Heating, Ventilation & Air Conditioning (HVAC) for Hospital

Hospital Management
Munich (Germany)
27 - 31 Jan 2025

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Introduction

Heating, ventilation, and air conditioning HVAC is an indoor and vehicular environmental comforting technology. The technology aims to provide thermal comfort and high indoor air quality. The techniques of ventilating a building is further divided into a few types as mechanical, forced, and natural ventilation that will provide optimal temperature throughout the day and night.
Today in hospitals, HVAC systems are witnessed everywhere despite the type of environment including domestic and commercial. HVAC systems offer ventilation and balances pressure between vacuum spaces. This method of delivering air and removing spaces is called as room air distribution.

Course Objectives Of Heating, Ventilation, and Conditioning HVAC for Hospitals

- Provide a deep understanding of real-world solutions and has been tailored with simple yet realistic modules for effective and holistic implementation.
- Equip the learner with all the basic fundamentals of AC systems and design
- Use of testing equipment, and the principles of mechanics, electricity, and electronics.
- Enabling the learners to start off with a great professional career in this field.

Course outlines Of Heating, Ventilation, and Conditioning HVAC for Hospitals

Day 1

First Cost, Energy Efficiency / O&M Cost

- Maintainability. Reliability. Redundancy. Flexibility
- Change in Occupancy
- Partial Controllability
- Temperature
- Humidity
- Pressurization
- Air Quality
- Infection Control

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Day 2

The Selection of Hospital HVAC Systems

- Packaged Air Handling Units, Direct Expansion
- Chilled Water, Local Special Systems
- Medical Equipment, Computer Rooms
- Terminal Units, Unitary or Served by a Central Plant
- Fan Coil Units, Incremental Units
- Heat Pumps
- Induction Traditional Hospital HVAC Systems Decentralized Systems

Packaged Terminal Air Conditioner filter

- Water-Source Heat Pump
- Fan-Coil Unit cooling coil supply fan return-air inlet supply-air outlet filter
- Fan Coil Systems 4 pipe 2 pipe Central ventilation unit
- Induction Units 4 pipe 2 pipe Central ventilation unit
- Air-Cooled Chiller, Fan-Coil System
- Small Chilled-Water System

Day 3

Traditional Hospital HVAC Systems

- All Air Systems
- Central Heating
- Central Cooling
- Single Zone
- Multiple Zones & Constant Volume cooling
- Multiple Zones & Variable Volume

HVAC Filtration

- Primary panel filter Secondary filter HEPA or tertiary filter
- Sources of Chilled Water Chilled water
- Cooling Sources Chiller Plant
- Constant or Variable Flow-Primary-Flow Systems bypass two-way valve variable-flow pumps control valve check valves optional bypass with three-way valve
- Primary-Secondary Configuration production pumps
- Variable-Speed Drives
- Boiler Plant Steam vs. Hot Water Fire tube vs. water tube Full size vs. Modular Hot Water

Day 4

LEED for HealthCare

- Energy Conservation a significant part

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- Establish ASHRAE 90.1 for base performance
- LEED forces early consideration of all measures
- Energy modeling required
- ASHRAE Standard 189.2P
- High Performance Healthcare Facilities

Guidelines for Construction of Hospitals

- Building Envelope Improvements
- Reduce Building Volume Height
- Reduce Fan Horsepower's
- BIM as a resource
- Requires less external static pressure
- Dedicated ventilation air systems

Day 5

Chiller, Heat Recovery, Solar, Hydronic

- PV Strategies to Reduce Energy Consumption
- Heat Recovery Chillers
- Using the rejected condenser heat
- Heat Pumps Heat Recovery, Laundry, Data Centers, Ground Source Heat Pumps, Cogeneration
- Trigeneration Strategies to Reduce Energy Consumption Continued...
- Ground-Source Heat-Pump System geothermal heat exchanger heat pump pumps
- Reducing building height and horizontal duct lengths
- Non-All Air Systems
- Ventilation- Energy Recovery
- Non-All Air Alternatives
    - Fan Coil Units
    - Chilled Beams
    - Positive Displacement Ventilation
    - Hybrid VAV Systems
- Active Chilled Beams in Cooling and Heating Mode
- Passive Chilled Beams
- Active Chilled Beams
- Displacement Ventilation

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