Mounting



HVAC Systems: Advanced Design, Operation & Maintenance Strategies

Duration: 5 Days

Language: en

Course Code: IND04 - 135

Objective

By the end of this course, participants will be able to:

- Apply fundamental and advanced principles of HVAC design.
- Analyse heat load components and reduce unnecessary energy consumption.
- Evaluate and select the most suitable AC systems and configurations.
- Understand and manage the operational modes of HVAC systems.
- Develop and implement effective maintenance programmes.
- Identify opportunities for improving system performance and longevity.

Audience

This course is ideal for:

- HVAC design engineers and consultants.
- Contractors and project engineers.
- Facility and maintenance engineers.
- End-user engineers responsible for HVAC systems.
- Operations and energy managers.
- Anyone involved in specifying, supervising, or maintaining HVAC systems.

Training Methodology

The course combines technical presentations, case study analysis, calculations, group discussions, and interactive workshops. Participants will work on real-world scenarios and apply learned concepts through guided exercises, fostering a strong practical understanding.

Summary

Heating, Ventilation, and Air Conditioning (HVAC) systems are essential to ensuring comfort, productivity, and efficiency in buildings and industrial facilities. However, designing, operating,

and maintaining HVAC systems optimally requires a deep understanding of environmental conditions, system dynamics, and maintenance best practices.

This comprehensive training course equips participants with the expertise to design HVAC systems tailored to specific project needs, operate them effectively, and implement proactive maintenance strategies that enhance system reliability, reduce costs, and improve user satisfaction.

Course Content & Outline

Section 1: HVAC Design Concepts and Comfort Criteria

- Sources and calculation of heat loads.
- Techniques to analyse and reduce internal and external heat gains.
- Principles of air treatment for thermal comfort.
- Evaluating indoor and outdoor design conditions.
- Understanding and applying daily and seasonal heat load profiles.
- Criteria for selecting the appropriate AC system for different applications.

Section 2: Piping Systems for Chilled Water Applications

- Design considerations: velocity, friction loss, cost trade-offs.
- Open vs. closed loop systems: advantages and limitations.
- High-rise building solutions: pressure breakers, booster pumps.
- Expansion and contraction: joints, pressurised tanks, and makeup water.
- Environmental considerations of refrigerants and their impact on system selection.

Section 3: Heat Transfer and Selecting Optimal AC Systems

- Cooling tower operation principles for water-cooled systems.
- Introduction to thermal storage and its types.
- Load shifting strategies using air-cooled and water-cooled systems.
- Understanding and minimising ventilation losses (infiltration, exfiltration).
- Decision factors in selecting efficient AC systems: COP, lifecycle cost, footprint.
- Comparative case study of AC system configurations with calculations.

Section 4: HVAC System Operation and Performance Monitoring

- Overview of system components and their functional roles.
- Pre-startup preparation and system commissioning.

- Monitoring operational conditions and performance parameters.
- Understanding the sequence of operations and control logic.
- Partial system operation strategies during low-load conditions.
- Procedures for controlled shutdown and restart after downtime.

Section 5: Proactive HVAC Maintenance and Reliability Enhancement

- Preventive maintenance schedules and task planning.
- Daily log sheets: what to record, how to use the data.
- Analysing historical records to improve reliability and efficiency.
- Importance of a complete handover package for maintenance planning.
- Training onsite staff to improve response, reduce downtime and cost.
- Case studies of maintenance failures and best-practice recovery strategies.
- Open discussion: addressing participant-specific challenges and sharing solutions.

Certificate Description

Upon successful completion of this training course, delegates will be awarded a Holistique Training Certificate of Completion. For those who attend and complete the online training course, a Holistique Training e-Certificate will be provided.

Holistique Training Certificates are accredited by The CPD Certification Service (CPD), and are certified under ISO 9001 and ISO 29993 standards.

CPD credits for this course are granted by our Certificates and will be reflected on the Holistique Training Certificate of Completion. In accordance with the standards of The CPD Certification Service, one CPD credit is awarded per hour of course attendance. A maximum of 50 CPD credits can be claimed for any single course we currently offer.

Categories

Energy and Oil & Gas, Engineering, Health, Safety & Environment HSE

Tags

HVAC systems, HVAC Design, Heat Transfer

Related Articles



The Importance of Value Engineering in 2025

Optimise construction projects with Value Engineering. Enhance functionality, reduce costs, and mitigate risks. Learn its steps and applications in construction.