P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY
(Autonomous)

REFRIGERATION & AIR CONDITIONING

Course Code	23ME4602D	**Year**	**III**	**Semester**	**II**
Course Category	Professional Elective	**Branch**	ME	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Pre-requisites**	Thermodynamics
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO	Statement	Skill	Blooms	Units
CO1	Illustrate the operating cycles and different systems of refrigeration.	Understand	L2	1,2,3
CO2	Analyze cooling capacity and coefficient of performance of vapour compression refrigeration systems and understand the properties of refrigerants	Apply	L3	2
CO3	Analyze COP of vapour absorption & steam jet refrigeration systems.	Apply	L3	3
CO4	Solve cooling load for air conditioning systems.	Analyze	L4	4
CO5	Demonstrate requirements of comfort air conditioning and classification of refrigeration and air conditioning systems.	Analyze	L4	5

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	2								2	3	2
CO2	3	3	2	2							2	3	2
CO3	3	3	2	2							2	3	2
CO4	3	3	2	2	2						2	3	2
CO5	2	2	2								2	2	2

Course Content		
Unit No	**Contents**	**Mapped CO**
UNIT-1	**INTRODUCTION TO REFRIGERATION:** Necessity and applications, unit of refrigeration and C.O.P., Mechanical refrigeration, types of ideal cycles of refrigeration. Air refrigeration: Bell Coleman cycle, open and dense air systems, Numerical Problems. Refrigeration systems used in air crafts.	**CO1**
UNIT-2	**VAPOUR COMPRESSION REFRIGERATION SYSTEM** Working principle and essential components of the plant, simple vapour compression refrigeration cycle, COP, Representation of cycle on T-S and p-h charts, effect of sub cooling and super heating, cycle analysis, actual cycle & influence of various parameters on system performance, use of p-h charts, Numerical problems. **REFRIGERANTS** Desirable properties, classification, nomenclature, ODP & GWP	**CO1** **CO2**
UNIT-3	**VAPOR ABSORPTION SYSTEM**: Calculation of maximum COP, Description and working of NH_3-water system and LiBr –water System, Principle of operation three fluid absorption system. **STEAM JET REFRIGERATION SYSTEM**: Working Principle and basic components, Principle and operation of Thermoelectric refrigerator and vortex tube.	**CO1** **CO3**
UNIT-4	**INTRODUCTION TO AIR CONDITIONING:** Psychometric properties & processes, characterization of sensible and latent heat loads, need for ventilation, consideration of infiltration. Load concepts of RSHF, GSHF, ESHF and ADP temperature, Numerical Problems.	**CO4**
UNIT-5	**Human Comfort:** Requirements of Human comfort, Concept of effective temperature, Comfort chart. **AIR CONDITIONING SYSTEMS:** Classification of equipments, cooling, heating humidification and dehumidification, Filters, grills, registers fans and blowers.	**CO5**
Learning Resources		
Text books:	1. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar Dhanpatrai 2. Refrigeration and Air Conditioning / CP Arora / TMH.	
Reference books	1.Refrigeration and Air Conditioning by R K Rajput, S K kataria & sons, 2010. 2. Refrigeration and Air Conditioning / Manohar Prasad / New Age. 3. Principles of Refrigeration, by Dossat ,Prentice Hall,1997. 4. Refrigeration and air conditioning, by Stoecker , Mc Graw hill Edu.,2004. 5. Basic refrigeration and air conditioning/PN Ananthanarayanan/Mc Graw hill education.	
Online Learning Resources:	1. https://nptel.ac.in/courses/112105128 2. https://nptel.ac.in/courses/112107208 3. https://nptel.ac.in/courses/112106914 4. https://nptel.ac.in/courses/112105129	

Data Books	1. Refrigeration and Air conditioning Data book, CP Kothandaraman /New age publishers. 2. Refrigeration and Air conditioning Data book-Domakundwar & Domakundwar / Dhanpathi rai &Co