



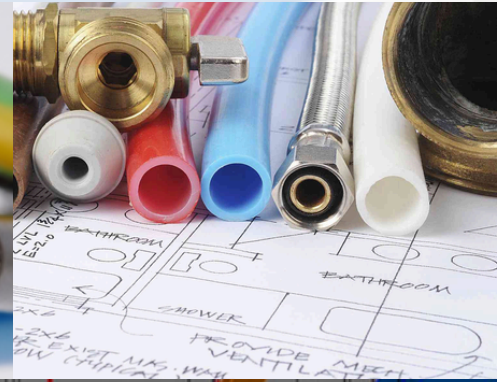
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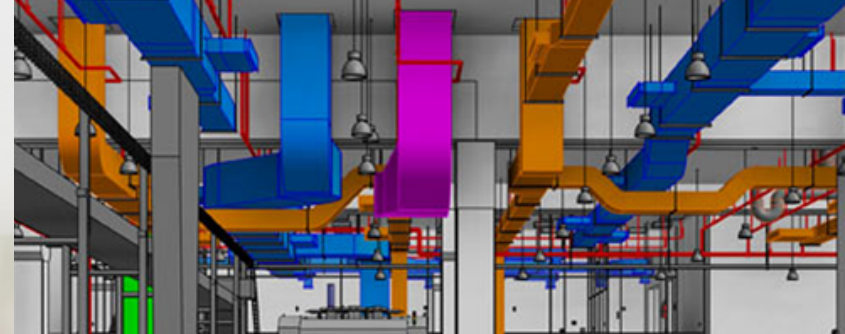


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HVAC COURSE

COURSE STANDARDS



SOFTWARES

- Carrier HAP
- ASHRAE Climatic Data
- ASHRAE Psychrometry
- Autodesk Design Review
- AutoCAD 2D
- Zamil E-selector Machine Selection
- Daikin VRV
- McQuay Duct Sizer
- McQuay Pipe Sizer
- Beta Program
- ASHRAE Duct Fittings
- Pump Excel Program
- Fan static Pressure Excel Program
- Air Terminal Selection Software
- BOQ Excel Program

PROJECTS

- Villa Type A
- Sample Project (Load Calculation)
- School Project (HAP)
- Studio Project (Machine selection)
- Tower Project (Estimation)
- Hotel Project (Ducting & Piping)

HIGHLIGHTS

- Live online Training
- Classroom Training
- Video Courses
- Gulf experience faculty
- Digital classroom
- Basic to advance level
- Concept based training
- Software calculation
- Interactive sessions
- Updated syllabus
- Motivation



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HVAC

DESIGNING, DRAFTING, ESTIMATION & INSTALLATION

SYLLABUS

- **MODULE - 01**

HVAC Designing (Video or Live Online Mode)

PART 1 - HVAC Basics

PART 2 - Manual Load Calculation

PART 3 - Carrier HAP

PART 4 - HVAC Air System

PART 5 - HVAC Chilled Water System

Free Complimentary

- **MODULE - 02**

HVAC Drafting (Video Mode Only)

- **MODULE - 03**

HVAC Estimation (Video Mode Only)

- **MODULE - 04**

HVAC Installation (Video Mode Only)



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MODULE - 01

HVAC DESIGNING

PART 01

DESIGN BASICS

Chapter 1

Introduction to MEP

- Difference between MEP & HVAC
- HVAC abbreviation
- Definition of air conditioning
- HVAC application
- Standard societies
- ASHRAE, ISHRAE, SMACNA..

Chapter 2

How HVAC project executes

- Types of drawing
- Overview of HVAC design
- Roles & responsibilities of design engineers
- Overview of HVAC installation
- Roles and responsibilities of installation engineers



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Chapter 3

Physics Used in HVAC

- Heat
- British thermal unit
- Modes of heat transfer
- Unit of refrigeration
- Temperature & temperature scales
- Enthalpy
- Sensible and latent heat
- Vapour compression refrigeration cycle
- Unit
- System of units
- Conversions

Chapter 4

Psychometric

- Introduction
- Properties of air
- Dry bulb temperature
- Wet bulb temperature
- Dew point temperature
- Relative humidity
- Humidity ratio
- Manual psychometric chart
- Psychometric software
- Psychometric analysis
- Humidification
- De-humidification
- Sensible heat ratio
- By pass factor
- Contact factor

