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 January 2020 to April 2020)

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	1		

1° Basic Absorption System. COP and Maximum COP of The Absorption System.					
20d Actual NH3 Absorption System, Functions of Various Components. 3° 1.3-Br Absorption System.	7 th	1 st		7 th	Viva- voce -2
Bill Bir Absorption System. Tutorial Numerical Problems		2 nd	Actual NH3 Absorption System, Functions of Various		
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Absorption Refrigeration Systems. 2m		Tutorial	Numerical Problems		
200 Psychometric Properties of Moist Air (Wet Bulb, Dry Bulb, Dew Point Temperature). 301 Relative and Specific Humidity of Moist Air. Tutorial Numerical Problems & Assignment -2 201 Empirical Relation to Calculate Pv in Moist Air. 201 Empirical Relation to Calculate Pv in Moist Air. 302 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. Tutorial Numerical Problems Numerical Problems 108 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. 201 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. 201 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. 201 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. 201 Psychometric Chart, Construction and Use, Mixing of Two Air Streams. 201 Psychometric Chart, Conditioning Chart, Conditioning and Humidification. 201 Psychometric Chart Streams. 201 Psychometric Chart St	8 th	1 st		-	experiment on vapor
Tutorial Numerical Problems & Assignment -2 9th 2th Temperature of Adiabatic Saturation. Numerical 2th Empirical Relation to Calculate Pv in Moist Air. 3th Psychometric Chart, Construction and Use, Mixing of Two Air Streams. Tutorial Numerical Problems 1th Numerical Problems 1th Psychometric Chart, Construction and Use, Mixing of Two Air Streams. Tutorial Numerical Problems 1th Humidification and Dehumidification, Cooling With Dehumidification. 2th Cooling With Adiabatic Humidification, Heating and Humidification. 3th Superate Problems 1th Class Test -2 (Syllabus will be notified) 1th Tutorial Numerical Problems 1th Tutorial Numerical Problems 1th Tutorial Numerical Problems 1th Tutorial 1th Tutorial Numerical Problems 1th Tutorial Tutorial		2 nd	Bulb, Dew Point Temperature).		
1st		3 rd	Relative and Specific Humidity of Moist Air.		
2"d Empirical Relation to Calculate Pv in Moist Air.		Tutorial	Numerical Problems & Assignment -2		
Psychometric Chart, Construction and Use, Mixing of Two Air Streams. Tutorial Numerical Problems To find performance of a refrigeration test rig system by using different expansion devices Tutorial Class Test -2 (Syllabus will be notified) Tutorial Numerical Problems Tutorial Numerical Problems & Assignment -3 To study the Air-Washer	9 th	1 st	Temperature of Adiabatic Saturation. Numerical	9 th	devices of a refrigeration
Two Air Streams. Tutorial Numerical Problems 10		2 nd	Empirical Relation to Calculate Pv in Moist Air.		
1st Humidification and Dehumidification, Cooling With Dehumidification. 2nd Cooling With Adiabatic Humidification, Heating and Humidification. 3rd By-Pass Factor of Coil, Sensible Heat Factor; ADP of Cooing Coil, Air Washer. Tutorial Class Test - 2 (Syllabus will be notified) 11th Classification Factors Affecting Air Conditioning Systems, Comfort Air-Conditioning System. 2nd Winter Air Conditioning System. Summer Air-Conditioning System. Summer Air-Conditioning System. 1sth Conditioning System. 2nd Winter Air Conditioning System. 2nd Winter Air Conditioning System. 2nd Winter Air Conditioning System. 2nd Vear Round Air Conditioning Unitary Air-Conditioning System. Numerical Problems 1sth Inside Design Conditions 2nd Components of Cooling Loads. 2nd Components of Cooling Loads. 2nd Components of Cooling Loads. 2nd Internal Heat Gain From (Occupancy, Lighting, Appliances, Product and Processes). 2nd System Heat Gain (Supply Air Duct, A.C. Fan 3rd Return Air Duct). Tutorial Numerical Problems 1sth External Heat Gain (Supply Air Duct, A.C. Fan 3rd Return Air Duct). Tutorial Solar Heat Gain (Heat Gain Through Building, Solar Heat Gains Through Outside Walls and Roofs). 2nd Solar Heat Gain Through Glass Areas. 3rd Solar Air Temperature Tutorial Revision of discussed Topics 1sth Heat Gain Due to Ventilation and Infiltration. 1sth Final Internal Viva-Voce 2nd Cooling Towers, Heat Pumps. 3rd Transport Air Conditioning, Evaporative Condensers. 1sth Final Internal Viva-Voce 1sth Transport Air Conditioning, Evaporative Condensers. 2nd Transport Air		3 rd			
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