

## **HVAC (Heating, Ventilating, and Air conditioning)**

- Fundamentals
- Modes of Heat Transfer
- Sensible Heat and Latent Heat

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

- Basic Refrigeration System or Vapor Compression Cycle
- Pressure – Enthalpy Chart
- Function & Types of Compressor
- Function & Types of Condenser
- Function & Types of Expansion Valve
- Function & Types of Evaporator
- Accessories used in the System
- Refrigerant and Brines

### **Classification of Air-Conditioning System**

- Window A/C

### **Working of Window A/C with Line Diagrams**

- Split A/C

Types of Split A/C

### **Working of Split A/C with Line Diagrams**

- Duct able Split A/C

### **Working of Duct able Split A/C with Line Diagrams**

- Variable Refrigerant Volume (VRV)/ Variable

### **Refrigerant Flow (VRF)**

- Duct able Package A/C
- Working of Duct able Package A/C with Line Diagrams

### **Categories of Air Conditioning**

- All air system
- All water system
- Air - water system
- Direct Refrigerant system

### **Study of Psychometric Charts**

- Dry Bulb Temperature
- Wet Bulb Temperature
- Dew Point Temperature
- Relative Humidity
- Humidity Ratio

### **Processes**

- Heating
- Cooling
- Cooling and Dehumidification
- Heating and Humidification
- Finding Values Using the Chart

Load Calculation

Survey of Building

Cooling Load Steps

### **Finding Temperature difference ( $\Delta T$ )**

- Wall
- Glass
- Roof
- Partition

### **Finding 'U' Factor**

- Wall
- Glass
- Roof
- Partition

### **Finding Ventilation requirement for IAQ**

### **Load Calculations (Manually using E-20 form)**

### **ESHF, ADP & Air Flow Rate (CFM) Calculation**

### **Air Distribution System**

- Duct-Definition & Terminology
- Duct Design consideration
- Duct sizing methods
- Duct sizing as per Aspect Ratio
- Finding Duct size using Ductulator
- Calculation of Number of sheets for Duct
- Gauge selection for Sheet Metal
- Bill of Materials for Duct Network
- Legends and Symbols used in the HVAC Industry
- Selection of Diffusers and Grilles
- Duct Materials and Insulation materials used in HVAC Industry
- Duct Routing - Preparation of single line diagram (SLD)
- Preparation of Layouts (Double line Diagram - DLD) as per SMACNA rules
- Openings for Ducts passing through Wall
- Duct supports
- Concept of CAV & VAV

### **Static Pressure Calculation**

- Selection of Motor HP
- Selection Fan/Blower RPM

### **Hydraulic System**

- Classification of Water Piping
- Pipe sizing for chill water system
- Fittings used in the HVAC Piping System
- Valves used in the HVAC Piping System
- Function of Valves
- Openings for CHW Pipes passing through Wall
- Pipe supports