MECH3423 Building Services Engineering II

http://me.hku.hk/bse/MECH3423/

Summary of Teaching – HVAC Design (Dr. Sam C. M. Hui)

1. Introduction to HVAC
1.1 Background
1.2 HVAC&R
1.3 Air Conditioning
1.4 Design of HVAC Systems

2. Psychrometry
2.1 Introduction to Psychrometry
2.2 Psychrometric Processes
2.3 Psychrometric Software

3. Thermal comfort
3.1 What is Thermal Comfort?
3.2 Thermal Environment and Heat Balance
3.3 Comfort Equation and Prediction
3.4 Influencing Factors
3.5 Environmental Indices
3.6 Local Thermal Discomfort

4. Load Estimation
4.1 Basic Concepts
4.2 Outdoor Design Conditions
4.3 Indoor Design Conditions
4.4 Cooling Load Components
4.5 Cooling Load Principles
4.6 Heating Load
4.7 Software Applications

5. Energy calculations
5.1 Objectives
5.2 Calculation Methodology
5.3 Energy Calculation Methods
5.4 Building Energy Simulation
5.5 Examples:
- Energy-10, VisualDOE, MIT Design Advisor

6. HVAC Air-side Systems: Part 1 Fans and AHUs
6.1 Air Flow Dynamics
6.2 Fan Design
6.3 Air System Basics
6.4 Air Handling Units
6.5 Main AHU Components

7. HVAC Air-side Systems: Part 2 Air Duct Design and Space Air Diffusion
7.1 Duct Construction
7.2 Duct Properties
7.3 Air Duct Design and Sizing
7.4 Space Air Diffusion
7.5 Air Jets
7.6 Outlets and Inlets

8. Mechanical and Natural Ventilation
8.1 Basic Concepts
8.2 Ventilation Requirements
8.3 Natural Ventilation
8.4 Mechanical Ventilation
8.5 Design Factors

9. HVAC Water-side Systems
9.1 Pipe Systems and Design
9.2 Water Systems in HVAC
9.3 Centrifugal Pumps
9.4 Pump Arrangements

10. Refrigeration Systems
10.1 Introduction
10.2 Refrigerants
10.3 Refrigeration Cycles
10.4 Refrigeration Systems

Concept Map: