HEATING VENTILATION AND AIR CONDITION

INTRODUCTION

- Basic Fundamentals
- Standards & codes used In HVAC-R System
- Factors to \controlled in HVAC System
- Modes of heat transfer
- Sensible and Latent Heat

Refrigerants & refrigeration Cycle

- Study on Refrigerants
- Laws & Properties of Refrigerant
- Refrigerant and Brines Solutions
- Classification of Refrigerant
• Practical hands on experience on Refrigeration Cycle

**Psychometrics Chart**

• Study on Psychometrics
• Study on properties of Air & moisture
• Dry Bulb Temperature
• Wet Bulb Temperature
• Dew Point Temperature
• Relative Humidity
• Humidity Ratio

**Components of Air-Conditioning and Refrigeration machines**

• Basic Refrigeration System or Vapor Compression Cycle
• Working and classification of Compressors
• Function and classification of Condensers
• Function and classification of Expansion Valves
• Working and classification of Evaporators
• Accessories used in the System

**Designing and Calculation of Heat Loads**

• Dehumidified air and heat load calculations
• Finding U Factor for the various material like Wall, Glass, Roof, Partition

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• Finding Temperature difference (TD)
• Ventilation and Infiltration Concept
• Heat Load Estimate (Manually & Software-E20)
• Heat Load Estimate (HAP Software)
• Tonnage (TR) & Air Flow (L/S, CFM) for Project

**Classification of Air-Conditioning System**

• Centralized and non-centralized A/Cs
• Working and installation different kind of A/Cs
• Selection and installation of Machine based on load
• Selection as per Project Specifications
• Placing Location of Equipment

**Air Distribution System**

• Types of Air Distribution System & Equipment
• Types of Air Terminal Devices
• Types of AHU, FCU, FAHU and their installation
• Types of material used for air distribution system
• Classification of Fans
• Selection of Fans
• Classification of Ducts
• Designing & Installation of Ducts
Duct Routing and terminals connections
Duct Fittings
Classification and selection of Dampers

Central Plant Chilled Water System
Designing and installation of chillers
Types of chilled water system
Components of chilled water system
Designing and installation of Colling tower
Pump head calculations
Selection & installation of pumps & valves
Designing of Exhaust & Ventilation System
Types of ventilation system
Types of exhaust system
Designing of Staircase Pressurization System
Designing process for the calculation of Air Flow Quantity

Ventilation and exhaust System
Natural ventilation system
Mechanical Ventilation system
Car Park ventilation
Designing and calculation of ventilation system

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• Selection of Exhaust fans (Jet Fans, Jet thrust fans, etc.)

**Staircase Pressurization System**

• Idea on Staircase pressurization System
• Staircase pressurization System calculation
• Duct routing and designing for fresh air
• Fresh air fan selection

**Detailed Schematic design Layouts (Drafting)**

• Basics of CAD,
• Preparation Symbols & Legends of Plumbing & Fire Fighting System
• Preparation of detail layouts including sectional details wherever required
• Representation of Design drawing
• Preparation of Single line Schematic & isometric Drawing of Water Supply Piping, Drainage Disposal Pipe Routing, Fixture, Equipment’s and other required sections.
• Coordination with other services like PL, FF, EE, ELV layouts
• Preparation of shop drawings based on the tender drawings issued
• As built drawings shall be prepared and handed over to client’s representative

**ESTIMATION & COSTING OF PROJECTS**

• Estimation & tendering requirements
• Bill of Quantities (BOQ) from shop drawing
• Preparation of O&M manuals

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• Preparation of Testing & Commissioning Reports
• Preparation of inquiries, & preparation of Final Billings
• Preparation of approvals from consultants and authorities

PROJECT MANAGEMENT

• Estimation and tendering of projects
• Procurement Process
• Preparation of material submittals
• Preparation of bill of quantities
• Preparation of O&M manuals
• Preparation of testing and commissioning reports
• Preparation of installation approvals from consultants and authorities

PROJECT WORKS

• 1 minor and 1 major project

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