

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 February 2021 to May 2021)

Work Load : L-3T-1P-2

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

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

(Signature of the teacher concerned with date)