

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

<u>LESSON PLAN</u>		
Discipline: Mechanical Engineering	Semester: 4th	Name of the Teaching Faculty: CHINMAYA BRAHMADARSHI MISHRA
Refrigeration and Air Conditioning	No. of days/week class allotted 3	Semester From date:22.12.2025 To date:18.04.2026 No. of Week: 15
PRE-REQUISITE	REFRIGERATION AND AIR CONDITIONING	
Course Outcomes	1. Define refrigeration and types of Refrigeration cycles 2. Explain Vapor Compression and Vapor Absorption System working principles 3. Identify the components required for refrigeration system. 4. Identify the controlling components for a refrigeration system. 5. Explain the working principles of Air-conditioning.	
Week	Class Day	Theory/Practical Topics
1st	1st	Introduction to Refrigeration: Definition of Refrigeration
	2nd	Refrigerating effect- unit of refrigeration- Coefficient of performance
	3rd	Types of Refrigeration-Ice, dry ice, Steam jet, Throttling
2nd	1st	Liquid nitrogen refrigeration; Carnot refrigeration Cycle
	2nd	Liquid nitrogen refrigeration; Carnot refrigeration Cycle
	3rd	Air refrigeration- Bell - Coleman cycle
3rd	1st	Air refrigeration- Bell - Coleman cycle
	2nd	PV& TS diagram; Advantage and disadvantages in air refrigeration
	3rd	Simple problems
4th	1st	Simple problems
	2nd	Refrigeration systems: Basic Components
	3rd	Flow diagram of working of Vapour compression cycle
5th	1st	Flow diagram of working of Vapour compression cycle
	2nd	Representation of the vapour compression cycle on P-H, T-S & P-V Diagram
	3rd	Expression for Refrigerating effect, work done and power required
6th	1st	Expression for Refrigerating effect, work done and power required
	2nd	Types of Vapour Compression cycle; Effects of super heating and under cooling, its advantages and disadvantages
	3rd	Simple Vapour absorptions cycle and its flow diagram
7th	1st	Simple Electrolux system for domestic units; Comparison of Vapour absorption and vapour compression system
	2nd	Simple problems on vapour compression cycle.
	3rd	Refrigeration equipment: Compressor - types of compressors
8th	1st	Refrigeration equipment: Compressor - types of compressors
	2nd	Hermetically sealed and Semi hermetically sealed compressor
	3rd	Condensers - Air Cooled, water cooled, natural and forced draught cooling system
9th	1st	Advantages and disadvantages of air cooled and water cooled condensers
	2nd	Evaporators -natural, convection, forced convection types
	3rd	Evaporators -natural, convection, forced convection types
10th	1st	Evaporators -natural, convection, forced convection types
	2nd	Refrigerant flow controls: Capillary tube; Automatic Expansion valve
	3rd	Refrigerant flow controls: Capillary tube; Automatic Expansion valve
11th	1st	Thermo- static expansion valve; High side and low side float valve
	2nd	Thermo- static expansion valve; High side and low side float valve
	3rd	Solenoid valve; Evaporator pressure regulator.
12th	1st	Application of refrigeration: Slow and quick freezing; Cold storage and Frozen storage
	2nd	Application of refrigeration: Slow and quick freezing; Cold storage and Frozen storage
	3rd	Dairy refrigeration; Ice making industry; Water coolers
13th	1st	Air conditioning: Introduction to Air conditioning
	2nd	Factors affecting Air conditioning
	3rd	Psychometric chart and its use; Psychometric process-sensible heating and cooling
14th	1st	Psychometric chart and its use; Psychometric process-sensible heating and cooling
	2nd	Humidifying and dehumidifying; Adiabatic saturation process
	3rd	Equipment used in air conditioning cycle; Air conditioning units and plants.
15th	1st	Installation procedure
	2nd	Faults in refrigeration and air conditioning system; Servicing procedure
	3rd	Faults in refrigeration and air conditioning system; Servicing procedure

Learning Resources:

Refrigeration and Air Conditioning – S. Domakundawar, Dhanpat Rai publications.
 Refrigeration and Air Conditioning – Sadhu Singh, Khanna Book Publishing Co., New Delhi
 Refrigeration and Air Conditioning – M.Zakria Baig, Premier/ Radiant Publishing House.

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