



Department of Mechanical Engineering
Raajdhani Engineering College, Bhubaneswar, Odisha-751017

LESSON PLAN

Faculty Name	PROF. JAYANTI MANJARI SAHOO			Name of the Program	Diploma in Mechanical Engineering
Course Name	REFRIGERATION & AIR CONDITIONING			Course Code	TH-5 (C 305)
Course Year	3 rd year	Semester	5 th	Academic Period	2023-24
No. of Classes allotted per Week	04		Planned Classes Required to Complete the Course		

Sl. No.	Topics to be covered	Module	No. of hours Required	Mode of Teaching	CO	BOOK	CHAPTER (PAGES)	OTHER SOURCE(IM)
1	Definition of refrigeration and unit of refrigeration	I	1	LM/ IM	CO1	T1 T2	2:38-76 2:64-86	https://youtu.be/zqXgmVnI3L8
2	Definition of COP, Refrigerating effect (R.E)	I	1	LM/ IM	CO1	T1 T2	2:39-40 2:64-86	https://youtu.be/qj-4qm45Hes
3	Principle of working of open and closed air system of refrigeration.	I	1	LM/ IM	CO1	T1 T2	2:41-42 2:64-86	https://youtu.be/XbxVmvLFYxs
4	Calculation of COP of Bell-Coleman cycle and Problem Solving.	I	1	LM/ IM	CO1	T1 T2	2:51-54	https://youtu.be/YuQtoOInmiM https://youtu.be/kIS_K9VYGiU
5	Numerical on COP of refrigeration.	I	1	LM/ IM	CO1	T1	2:54-73	



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						T2		
6	Schematic diagram of simple vapors compression refrigeration system & its type	II	1	LM/ IM	CO2	T1 T2	4:125-193 3:87-122	https://youtu.be/_yzU0ydis?t=391
7	Cycle with dry saturated vapors after compression	II	1	LM/ IM	CO2	T1 T2	4:128-130 3:90-130	https://youtu.be/yNmUQalljyw
8	Cycle with wet vapors after compression.	II	1	LM/ IM	CO2	T1 T2	4:134-136 3:90-136	https://youtu.be/x9yirfC8niI
9	Numerical on VCRS	II	1	LM/ IM	CO2	T1 T2	4:128-136 3:122-124	https://youtu.be/x9yirfC8niI
10	. Cycle with superheated vapors after compression & before compression	II	1	LM/ IM	CO2	T1 T2	4:146-147 3:90-122	https://youtu.be/x9yirfC8niI
11	Cycle with superheated vapors before compression	II	1	LM/ IM	CO2	T1 T2	4:146-147 3:90-122	https://youtu.be/x9yirfC8niI
12	Cycle with sub cooling of refrigerant	II	1	LM/ IM	CO2	T1 T2	4:181-184 3:90-122	https://youtu.be/ZwgjiqGJTho
13	Representation of above cycle on temperature entropy and pressure enthalpy diagram.	II	1	LM/ IM	CO2	T1 T2	4:126-127 3:90-122	https://youtu.be/qDY-NIyXMzo



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14	Problem solving(determination of COP, mass flow)	II	1	LM/ IM	CO2	T1 T2	4:126-186	
15	Surprise test/Assignment	II	1	LM/ IM	CO2	T1 T2		
16	Working principle of Simple vapor absorption refrigeration system	II	1	LM/ IM	CO2	T1 T2	7:273-293 12:402-430	https://youtu.be/P_YIwtY1984
17	Comparison between VCRS & VARS	II	1	LM/ IM	CO2	T1 T2	7:278-278 12:402-430	https://youtu.be/YCkbRADU0nw
18	Working principle of Practical vapor absorption refrigeration system	II	1	LM/ IM	CO2	T1 T2	7:275-276 12:423-425	https://youtu.be/Ghp-O1bMMuU
19	Working principle of ideal vapor absorption refrigeration system	II	1	LM/ IM	CO2	T1 T2	7:277-278 12:423-425	https://youtu.be/Ghp-O1bMMuU
20	COP of an ideal vapor absorption refrigeration system .Problem solving on COP	II	1	LM/ IM	CO2	T1 T2	7:278-285 12:278-285	https://youtu.be/SLuN4xxkTZE
21	Problem solving on COP	II	1	LM/ IM	CO2	T1 T2	7:278-285 12:278-285	
22	Surprise test and discussion	II	1	LM/ IM	CO2	T1 T2		



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23	Refrigerant compressors- Principle of working and constructional details of reciprocating and rotary compressors.	III	1	LM/ IM	CO3	T1 T2	9:316-357 6:236-280	https://youtu.be/vBMHlgPtGcg
24	Centrifugal Compressor(only theory)	III	1	LM/ IM	CO3	T1 T2	9:350-350 6:260-261	https://youtu.be/PT0UIqAGacg
25	Hermetically and semi hermetically sealed compressor.	III	1	LM/ IM	CO3	T1 T2	9:347-348 6:236-239	https://youtu.be/1_t8HTNgwwo
26	Principle of working and constructional details of air cooled and water cooled condenser.	III	1	LM/ IM	CO3	T1 T2	10:361-362 7:286-300	https://youtu.be/UPsH2fF7Igs
27	Heat rejection ratio. Cooling tower and spray pond	III	1	LM/ IM	CO3	T1 T2	10:360-371 7:286-286	https://youtu.be/sWJCWDpY9is
28	Principle of working and constructional details of an evaporator.	III	1	LM/ IM	CO3	T1 T2	11:376-378 9:319-322	https://youtu.be/dUOgKRUUc3Q
29	Types of evaporator	III	1	LM/ IM	CO3	T1 T2	11:382-383 9:319-322	https://youtu.be/gyYa1BDjNAg
30	Bare tube coil evaporator, finned evaporator, shell and tube evaporator	III	1	LM/ IM	CO3	T1 T2	11:383-386 9:319-340	https://youtu.be/ZbeRFEC6DHc



