

Lesson Plan

Name of Institute : Ambala College of Engineering and Applied Research
 Name of the Faculty member : Er. Ajay Kumar
 Discipline : Mechanical Engineering
 Semester : 6th
 Subject : Refrigeration and Air-conditioning
 Lesson Plan Duration : 15 weeks (from Jan 2026 to May 2026)
 Work Load : L-3 T-1 P-2

Week	Theory		Practical	
	Lecture day	Topic (including assignment/ test)	Practical day	Topic
1	1	Basics of Heat Pump & Refrigerator, COP of Refrigerator and Heat Pump.	1	Introduction to Laboratory about Importance of various Studies.
	2	Carnot's Refrigeration and Heat pump, Units of Refrigeration, Carnot's COP.		
	3	ICE Refrigeration, Evaporative Refrigeration.		
	Tutorial	Numerical Problems		
2	1	Refrigeration by Throttling of Gas.	2	Study & Performance of basic vapor compression refrigeration cycle.
	2	Vapor Refrigeration System, Steam Jet Refrigeration.		
	3	Thermoelectric Cooling, Adiabatic Demagnetization.		
	Tutorial	Revision of discussed Topics		
3	1	Basic Principles of Operation of Air Refrigeration System.	3	Perform the experiment & calculate various performance parameter on a Heat Pump Test Rig
	2	Bell-Coleman Air Refrigerator.		
	3	Advantages of Using Air-Refrigeration in Aircrafts. Disadvantages of air Refrigeration in Comparison to Other Cold Producing Methods.		
	Tutorial	Numerical Problems		
4	1	Simple Evaporative Type Air Refrigeration in Aircraft, Necessity of Cooling The Aircraft.	4	Viva- voce - 1
	2	Simple Vapor Compression Refrigeration System.		
	3	Different Compression Processes (Wet Compression, Dry or Dry and Saturated Compression, Superheated Compression).		
	Tutorial	Numerical Problems & Assignment -1		
5	1	Limitations of Vapour Compression Refrigeration System if Used on Reverse Carnot cycle.	5	To study various compressors.
	2	Representation of Theoretical and Actual Cycle on T-S and P-H charts, Effects of Operating Conditions on the Performance of the System.		
	3	Methods of Improving COP. Limitations of Vapor Compression Refrigeration System if Used on Reverse Carnot cycle.		
	Tutorial	Class Test -1 (Syllabus will be notified)		
6	1	Flash Chamber, Flash Inter Cooler, Optimum Interstate Pressure For Two Stage Refrigeration System.	6	To study various components in a room air conditioner.
	2	Single Expansion and Multi Expansion Processes.		
	3	Basic Introduction of Single Load and Multi Load Systems, Cascade Systems.		
	Tutorial	Numerical Problems		

7	1	Basic Absorption System, COP and Maximum COP of The Absorption System.	7	Viva- voce -2
	2	Actual NH ₃ Absorption System, Functions of Various Components.		
	3	Li-Br Absorption System.		
	Tutorial	Numerical Problems		
8	1	Electro Refrigerator, Comparison of Compression and Absorption Refrigeration Systems.	8	To study & perform experiment on vapor absorption apparatus.
	2	Psychometric Properties of Moist Air (Wet Bulb, Dry Bulb, Dew Point Temperature).		
	3	Relative and Specific Humidity of Moist Air.		
	Tutorial	Numerical Problems & Assignment -2		
9	1	Temperature of Adiabatic Saturation. Numerical	9	Study of various control devices of a refrigeration system.
	2	Empirical Relation to Calculate P _v in Moist Air.		
	3	Psychometric Chart, Construction and Use, Mixing of Two Air Streams.		
	Tutorial	Numerical Problems		
10	1	Humidification and Dehumidification, Cooling With Dehumidification.	10	To find performance of a refrigeration test rig system by using different expansion devices
	2	Cooling With Adiabatic Humidification, Heating and Humidification.		
	3	By-Pass Factor of Coil, Sensible Heat Factor; ADP of Cooling Coil, Air Washer.		
	Tutorial	Class Test -2 (Syllabus will be notified)		
11	1	Classification Factors Affecting Air Conditioning Systems, Comfort Air-Conditioning System.	11	Viva- voce - 3
	2	Winter Air Conditioning System. Summer Air-Conditioning System.		
	3	Year Round Air Conditioning. Unitary Air-Conditioning System.		
	Tutorial	Numerical Problems		
12	1	Inside Design Conditions	12	To study the Air-Washer
	2	Comfort Conditions		
	3	Components of Cooling Loads.		
	Tutorial	Numerical Problems & Assignment -3		
13	1	Internal Heat Gains From (Occupancy, Lighting, Appliances, Product and Processes).	13	To find the performance parameters of Ice Plant.
	2	System Heat Gain (Supply Air Duct, A.C. Fan		
	3	Return Air Duct).		
	Tutorial	Numerical Problems		
14	1	External Heat Gain (Heat Gain Through Building, Solar Heat Gains Through Outside Walls and Roofs).	14	To find Relative Humidity of atmosphere air by using sling Psychrometer.
	2	Solar Heat Gain Through Glass Areas.		
	3	Solar Air Temperature		
	Tutorial	Revision of discussed Topics		
15	1	Heat Gain Due to Ventilation and Infiltration.	15	Final Internal Viva- Voce
	2	Cooling Towers, Heat Pumps.		
	3	Transport Air Conditioning, Evaporative Condensers.		
	Tutorial	Numerical Problems & Assignment - 4		

(Signature of the teacher concerned with date)