Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
Integrated B. Tech. + M. Tech. / M.B.A.	Refrigeration & Air Conditioning	ME 306	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
VI	4	3-1-0	3 Hours

Unit - I

Introduction of Refrigeration: Introduction to refrigeration system; Methods of refrigeration; Carnot refrigeration cycle; Unit of refrigeration; Refrigeration effect & C.O.P.

Air Refrigeration Cycle: Open and closed air refrigeration cycles; Reversed Carnot cycle; Bell Coleman or Reversed Joule air refrigeration cycle; Aircraft refrigeration system; Classification of aircraft refrigeration system; Boot strap refrigeration; Regenerative; Reduced ambient; Dry air rated temperature (DART). **(08 Hours)**

Unit - II

Vapor Compression System: Single stage system; Analysis of vapor compression cycle; Use of T-S and P-H charts; Effect of change in suction and discharge pressures on C.O.P; Effect of sub cooling of condensate & superheating of refrigerant vapor on C.O.P of the cycle; Actual vapor compression refrigeration cycle; Multistage vapor compression system requirement; Removal of flash gas; Intercooling; Different configuration of multistage system; Cascade system. **(08 Hours)**

Unit - III

Vapour Absorption System: Working Principal of vapour absorption refrigeration system; Comparison between absorption & compression systems; Elementary idea of refrigerant absorbent mixtures; Temperature–concentration diagram & Enthalpy – concentration diagram; Adiabatic mixing of two streams; Ammonia – Water vapor absorption system; Lithium- Bromide water vapor absorption system; Classification of refrigerants; Nomenclature; Desirable

properties of refrigerants; Common refrigerants; Secondary refrigerants and CFC free refrigerants; Recent substitute for refrigerants. **(08 Hours)**

Unit - IV

Air Conditioning: Introduction to air conditioning; Psychometric properties and their definitions; Psychometric chart; Different Psychometric processes; Thermal analysis of human body; Effective temperature and comfort chart; Air conditioning systems and their types; Selection of system; Components and controls of air distribution; Window air conditioners; Split air conditioners; Central air conditioners. **(08 Hours)**

Unit - V

Air-Conditioning Load Calculations: Cooling and heating load calculations; Selection of inside & outside design conditions; Sources of heating load; Sources of cooling load; Heat transfer through structure; Solar radiation; Electrical applications; Infiltration and ventilation; Heat generation inside conditioned space; Internal heat gain; Sensible heat factor (SHF); By pass factor; Grand Sensible heat factor (GSHF); Apparatus dew point (ADP).

(06 Hours)

Unit - VI

Refrigeration Equipment & Application: Elementary knowledge of refrigeration & air conditioning equipments e. g. Compressors; Condensers; Evaporators & expansion devices; Air washers; Cooling; Towers & humidifying efficiency; Food preservation; Cold storage; Refrigerates freezers; Ice plant; Water coolers; Elementary knowledge of transmission and distribution of air through ducts and fans; Basic difference between comfort and industrial air conditioning. **(07 Hours)**

Recommended Books:

1. Refrigeration and Air Conditioning; C. P. Arora; Tata McGraw Hill.
2. Principles of Refrigeration; R. J. Dossat; Prentice Hall.
3. Refrigeration and Air Conditioning; Domkundwar; Dhanpat Rai.
4. Refrigeration and Air Conditioning; Manohar Prasad; New Age International.
5. Refrigeration and Air Conditioning; P.L. Ballany; Khanna Publications.
6. Refrigeration and Air Conditioning. Stoecker & Jones.
7. Air Conditioning System Design Handbook; Carrier Corporation; USA.