

# HVAC Systems: Fundamentals, Design, and Maintenance

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# HVAC Systems: Fundamentals, Design, and Maintenance

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## Overview

This course provides an excellent introduction to the fundamentals of Heating, Ventilation, and Air Conditioning. It commences with a review of psychometric charts and then examines the factors that nuance design choices, indoor air quality, load calculations and heating/ventilation and air-conditioning systems. The course introduces many important subjects. The details include terminologies, psychometric processes, heat load calculations, the selection of appropriate equipment/system, installation procedures for equipment, its maintenance, and troubleshooting.

## Course Objectives

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

- Study the details of heat load calculations, selection of appropriate equipment/system and the design of the ducts and piping networks, in addition to installation, maintenance and troubleshooting
- Learn the fundamentals of HVAC, including primary and secondary equipment; means of distribution, space and load determination, and operating strategy, performance rating terms, and function of components.
- Understand the basic selection criteria for heating systems and factors considered when designing commercial heating systems.
- Understand and apply the psychometric chart.
- Design for good air quality
- Minimise forced outages and prevent severe damage to HVAC Equipment
- Provide an overview of the legislative requirements, plus the essential steps and responsibilities for the maintenance and repair of HVAC Systems



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## Course Content

- An introduction to heating, ventilation and air conditioning systems
- Basic criteria of heat transfer and ventilation
- Mollier charts and thermodynamic principles
- Basic cycles and calculation of performance and effectiveness
- Basic components of a complete system
- Understanding of airflow and affecting parameters
- Evaporator construction details
- Condenser construction details
- Capillary action and expansion valves
- Compressor construction details
- Cycle coefficient of performance
- Lubrication system
- Thermo-states and method of control
- Control equipment
- Reverse systems
- Measuring techniques and methods of control
- Sticho-metric chart
- Operation of a cycle
- Maintenance of a cycle and maintenance philosophy.
- Case studies

## Targeted Audience

- HVAC Engineers
- HVAC Consultants
- HVAC Contractors
- End Users Engineers



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## Course Methodology

Facilitated by an experienced professional trainer, this training course will be conducted as a highly interactive workshop session. A variety of training methodologies and facilitation techniques will be employed before and during the course, as applicable. These methods are aimed at enhancing individual and group interaction while maximising learning. Some of these methods are:

- Online Pre-post Test
- Colourful Visual Aids
- Gamification
- Self-Assessment Instruments
- Simulations
- Case Studies
- Videos
- Group Exercises & Discussions
- Role-plays
- Indoor & Outdoor games

