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

7th	1st	Basic Absorption System, COP and Maximum COP of The Absorption System.	7th	Viva- voce -2
	2nd	Actual NH3 Absorption System, Functions of Various Components.		
	3rd	Li-Br Absorption System.		
	Tutorial	Numerical Problems		
8th	1st	Electro Refrigerator, Comparison of Compression and Absorption Refrigeration Systems.	8th	To study & perform experiment on vapor absorption apparatus.
	2nd	Psychometric Properties of Moist Air (Wet Bulb, Dry Bulb, Dew Point Temperature).		
	3rd	Relative and Specific Humidity of Moist Air.		
	Tutorial	Numerical Problems & Assignment -2		
9th	1st	Temperature of Adiabatic Saturation. Numerical	9th	Study of various control devices of a refrigeration system.
	2nd	Empirical Relation to Calculate Pv in Moist Air.		
	3rd	Psychometric Chart, Construction and Use, Mixing of Two Air Streams.		
	Tutorial	Numerical Problems		
10th	1st	Humidification and Dehumidification, Cooling With Dehumidification.	10th	To find performance of a refrigeration test rig system by using different expansion devices
	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	1st	Classification Factors Affecting Air Conditioning Systems, Comfort Air-Conditioning System.	11th	Viva- voce - 3
	2nd	Winter Air Conditioning System. Summer Air-Conditioning System.		
	3rd	Year Round Air Conditioning. Unitary Air-Conditioning System.		
	Tutorial	Numerical Problems		
12th	1st	Inside Design Conditions	12th	To study the Air-Washer
	2nd	Comfort Conditions		
	3rd	Components of Cooling Loads.		
	Tutorial	Numerical Problems & Assignment -3		
13th	1st	Internal Heat Gains From (Occupancy, Lighting, Appliances, Product and Processes).	13th	To find the performance parameters of Ice Plant.
	2nd	System Heat Gain (Supply Air Duct, A.C. Fan		
	3rd	Return Air Duct).		
	Tutorial	Numerical Problems		
14th	1st	External Heat Gain (Heat Gain Through Building, Solar Heat Gains Through Outside Walls and Roofs).	14th	To find Relative Humidity of atmosphere air by using sling Psychrometer.
	2nd	Solar Heat Gain Through Glass Areas.		
	3rd	Solar Air Temperature		
	Tutorial	Revision of discussed Topics		
15th	1st	Heat Gain Due to Ventilation and Infiltration.	15th	Final Internal Viva- Voce
	2nd	Cooling Towers, Heat Pumps.		
	3rd	Transport Air Conditioning, Evaporative Condensers.		
	Tutorial	Numerical Problems & Assignment - 4		

(Signature of the teacher concerned with date)