Chapter 5

Air conditioning system

- Direct expansion system
- Window air conditioning
- Split air conditioning
- High wall
- Cassette air conditioning
- Floor stand
- Cube air conditioning
- Ductable split air conditioning
- Package air conditioning
- Chilled water system
- Air cooled chiller
- Water cooled chiller

- VRF/VRV system
- Radiant cooling
- Chilled beams
- District cooling system
- Air system
- FCU (fan coil unit)
- AHU (air handling unit)
- HRU (heat recovery unit)
- CAV system
- VAV system
- Desert cooler
- Air curtain



Types of Air Conditioners



Central Air Conditioner



Portable AC



Window Air Conditioner



Floor Mounted AC



Ductless Air Conditioner



Dual Fuel Air Conditioner



Evaporative Air Conditioner



HVAC DESIGNING

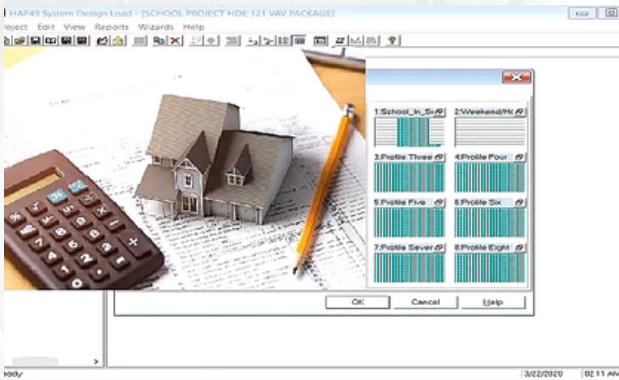
PART 02 MANUAL LOAD CALCULATION (UPDATED)

Chapter 6

Building survey

- Introduction
- Types of architecture drawing
- Psychometric conditions
- Latitude
- Longitude
- Orientation of building
- Elevation of city
- Levels (section heights)
- Construction materials
- Terminology of building structure
- Surrounding conditions
- Windows
- Doors
- People
- Lighting

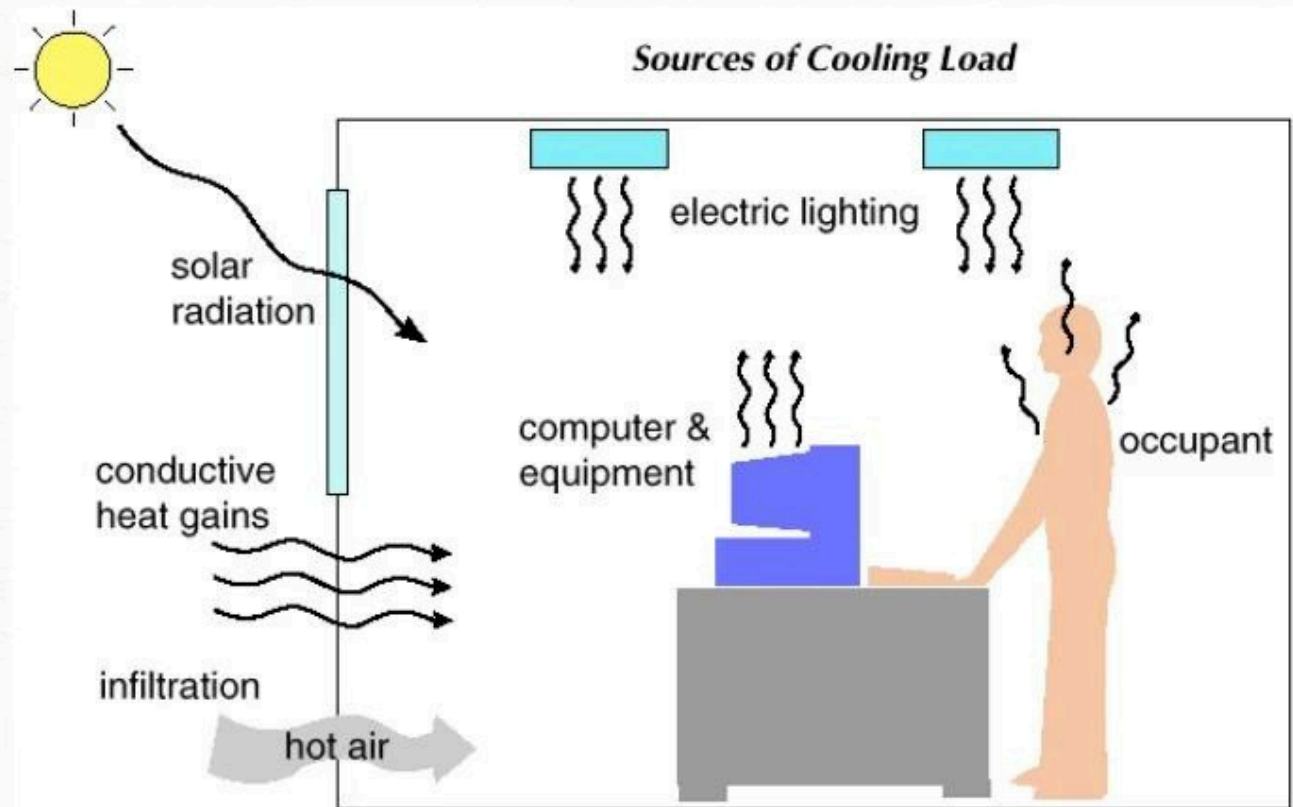
- Appliances
- Thermal storage
- Location air conditioning machine
- Available spaces
- Power services
- Water services
- Applications
- Drain location



