

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Discipline: Mechanical Engineering	Semester: 5th	Name of the Teaching Faculty: BIBHASI MANDAL	
Subject: Refrigeration and air-conditioning	No. of days/week class allotted 1	Semester From date: 14.07.2025 No. of Week: 15	To date: 15.11.2025
PRE-REQUISITE	Basic knowledge about <u>refrigeration</u> .		
Course Outcomes	CO1:- Explain the working of open and closed air system of air refrigeration system. CO2:- Describe working and construction of compressor, condenser, evaporator, expansion valve used for air conditioning and refrigeration. CO3:- Explain vapour compression refrigeration system. CO4:- Explain vapour absorption refrigeration system. CO5:- Compare different refrigerants properties. CO6:- Describe equipment for air conditioning.		
Week	Class Day	Theory/Practical Topics	
1st	1st	AIR REFRIGERATION CYCLE:- Definition of refrigeration and unit of refrigeration	
	2nd	Definition of COP, Refrigerating effect (R.E)	
	3rd	Principle of working of open and closed air system of refrigeration.	
	4th	Calculation of COP of Bell-Coleman cycle and numerical on it	
2nd	1st	Calculation of COP of Bell-Coleman cycle and numerical on it	
	2nd	SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM:- Simple vapors compression refrigeration system, types	
	3rd	Cycle with dry saturated vapors after compression	
	4th	Related problems	
3rd	1st	Cycle with wet vapors after compression.	
	2nd	Related problems	
	3rd	Cycle with superheated vapors after compression.	
	4th	Related problems	
4th	1st	Cycle with superheated vapors before compression, Related problems	
	2nd	Cycle with sub cooling of refrigerant, Related problems	
	3rd	Cycle with sub cooling of refrigerant, Related problems	
	4th	VAPOUR ABSORPTION REFRIGERATION SYSTEM:- Simple vapor absorption refrigeration system	
5th	1st	Simple vapor absorption refrigeration system	
	2nd	Practical vapor absorption refrigeration system	
	3rd	Practical vapor absorption refrigeration system	
	4th	COP of an ideal vapor absorption refrigeration system	
6th	1st	COP of an ideal vapor absorption refrigeration system	
	2nd	Numerical on COP	
	3rd	REFRIGERANT COMPRESSORS:- Principle of working and constructional details reciprocating and rotary compressors	
	4th	Centrifugal compressor, Important terms	
7th	1st	Hermetically and semi hermetically sealed compressor	
	2nd	CONDENSERS:- Principle of working and constructional details of air cooled and water cooled condenser	
	3rd	Heat rejection ratio, cooling tower and spray pond	
	4th	EVAPORATORS:- Principle of working and constructional details of an evaporator, types of evaporator	
8th	1st	Bare tube coil evaporator, finned evaporator, shell and tube evaporator	
	2nd	Bare tube coil evaporator, finned evaporator, shell and tube evaporator	
	3rd	EXPANSION VALVES:- Capillary tube, Automatic expansion valve, Thermostatic expansion valve	
	4th	REFRIGERANTS:- Classification of refrigerants	
9th	1st	Desirable properties of an ideal refrigerant.	
	2nd	Designation of refrigerant.	
	3rd	Thermodynamic Properties of Refrigerants.	
	4th	Chemical properties of refrigerants.	
10th	1st	commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717	
	2nd	Substitute for CFC	
	3rd	APPLICATIONS OF REFRIGERATION:- cold storage, dairy refrigeration, ice plant, water cooler, frost free refrigerator	
	4th	APPLICATIONS OF REFRIGERATION:- cold storage, dairy refrigeration, ice plant, water cooler, frost free refrigerator	
11th	1st	PSYCHOMETRICS & COMFORT AIR CONDITIONING SYSTEMS, Psychometric terms	
	2nd	Adiabatic saturation of air by evaporation of water	
	3rd	Psychrometric chart and uses	
	4th	Sensible heating and cooling, Cooling and Dehumidification	
12th	1st	Heating and Humidification, Adiabatic cooling with humidification	
	2nd	Heating and Humidification, Adiabatic cooling with humidification	
	3rd	Total heating of a cooling process, SHF, BPF	
	4th	Related problems	
13th	1st	Related problems	
	2nd	Effective temperature and Comfort chart	
	3rd	AIR CONDITIONING SYSTEMS, factors affecting comfort air conditioning	
	4th	EQUIPMENT USED IN AN AIR-CONDITIONING	
	1st	Classification of air-conditioning system	

14th	2nd	Classification of air-conditioning system
	3rd	Winter Air Conditioning System
	4th	Winter Air Conditioning System
15th	1st	Summer air-conditioning system
	2nd	Summer air-conditioning system
	3rd	Related prolems
	4th	Related prolems

Learning Resources:

- 01:- REFRIGERATION AND AIR CONDITIONING, C.P ARRORA
- 02:- REFRIGERATION AND AIR CONDITIONING, R.S.KHURMI & J.K.GOPTA
- 03:- REFRIGERATION AND AIR CONDITIONING, P.L BALLANY
- 04:- REFRIGERATION AND AIR CONDITIONING, DOMKUNDRA AND ARORA

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of Faculty

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