GUJARAT TECHNOLOGICAL UNIVERSITY
M.E Semester: 1
Mechanical Engineering (Thermal Engineering)

Subject Name: ADVANCED REFRIGERATION

Sr. No.	Course Content
1.	Balancing of vapor compression refrigeration system
2.	Dual pressure vapor compression system and its analysis.
3.	Compound compression with flash cooler and flash intercooler, multiple expansions, parallel operation, sectionalizing, booster operations, various types of cascade systems analysis
4.	Refrigerants: Ecofriendly refrigerants & their properties, secondary Refrigerants, mixture of refrigerants, azeotropics, salient characteristics of various refrigerants. Synthetic lubricating oil &their properties
5.	Absorption refrigeration: H-x charts of LiBr-H2O and NH3-H2O solutions. analysis of vapor absorption refrigeration system on H-X charts, mass concentration &equilibrium charts , heat balance, COP comparison with vapor compression refrigeration systems, two stage vapor absorption refrigeration system ,balancing of vapor absorption refrigeration systems.
6.	Air cycle refrigeration, Analysis of various cycles and their applications. Calculations of COP
7.	Steam jet refrigeration - cycle analysis, analysis on H-O charts performance, control and various applications.
8.	Thermo-electric refrigeration: Thermo-electric effects, analysis of thermoelectric cooling, COP, FOM, thermoelectric, materials.
9.	Heat pumps: Sources and sinks, refrigerant circuits, heating and cooling performance of heat pumps.
10.	Design of refrigeration systems for industrial &other application for transport refrigeration, walk in coolers & cold storages for different applications.
11.	Preservation & processing of food by use of refrigeration.

List of Experiments:

1. Study of advanced refrigeration systems.
2. Performance and analysis of VCR system using capillary tube as a throttling device.
3. Performance and analysis of VCR system using thermostatic expansion valve as a throttling device.
4. Study and design of a steam jet refrigeration system.
5. Study and design of cascade refrigeration system.
6. Performance and analysis of VAR system in "Electrolux" refrigerator.
7. Performance and analysis on Heat Pump system with different working conditions.
8. Design and selection of different components of VCR system.
9. Study of NH3 condensing plant of a cold storage.
10. Study of freeze drying machine.

Reference Books:

1. Threlked, J.L., "Thermal Environmental Engineering", Prentice Hall, N. Y. , 1970.
2. Air conditioning principles and systems –pita
3. ASHRAE Data Book, (1) Fundamentals (2001) (2) application (1999) (3) System and equipments (2000)
4. Refrigeration and air conditioning, stocker
5. Refrigeration and air conditioning, Jordan and priester
6. Refrigeration and air conditioning, C. P. Arora
7. Industrial refrigeration handbook, stoecker,1998