Chapter 7

Manual load calculations

- Cooling load calculation
- Heating load calculation
- Sources of heat
- Project data extraction
- Sample project (Updated)
- Input file
- Finding u-values
- Manual load calculation
- E-20 chart calculation
- E-20 excel calculation



HVAC DESIGNING

PART 03

SOFTWARE (HAP) LOAD CALCULATION (UPDATED)

HAP 5.1 - Hourly Analysis
Program

Sample project (Updated)

Sample Project+School project

Optional project for practice

Chapter 7.1

Software load calculation

- Introduction to HAP
- Ventilation standards
- Sample Project
- School project
- HAP general settings
- Project sequence
- Input weather data
- Creating Library
- Creating spaces
- All Air conditioning system
- Creating System
- Generating report
- Archive and Retrieve HAP project Data
- HAP Additional Topics
- HAP Project Analysis
- Ventilation in HAP

Chapter 8

Machine selection

- Factor effecting machine selection
- Window air conditioning
- Split air conditioning
- Ductable air conditioning
- Package air conditioning
- VRV/VRF
- Chiller
- Air cooled selection
- Water cooled selection
- Ahu selection
- Software Selection

HVAC DESIGNING

PART 04 HVAC AIR SYSTEM (UPDATED)

Chapter 9

HVAC Air System

- Introduction to Ducting
- Continuity Equation
- SMACNA Standard
- Classification of Duct
- Duct Material
- Flexible Duct
- Duct Gauging
- Duct Fitting
- Duct Accessories
- Fire Damper
- Types of Duct Plenum

Chapter 10

Duct Design

- Key Objectives of Duct Design
- Duct design process overview
- Duct Velocity
- Types of Duct System Layout
- Duct Aspect Ratio



Chapter 11

Duct Sizing Methods

- Equal Friction Method
- Static Regain Method
- Velocity Reduction Method
- Constant Velocity Method
- Duct Design Using the Continuity Equation
- Examples
- Duct Branch Design
- Plenum Box Sizing

Chapter 12

Air Distribution & Terminal

- Function of Air Terminals
- Occupied Zone
- Good Air Distribution
- Air Patterns
- Types of Air Terminals
- Air Terminal Selection
- Example Calculation
- Catalogue Selection
- Diffuser Selection
- Grill Selection
- Steps for HVAC Air-Side Planning

Chapter 13

Exhaust System

- Toilet Exhaust System
- Steps for Designing Toilet Exhaust System
- Sample Project
- Car Parking Exhaust System
- Why Ventilate Enclosed Car Parks
- Key Codes & Standards
- Ventilation Strategies & System Types
- Determining Exhaust Airflow (Detailed Methods)
- Sample Project
- Kitchen Exhaust System
- Design Steps
- Sample Project

