

Lesson Plan

Name of the Faculty : Mr. Pardeep
 Discipline : Mechanical Engineering
 Semester : 7th
 Subject : Refrigeration & Air Conditioning (ME- 403-F)
 Lesson Plan Duration : 15 Weeks (from Aug., 2020 to Nov., 2021)
 ** Work Load (Lecture) per week (in hours): Lectures-02, Practicals-01

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/test)	Practical day	Topic
1 st	1 st	Introduction: Definition of refrigeration & air conditioning; Necessity;	1 st	To study the vapour compression Refrigeration System and determine its C.O.P. and draw P-H and T-S diagrams.
	2 nd	Methods of refrigeration; Unit of refrigeration; Coefficient of performance (COP)		
2 nd	3 rd	Fundamentals of air-conditioning system; Refrigerants Definition, Classification, Nomenclature, Desirable properties,	2 nd	To Study the Mechanical heat pump and find its C.O.P.
	4 th	Comparative study, secondary refrigerants, Introduction to eco-friendly Refrigerants;		
3 rd	5 th	Carnot refrigeration cycle. Temperature. Limitations;	3 rd	

	6 th	Brayton refrigeration or the Bell Coleman air refrigeration cycle Necessity of cooling the aero plane;		To study the Air and Water heat pump and find its C.O.P.
4 th	7 th	Air craft refrigeration systems, Simple cooling and Simple evaporative types, Boot strap and Boot strap evaporative types,	4 th	To study the cut-sectional models of Reciprocating and Rotary Refrigerant compressor.
	8 th	Regenerative type and Reduced Ambient type system, Comparison of different systems, problems		
5 th	9 th	Vapour Compression (VC) Refrigeration Systems: (A) Simple Vapour Compression (VC) Refrigeration systems-Limitations of Reversed Carnot cycle with vapour as the refrigerant A systems with individual or multiple expansion valves but with and without intercoolers	5 th	To study the various controls used in Refrigerating & Air Conditioning systems.
	10 th	analysis of VC cycle considering degrees of sub cooling and superheating; VC cycle on p-v, t-s and p-h diagrams; Effects of operating conditions on COP;		
6 th	11 th	Comparison of VC cycle with Air Refrigeration cycle Multistage Ref. Systems- Necessity of compound compression,	6 th	To study the Ice- plant, its working cycle and determine its C.O.P and capacity.
	12 th	Compound VC cycle , Inter-cooling with liquid sub –cooling and / or water inter cooler: Multistage compression with flash inter-cooling and / or water		

		inter-cooling systems with individual or multiple expansion valves;		
7 th	13 th	Individual compression system with individual or multiple expansion valves; Individual compression	7 th	To study the humidification, heating, cooling and dehumidification processes and plot them on Psychrometric charts.
	14 th	Other Refrigeration Systems: (A) Vapour Absorption Refrigeration Systems – Basic Systems, Actual COP of the System, Performance, Relative merits and demerits;		
8 th	15 th	Properties of aqua ammonia Electrolux Refrigeration; Problems. Steam Jet Refrigerating System- Introduction, Analysis, Relative merits and demerits, Performance Applications, Problems.	8 th	To determine the By-pass factor of Heating & Cooling coils and plot them on Psychrometric charts on different inlet conditions
	16 th	Psychrometry of Air & Air Conditioning Processes: Properties of moist Air-Gibbs Dalton law, Specific humidity, Dew point temperature, Degree of saturation		
9 th	17 th	Relative humidity, Enthalpy, Humid specific heat, Wet bulb temp., Thermodynamics wet bulb temp., Psychrometric chart; Psychrometry of air-conditioning processes,	9 th	To determine sensible heat factor of Air on re-circulated air-conditioning set up.
	18 th	Mixing Process, Basic processes in conditioning of air; Psychrometric processes in air washer,		
10 th	19 th	Problems Air- Conditioning Load Calculations: Outside and inside	10 th	

		design conditions; Sources of heating load; Sources of cooling load; Heat transfer through structure,		To study the chilling plant and its working cycle .
	20 th	Solar radiation Electrical applications, Infiltration and ventilation, Heat generation inside conditioned space; Apparatus selection;		
11 th	21 th	Comfort chart, Problems. Air Conditioning Systems with Controls & Accessories: Classifications, Layout of plants; Equipment selection;		
	22 nd	Air distribution system; Duct systems Design; Filters; Refrigerant piping;		
12 th	23 nd	Design of summer air conditioning and Winter air conditioning systems		
	24 nd	Temperature sensors, Pressure sensors, Humidity sensors, Actuators, Safety controls;		
13 th	25 nd	Accessories; Problems. Refrigeration and Air Conditioning Equipment:		
	26 nd	Type of compressors and their performance curve Types of Condensers,		
14 th	27 nd	Heat transfer in condensers Types of expansion devices;		
	28 nd	types of evaporators Cooling and Dehumidifying coils, Problems		
15 th	29 nd	Problems		
	30 nd	Problems		