

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Refrigeration and Air-Conditioning Practical
Course Code:	2ET1010602P
Pre-requisite Course:	Engineering Thermodynamics, Fluid Mechanics and Heat Transfer

Course Objectives:

1. To familiarize with the terminology associated with refrigeration systems and air conditioning.
2. To understand the basic refrigeration processes.
3. To understand the basics of Psychrometry and practice of applied psychrometrics.
4. To acquire the skills required to model, analyze and design different refrigeration as well as air - conditioning processes and components.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
01	-	-	02	02	-	-	-	-	10	25	10	25	50

Course Contents

Sr. No.	Detail of Practical	Contact Hours
1.	To study principle and working of VCRS components.	02
2.	Performance on VCR system and determine COP.	04
3.	Performance on Electrolux refrigerator and determine COP.	02
4.	Hands on Practice: Tools used for refrigeration tubing and to perform various operations like flaring, swaging, bending, brazing etc.	02
5.	To demonstrate principal and working of domestic refrigerator and split air-conditioner.	02
6.	To study different psychrometric processes and analyze them using psychrometric chart.	02
7.	Performance on air-conditioning Test-Rig. based on VCRS and determine COP.	04
8.	To determine cooling capacity of the air-cooler (Desert cooler).	02
9.	Performance on Ice Plant Tutor.	02
10.	Demonstration on model of vortex tube refrigerator.	02
11.	Demonstration on model of gas charging unit.	02
12.	Exercise on cooling load calculation of air-conditioning.	02
13.	Assignments	-

Note: At least ten practical should be performed during semester.

Reference Books:

1. Singh, Sadhu., Refrigeration and Air-conditioning, Khanna Book Publishing Edition, 2021.
2. Monohar Prasad, Refrigeration and Air-conditioning, New Age Publishers, New Delhi, 2021.
3. Domkundwar, Refrigeration and Air-conditioning, Dhanpat Rai., 2018.
4. Gosney, W.B, Principles of Refrigeration, Cambridge University Press, 1982.
5. Stoecker, W.F. and Jones, J.W., Refrigeration and Air-conditioning, Tata McGraw Hill, 1986.
6. Arora, C.P., Refrigeration and Air-conditioning, Tata McGraw Hill, 2nd Edition, 2000.
7. Roy J. Dossat, Thomas J. Horan, Principles of Refrigeration, Pearson; 5th edition, 2001.
8. Kuehn, T.H., Ramsey, J.W. and Threlkeld, J.L., Thermal Environmental Engineering, 3rd Edition, Prentice Hall, 1998.
9. Rajput R. K., "Refrigeration and Air-conditioning", S. K. Kataria & Sons., 2013.

E-Resources:

1. <https://nptel.ac.in/courses/112105128/>
2. <https://nptel.ac.in/courses/112107208/>
3. https://onlinecourses.nptel.ac.in/noc22_me135/preview

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Define basic concepts and terminology of refrigeration and air-conditioning.	1 Remembering
CLO2	Explain air refrigeration cycles and their applications.	2 Understanding
CLO3	Analyze vapor compression systems and performance improvement methods.	4 Analyze
CLO4	Identify components of refrigeration systems and their functions.	2 Understanding
CLO5	Compare different refrigeration methods and evaluate their suitability.	5 Evaluating
CLO6	Apply psychrometric principles to design basic air-conditioning systems.	3 Applying

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	M											L	M	
CLO2		H	M											
CLO3	L					H	M	L					L	
CLO4		H	M		M									M
CLO5	M	M		L									L	
CLO6			M	L										H

H: High, M: Medium, L: Low