

7 <sup>th</sup> Semester	RME7D005	Refrigeration and Air conditioning	L-T-P 3-0-0	3 Credits
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**Module-I:****(12 Hours)**

**Air Refrigeration System** : Introduction, Unit of refrigeration, Coefficient of performance, Reversed Carnot Cycle, Temperature limitations, maximum COP, Bell Coleman air cycle, Simple Air Cycle System for Air-craft with problems.

**Vapour Compression System** : Analysis of theoretical vapour compression cycle, Representation of cycle on T - S and p - h diagram, Simple saturation cycle, sub-cooled cycle and super-heated cycle, Effect of suction and discharge pressure on performance, Actual vapour compression cycle. Problem illustration and solution.

**Multi-stage compression and Multi-evaporator systems** : Different arrangements of compressors and inter-cooling, Multistage compression with inter-cooling, Multi-evaporator system, Dual compression system. Simple problems

**Module-II:****(12 Hours)**

**Vapour Absorption System** : Simple Ammonia - absorption system, Improved absorption system, Analysis of vapour absorption system (Specifically of analyzing column and rectifier), Electrolux / Three fluid system, Lithium-bromide-water vapour absorption system, comparison of absorption system with vapour compression system. Simple Problems and solution.

**Thermoelectric Refrigeration:** Basics and Principle. Defining the figure of Merit. (No Problem) **Refrigerants:** Classification of refrigerants and its designations- Halocarbon (compounds, Hydrocarbons, Inorganic compounds, Azeotropes, Properties of refrigerants, comparison of common refrigerants, uses of important refrigerants, Brines. Alternative refrigerants (Organic and inorganic compounds).

**Module-III:****(12 Hours)**

**Psychrometrics** : Properties of air-vapour mixture, Law of water vapour-air mixture, Enthalpy of moisture, Psychrometric chart, simple heating and cooling, Humidification, Dehumidification, Mixture of air streams. Review question and discussions

**Requirements of comfort air conditioning:** Oxygen supply, Heat removal, moisture removal, air motion, purity of air, Thermodynamics of human body, comfort and comfort chart, effective temperature, factors governing optimum effective temperature

**Air Conditioning System:** Process in air conditioning : Summer air conditioning, Winter air conditioning and year round air conditioning, Cooling load calculations. Review question and discussions.

**Books:**

- [1] Refrigeration and Air Conditioning by R.C. Arora , PHI Publication
- [2] Refrigeration and Air conditioning by C.P. Arora, Tata McGraw Hill.
- [3] Refrigeration and Air Conditioning by S.C. Arora and S. Domkundwar, Dhanpat Rai & Sons. (Chapters; 3,4,5,6,7,11,16,17,19,20)
- [4] Refrigeration and Airconditioning Data book by Manohar Prasad
- [5] Refrigeration and Air conditioning by P.L. Ballney, Khanna Publishers.
- [6] Refrigeration and Air conditioning by Manohar Prasad, New Age international publishers