Chapter 14

Stair Case Pressurization

- Introduction to Staircase Pressurization
- Codes & Standards
- System Components
- Calculation & Sizing
- Sample Project

Chapter 15

Fan Selection

- Introduction to Fans in HVAC Systems
- Types of fan
- Fan laws
- Fan performance characteristics
- Fan selection requirements
- Loss coefficient
- ASHRAE Duct Fitting Database software
- Air volume in CFM
- ESP Calculation
- Fan selection manual
- Fan selection with Excel Program

HVAC DESIGNING

PART 05

HVAC WATER SYSTEM (UPDATED)



Chapter 10

Introduction

- Types of pipe
- Pipe material
- Pipe class
- Classification of pipe
- Types of pipe arrangements
- Direct return systems
- Reversed return system
- Pipe Designing
- Pipe designing method
- Velocity method
- Velocity + fraction combine method
- Manual pipe designing
- Software pipe designing
- Project

Chapter 11

Fitting & Accessories

- Pipe fitting
- Pipe accessories
- PICV
- Pump hookup
- Chiller hookup
- Ahu hook up
- Valves selection

Chapter 12

Pump Selection

- Introduction
- Classification of pumps
- Pump laws
- Pump Curves
- Types of pump Primary pump
- Secondary pump
- Tertiary pump
- Head loss
- Pump selection manual
- Pump selection with Excel Program

Chapter 12.1

Other Equipment Selection

- Cooling Tower Selection
- Make up Water Tank Selection
- Expansion Tank Sizing
- • Air Separator selection



MODULE - 02

HVAC DRAFTING

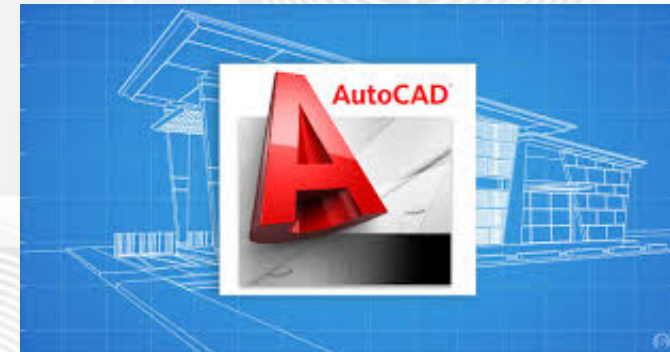
PART 01: AUTOCAD



AUTOCAD

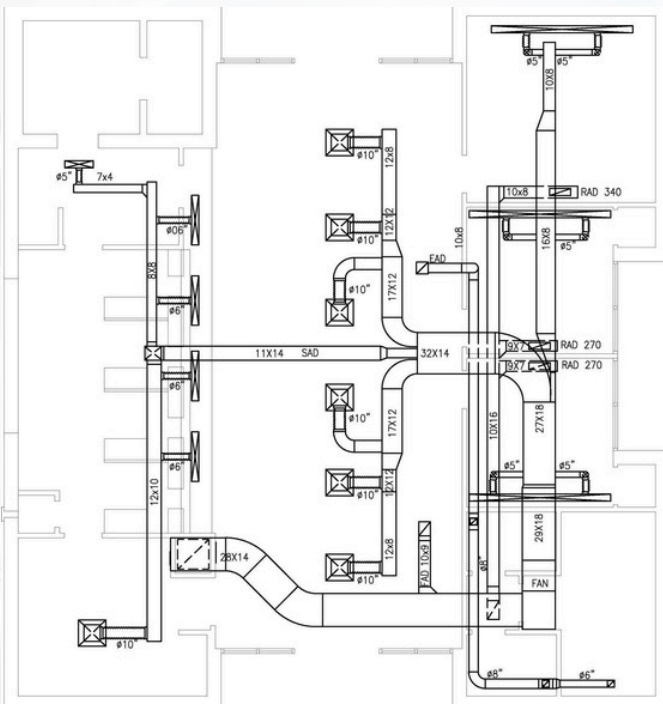
- Introduction to AutoCAD
- What is What on CAD Screen
- Autocad Coordinate System
- Angle Measurement System
- Drawing Setup
- Line Command-Absolute and Relative Method
- Polar and Direct Distance Method
- Function Keys Part 1
- Function Keys Part 2
- PolyLine
- Construction Line
- Circle
- Rectangle
- Ellipse
- Polygon
- Point
- Smooth PolyLine and Revision Clouds
- Selection Methods
- Copy and Move
- Rotate and Offset
- Mirror, Scale, Block and Explode
- Stretch, Break and Join
- Fillet and Chamfer

