

Gautam Buddha University; Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Thermal Engg.	Air Conditioning and Ventilation Systems	MET 509	SM+MT+ET 25+25+50
Semester	Credits	L-T-P	Exam.
I	3	3-0-0	3 Hours

Unit I

Psychrometry: Calculation of moist air properties; Psychrometer; Correlation of WBT with temperature of adiabatic saturation; Lewis number; Psychrometric chart; Physiological Principles: Comfort; Thermal interchanges with environment; Physiological body regulatory processes against heat or cold; High and low temperature hazards; Extreme environmental conditions; Heat stress index; ASHRAE comfort standards. **(09 Hours)**

Unit II

Simultaneous Heat and Mass Transfer: Direct contact transfer equipment; Simple air washer and indirect evaporative cooling; Enthalpy potential; Basic equation for direct contact transfer equipment; Graphical and analytical methods for heat and mass transfer analysis of air washers with heated and chilled water sprays; Cooling towers. **(08 Hours)**

Unit III

Extended Surface Heat Transfer Apparatus: Cooling and dehumidifying coils; Types and classification of extended surfaces; Design of finned surfaces; Adsorption cooling systems. **(08 Hours)**

Unit IV

Ventilation: Requirements; ventilation standards; Natural and mechanical ventilation; Forces for natural ventilation; General ventilation rules; Advantages of mechanical ventilation; Various methods; Ejector systems; Determining ventilation requirement; Use of decay equation; Filtration. **(07 Hours)**

Unit V

Air Cleaning: Physical and chemical vitiation of air; Permissible concentration of air contaminants; Mechanical and electronic air cleaners; Dry and wet filters; Air sterilization; Odour control. **(07 Hours)**

Unit VI

Design of Air-conditioning system: Design of year-round air conditioning system; Piping and Ducts; Pressure drops in piping and fittings; Design of water and refrigerant piping; Air conditioning duct design methods. **(06 Hours)**

Recommended Books:

1. Refrigeration and Air-conditioning; Stoecker & Jones; McGraw Hill; 2nd Edition; 1983.
2. Air Conditioning Engineering; William Peter Jones; Elsevier publication; 5th Edition; 2005.
3. Fundamentals of Industrial Ventilation; V. V. Baturin; Pergamon Press; Digital Edition; 2007.
4. Extended Surface Heat Transfer; By Allan D. Kraus; Abdul Aziz; James Welty; Wiley e books; 2001.
5. Thermal Environmental Engineering; J. L. Threlkeld; Prentice Hall; U.S.A.; First Edition; 1970.
6. ASHRAE Handbook – ASHRAE (Fundamentals); 2013.