

REFRIGERATION AND AIR CONDITIONING (ME-422)

Pre-requisite: None

Credit Hours: 02

Contact Hours: 32

RECOMMENDED BOOK(S)

Heating, Ventilating, and Air-Conditioning Analysis and Design, by

McQuiston, Parker and Spitler John Wiley & Sons

Heating and Cooling of Buildings, By Ed. Kreider, Curtiss & Rabl McGraw-Hill.

Principles of Refrigeration, By Dossat, R. J., John Wiley

HVAC Systems Design Handbook, By Haines, Roger W. Wilson, Lewis
McGraw-Hill Companies

COURSE OBJECTIVES

To understand refrigeration systems.

To develop basic ideas about cycle analysis and designing parameters pertaining to refrigeration and air conditioning systems

To deal with the problems related to architectural, building services, HVAC, equipment

S. No.	CLO/PLOS MAPPING	DOMAIN	PLO
1	Apply basic principles of thermodynamics on processes and systems of air-conditioning.	C3	02
2	Analyze the parameters involved in human comfort and health	C4	02
3	Design the solution by applying the skills gained to estimate the space heating and cooling loads	C5	03

COURSE CONTENTS

Refrigeration cycles:

Reversed Carnot and Joule Cycles, vapor compression and vapor absorption systems, COP, pressure-enthalpy chart, types of refrigerants, air cycle refrigeration, multiple effect compression, multi-stage compression, heat pump

Air conditioning:

Indoor and outdoor air conditions, comfort conditions and comfort zone, indoor air quality, psychometric.

Central air-conditioning system:

Essential components of central air-conditioning plant, water chiller and water heater, air handling unit, chilled water and hot water recirculation system, return air supply

system, fresh air supply system air mixture chamber, supply fan, air dust cleaning and bacteria removal, air supply and air return terminals, diffusers and grilles, CFM rating and tons of air-conditioning of a central air-conditioning plant.

Load calculation and system design:

Cooling and heating load calculation procedures, duct sizing and piping design, pumps and fans selection, and air ventilation: calculation of fresh air supply of a multi-story building, air handling unit for untreated fresh air, forced convection based air ventilator design.