilled water applications

- Velocity/friction loss VS initial and running cost. How to decide which way to go.
- Closed or open type systems. (Advantages and dis-advantages of each type).
- Pressure breakers and the need for high rise buildings
- Providing Quality and
- Effect of pressure breakers on evaporating temp., chilled water temp., C.O.P., air side, initial and running cost.
- Expansion and contracting of the piping circuits and the selection of expansion joints, pressurized expansion & make up tanks.
- Refrigerants and their effect on AC systems selection and the environment.

Day 3: How cooling towers work for centralized water cooled systems.

Thermal storage

- Types of thermal storage systems.
- Air cooled systems Load shifting (partial and full), daily and weekly, case study with calculations

- and comparison of C.O.P.
- Ventilation, infiltration, ex-filtration. How to minimize their heat loads
- The conclusion (Selecting the right AC system based on):
- Size of installation and the limitations on our choice according to job size and the readymade manufacturers equipment.
- Initial and running cost
- Type, size and number of compressors
- Type of condensers. (Air, water, evaporative and radiators)
- Evaporating temperature and the type of heat exchange in coolers and air side.
- Evaluating the C.O.P.

Day 4: Total system reliability

- What reliability means (Redundancy, stand by equipment/components for commercial and industrial applications)
- The difference between commercial individual systems and centralized systems.
- Centralized control and management
- Definitions and the need for control narrative, BMS, SCADA and DCS systems
- How BMS, SCADA & DCS systems improve the efficiency & reliability and their effect on initial cost
- District cooling
- Introduction to district cooling
- Why district cooling (For the real state developers/clients, the nation and environment).
- The choice of condensing method for district cooling systems

Day 5: Introduction to Inlet air cooling to gas turbines

- Iso conditions for gas turbines and nominal capacity for air conditioning units.
- Gas turbines power output and the relation with ambient conditions and site elevation
- Why we need to cool the inlet air to gas turbines

- Base and peak load inlet air cooling and their economics.
- Load shifting and the need for thermal storage (Build up cycle and burn off cycle)
- Types of thermal storage for inlet air cooling
- Open discussions on the HVAC design
- Operation and Maintenance
- Scheduled preventive maintenance routines for DX and chilled water systems
- Daily log sheets and the items to record and monitor.
- Importance of pre-commissioning tests, cold and hot tests for proper maintenance
- Utilizing records history for improvement of systems reliability
- Hand over package and its importance for proper maintenance.- Training of hands on staff for better understanding of the systems to reduce down time and operational cost.
- Operation and maintenance case studies
- Open discussions including any specific related cases from attendees.
- Feedback from attendees and distribution of certificates
- Continuation of open discussions on operation and maintenance

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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