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31	Surprise Test/Assignment	III	1	LM/ IM	CO3	T1 T2		
32	Function of expansion valves- Working of Capillary tube	IV	1	LM/ IM	CO4	T1 T2	12:398-407 8:303-311	https://youtu.be/U5NJvDxIHjY
33	Working principle of Automatic expansion valve	IV	1	LM/ IM	CO4	T1 T2	12:401-402 8:303-304	https://youtu.be/_9jFjoBBV6g
34	Working principle of Thermostatic expansion valve	IV	1	LM/ IM	CO4	T1 T2	12:402-403 8:305-306	https://youtu.be/oSLOHCOW3yg
35	Discussions	IV	1	LM/ IM	CO4	T1 T2		
36	Classification of refrigerants Desirable properties of an idealrefrigerant, Designation of refrigerant.	IV	1	LM/ IM	CO4	T1 T2	8:294-315 4:128-208	https://www.youtube.com/watch?v=6_ePn_LkIQM
37	Thermodynamic Properties & Chemical properties of refrigerants	IV	1	LM/ IM	CO4	T1 T2	8:306-311 4:137-150	https://youtu.be/6_ePn_LkIQM
38	Commonly used refrigerants, R-11,R- 12, R-22, R-134a, R-717,substitute for CFC	IV	1	LM/ IM	CO4	T1 T2	8:277-278 4:188-191	https://youtu.be/6_ePn_LkIQM



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39	Class Test	IV	1	LM/ IM	CO4	T1 T2		
40	Applications of refrigeration- cold storage, diary refrigeration	IV	1	LM/ IM	CO4	T1 T2	22:726-745 24:797-814	
41	Applications of refrigeration- ice plant, water cooler, frost free refrigerator	IV	1	LM/ IM	CO4	T1 T2	22:726-745 24:825-834	https://youtu.be/73ko1Ufc4dc
42	Discussion	IV	1	LM/ IM	CO4	T1 T2		
43	Psychometric terms	V	1	LM/ IM	CO5	T1 T2	16:467-533 15:474-508	https://youtu.be/O1OH7s10gu0?t=126
44	Adiabatic saturation of air by evaporation of water.	V	1	LM/ IM	CO5	T1 T2	16:481-484 15:474-508	https://youtu.be/T323G0gNlrw
45	Psychometric chart and uses. Psychometric processes	V	1	LM/ IM	CO5	T1 T2	16:488-489 15:474-508	https://www.youtube.com/watch?v=_UIPBYSVku
46	Sensible heating and Cooling	V	1	LM/ IM	CO5	T1 T2	16:489-490 15:474-508	https://youtu.be/yqpR7udHBEA



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47	Cooling and Dehumidification Heating and Humidification	V	1	LM/ IM	CO5	T1 T2	16:500-507 15:474-497	https://youtu.be/JwEW9yRXxw4
48	Adiabatic cooling with humidification, Total heating of acooling process SHF, BPF	V	1	LM/ IM	CO5	T1 T2	16:506-507 15:474-508	https://youtu.be/VQ48RDEbT24
49	Adiabatic mixing	V	1	LM/ IM	CO5	T1 T2	16:524-525 15:474-508	https://youtu.be/oRnArMLVL1U
50	Discussions on above.	V	1	LM/ IM	CO5	T1 T2		
51	Effective temperature and Comfort chart.	V	1	LM/ IM	CO5	T1 T2	17:534-548 16:514-528	https://youtu.be/zSa-hFmwzas
52	Surprise test & Discussion	V	1	LM/ IM	CO5	T1 T2		
53	Air conditioning System-Factors affecting comfort air conditioning.	VI	1	LM/ IM	CO6	T1 T2	17:549-596 15:497-508	https://youtu.be/nvUhiXD63Eg
54	Equipment used in air-conditioning.	VI	1	LM/ IM	CO6	T1 T2	17:550-551 15:474-508	https://youtu.be/o6S6I2Xqq08



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55	Classification of air-conditioning system, Winter Air Conditioning System	VI	1	LM/ IM	CO6	T1 T2	17:553-555 15:497-508	https://youtu.be/Dj8ATzgrxyA
56	Summer air-conditioning system. Numerical on above	VI	1	LM/ IM	CO6	T1 T2	17:555-556 15:497-508	https://youtu.be/Dj8ATzgrxyA
57	Numerical on above	VI	1	LM/ IM	CO6	T1 T2		
58	Assignment/ discussion	VI	1	LM/ IM	CO6	T1 T2		
59	Surprise test	VI	1	LM/ IM	CO6	T1 T2		
60	Discussion	VI	1	LM/ IM	CO6	T1 T2		

LM: Learner Mode: Chalk & Talk, Lecture

IM: Interactive Mode: PPT, VIDEO and Animation

T1: Refrigeration and airconditioning by R.S.Khurmi & J. K.Gupta (Selected portions of Chapter 2,4,7,8,9,10,11,12,16,17,22)

T2: Refrigeration and airconditioning by C. P Arrora (Selected portion of Chapter 2,3,4,6,7,8,9,12,15,16,24)

Signature of the Faculty

Signature of the HOD



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