- **Lengthen and Reverse**
- **Trim and Extend**
- **Rectangular and Polar Array**
- **Divide, Measure and Align**
- **Inquiry Commands-Measure Tools**
- **Zoom Commands**
- **Creating Isometric Drawing**
- **Central Line and Drawing Properties**
- **Object Properties**
- **Dimensioning in AutoCAD**
- **Dimension Command**
- **Dimension Style**
- **Single line and Multiline Text**
- **Creating Layers**
- **Layouts**
- **Printing & Plotting**
- **External Reference**
- **Basic Exercises**
- **Advance Exercises**



PART 02

HVAC DRAFTING



- Placement of Air Terminals
- Single line ducting
- Accessories (VAV, VCD, FD, Sand trap Lower ETC)
- Double Line Drawing in Ducting
- Placement of Indoor Unit
- Placement of Air Terminals
- Double line ducting
- Accessories placement
- Insulation
- Acoustic insulation

- Thermal Insulation
- Single Line Piping
- Rooting of piping
- Sizing (using chart and pipe sizer)
- Valves fitting
- Double Line Piping
- Conversion of single line piping to double line pipe
- Pipe fitting
- Elbow
- Tee
- Reducer
- Labeling
- SECTION

- Section for a particular complicated area
- Printing and plotting techniques





Introduction to Estimation

- Departments in Estimation
- Tender Department
- Job in Hand Department

Tree Diagram for Estimation

- Units & Conversions
- Length
- Area
- Tonnage

Legends & Abbreviation

- General Abbreviation
- HVAC Abbreviation
- Ducting Abbreviation
- Air Terminal Abbreviation
- Accessories Abbreviation
- Letter of Intend (LOI)

Equipments

- Air Side Equipments
- Water Side Equipments
- Refrigerant Side Equipment's

Air Side Extraction

- Supply Duct
- Return Duct
- Flexible Duct
- Fresh Air Duct
- Kitchen exhaust Duct
- Smoke exhaust Duct
- Toilet exhaust Duct



Water Side Extraction

- Chillers
- Pumps
- Chilled Water Supply piping
- Chilled Water Return piping

Step to Start the Services

- Document extraction
- Division of Services
- Division 21
- Division 22
- Division 23
- Division 26

Ducting Side

- Supply Air Duct
- Return Air Duct
- Flexible Duct
- Fresh Air Duct
- Kitchen exhaust Duct
- Smoke exhaust Duct
- Toilet exhaust Duct

Piping Side

- Chillers
- Pumps
- Chilled Water Supply piping
- Chilled Water Return piping



MODULE 4

HVAC INSTALLATION

Chapter 1

INTRODUCTION

- Responsibilities of Site Engineer
- How to Read Shop Drawing

Chapter 2

INSTALLATION

- Sequence of Operation
- Chiller Installation
- AHU Installation
- FCU Installation
- Duct Installation
- Fan Installation
- Pipe Installation
- Pump Installation

Chapter 3

INSULATING

- Duct Insulation
- Pipe Insulation

ADDITIONAL NOTES

**For Self-Study
(Complimentary)**

- Tab Work
- Maintenance
- Filters
- Installation Safety
- HVAC Sales





*"Teaching is my
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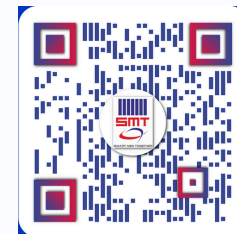


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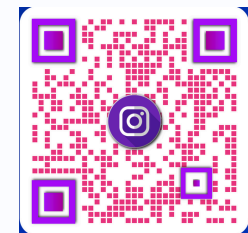
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INSTAGRAM