Course Code: EITS - 203
Course Title: Refrigeration and Air Conditioning

Number of Credits: 03 **Total Hours: 42** **Total Marks: 75**

Prerequisites for the course

Student should have basic knowledge of temperature, pressure.

Objectives of Course

Learning the fundamental principles and different methods of refrigeration and air conditioning. Study of the various equipment operating principles, operating and safety controls employed in refrigeration air conditioning systems.

Course Content

Unit I	**Psychrometry**	**5 Hours**

Psychrometric Processes: Sensible Cooling, Sensible Heating, Cooling with dehumidification, Cooling with adiabatic Humidification, Chemical dehumidification, heating and humidification, Mixing of air- streams, Air Washers.

Unit II	**Heat transfer and air-distribution**	**10 Hours**

Principles of heat transfer, Conduction, Convection and Radiation. Properties of insulating materials, Air Distribution, Systems of air distribution, Duct systems, and cooling load and air quantities pressure in ducts, duct layout & construction.

Unit III	**Components of refrigeration system**	**10 Hours**

Condensers, Air cooled and water cooled Evaporative Condensers, Heat Rejected in condensers, construction of condensers, Driers, receivers, Purging, Cleaning of Condensers, Refrigerant Controls, Types of expansion devices and sensible heat factor, construction and operation of Automatic expansion valve, thermostatic expansion valve, and capillary tube, low side float valve, High Side float valve. Solenoid valves, testing and adjusting thermostatic expansion valves, Evaporators, types of evaporators, Heat absorbed in evaporators, water chillers, brine coolers, Methods of defrosting.

Unit IV	**Electrical controls**	**7 Hours**

Refrigeration Controls, H.P and L.P cut-outs, Oil Pressure failure safety switch, Motor Starters, capacitors, Relays, over load protectors and servicing of motors.

Unit V	**Air conditioning system and maintenance**	**10 Hours**

Air-Conditioning systems and equipments, classification of air-conditioning systems-all air systems, all water system types, Fans, Blowers, grills, resistors, filters, compressors, cooling coils, condensers Air-Handling Units, Fan coil Units, Central Air Conditioning plants. Ventilation Systems, Leak Detection, Pressure testing and charging.

Pedagogy

Lectures/Tutorial/Assignments

Course Outcome

Students will gain knowledge of the working principle behind refrigeration and AC. Operate and analyze the refrigeration and air conditioning systems.

References/Readings

1. Refrigeration & Air-conditioning, CP Arora, TMG
2. Refrigeration & Air-conditioning, Manohar Prasad, NAI
3. Refrigeration & Air-conditioning, Stoecker&Jons, MGH
4. Principles of Refrigeration, RC Dosset, LPE
5. ASHRAE Handbook (Fundamentals), ASHRAE