TECHNICAL EDUCATION ACADEMY

School of Engineering

COURSE PROGRAMME

000215

MECH001 - HVAC system Operation and Maintenance

The design, operation, maintenance and troubleshooting of a wide range of HVAC systems will be covered.



Learn from the Best in the Business!

Course overview

Intermediate level

Why take this course

The design, operation, maintenance and troubleshooting of a wide range of HVAC systems will be covered. This course starts with a quick review of psychrometry and representation and air conditioning processes on the psychrometric chart. This is followed by a detailed discussion of the basic subsystems of any HVAC system, comprehensive coverage of various systems, and guidelines for selecting the most suitable HVAC system for various applications. Finally, a discussion of the operation and maintenance of various subsystems and components is presented, followed by an outline of the measurements and instrumentation used in HVAC system troubleshooting.

Who it is for and how it helps

Facility managers and engineers, mechanical engineers, maintenance and operations personnel, technicians and technologists.

What you will learn

- Apply and use psychrometry to understand the design and operation of various HVAC systems
- Recognize and understand the operation of a wide range of HVAC systems
- Select and identify the most suitable HVAC system for various practical applications
- Develop an outline of a complete HVAC system
- Prepare a preventative and regular maintenance program for HVAC systems

Curriculum

Modules 01–05

01 Introduction

- The meaning of air conditioning
- Comfort conditions
- Codes and standards
- Rules of thumb (cooling/heating load and ventilation)

02 Psychrometry

- Moist-air properties
- The Psychrometric chart
- Moist air processes

03 Basic Subsystems of any HVAC System

- Air subsystem
- Chilled/hot-water subsystem
- Refrigeration subsystem
- Heat-rejection subsystem
- Control subsystem

04 Types of HVAC Systems - Single-zone systems

- Packaged terminal air conditioner
- Packaged DX rooftop unit
- Split DX system
- Chilled-water terminal system
- Dedicated outdoor-air system
- Water-source heat pump
- Ground-source heat-pump
- Variable-air-volume system

05 Types of HVAC Systems - Multiple-Zone Systems

- Multizone air handing unit

Curriculum

Modules 05–10 · Module 05 — continued

- Changeover-bypass system
- DX rooftop variable-air-volume system
- Packaged self-contained VAV system
- Central chilled-water VAV system
- Two-fan, dual-duct VAV system
- Dual-duct VAV system

06 Selection of HVAC Systems for Various Applications

- Factors that affect selection of HVAC system
- Selection map of HVAC systems for: single-purpose occupancies and multi-purpose occupancies

07 HVAC Equipment Selection and Rating Tables

- Packaged DX units
- Air Handling Units
- Air-cooled water chillers
- Water-cooled water chillers

08 Operation and Maintenance of Air Subsystem Components

- Operation and Maintenance of Air Subsystem Components

09 Fans

- Functions and types of fans
- Fan selection
- Fan noise - estimated fan sound power level
- Eliminating fan-noise problems
- Periodic inspection
- Fan troubles and the possible causes

10 Coils

- Types of coils

Curriculum

Modules 10–14 · Module 10 — continued

- Coil accessories
- Condensate control
- Freeze-up protection
- Tightness and cleaning

11 Air Cleaning Equipment

- Classification of air filters
- Electronic air cleaners
- Activated carbon adsorbers
- Selection of air filters

12 Air Ducts

- Air leakage
- Fire protection
- Duct liner and duct cleaning
- Sound attenuation in ducts
- Silencers

13 Operation and Maintenance to Guarantee Indoor Air Quality

- Inspection, service, and access
- Monitoring of operating conditions in air systems
- Coils and ductwork
- Space pressurization control
- Minimum Ventilation Control
- CO2-based demand-controlled ventilation

14 Operation and Maintenance of Refrigeration Subsystem Components

- Operation and Maintenance of Refrigeration Subsystem Components

Curriculum

Modules 15–16

15 Compressors

- Main problems in direct-expansion reciprocating systems
- Parameters that influence the performance of Shell-and-Tube water–cooled condensers
- Air-cooled condensers: clearance, warm air recirculation, dirt clogging, and low-ambient air control
- Factors that affect cooling tower performance
- Operating considerations for cooling towers
- Maintenance of cooling towers

16 Troubleshooting of HVAC Systems

- Measurements
- Instrumentation

Joining the programme

Contact the Academy and quote course code 000215 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

mail@tecedu.org
www.tecedu.academy

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