GOVT POLYTECHNIC BOLANGIR
Department of Mechanical Engineering

LESSON PLAN: 2025-26
Name of the Faculty: Manabhanjan Bhoi (Lecturer Stage-II)
Subject: Refrigeration and Air Conditioning (TH4 (a)) (MEPE202(a)) Program: Diploma in Mechanical Engineering Semester: 4th Total Contact Hours: 45 Total Marks: 100 Assessment: Progressive –30, End Term – 70 Credits: 3

COURSE OBJECTIVES:

After completion of the course, the students will be able to

1. Define refrigeration and types of Refrigeration cycles
2. Explain Vapor Compression and Vapor Absorption System working principles
3. Identify the componentsrequired for refrigeration system.
4. Identify the controlling components for a refrigeration system.
5. Explain the working principles of Air-conditioning.

UNIT-I: Introduction to Refrigeration (Total Classes: 10)				
Class No.	**Topic**	**Subtopics Covered**	**Teaching Aids / Activities**	**Course Objective**
1	Introduction to Refrigeration	Definition of refrigeration; need and applications	Chalk & board, PPT, real-life examples	CO1
2	Refrigerating Effect	Refrigerating effect; unit of refrigeration	PPT, numerical examples	CO1
3	COP	Coefficient of Performance; significance	Board work, problem solving	CO1
4	Types of Refrigeration	Ice and dry ice refrigeration	PPT, images	CO1
5	Types of Refrigeration	Steam jet and throttling refrigeration	PPT, discussion	CO1
6	Advanced Refrigeration	Liquid nitrogen refrigeration	Video/visual aids	CO1
7	Ideal Cycle	Carnot refrigeration cycle	PPT, T-S diagram	CO1
8	Air Refrigeration	Bell–Coleman cycle; working principle	PPT, schematic diagram	CO1
9	Air Refrigeration Diagrams	PV and TS diagrams	Board work	CO1
10	Air Refrigeration	Advantages, disadvantages; simple problems	Numerical problems	CO1

UNIT-II: Refrigeration systems (Total Classes: 10)				
11	Vapour Compression System	Basic components; layout	Model/PPT	CO2
12	Vapour Compression Cycle	Working principle; flow diagram	PPT, animation	CO2
13	VCR Cycle Representation	P-H, T-S, P-V diagrams	Board & charts	CO2
14	Performance of VCR System	Refrigerating effect; work done	Numerical problems	CO2
15	Types of VCR Systems	Simple and modified cycles	PPT	CO2
16	Superheating & Subcooling	Effects, advantages, disadvantages	Charts, discussion	CO2
17	Vapour Absorption System	Principle and simple cycle	PPT	CO2
18	Electrolux System	Construction and working	Diagram, video	CO2
19	VCR vs VAR	Comparison between systems	Tabular discussion	CO2
20	Numerical Problems	Simple problems on VCR cycle	Problem solving	CO2
UNIT-III: Refrigeration equipment (Total Classes: 08)				
21	Compressors	Types of compressors	PPT, cut-section images	CO3
22	Compressors	Hermetically and semi-hermetic compressors	Visual aids	CO3
23	Condensers	Air-cooled and water-cooled condensers	Charts, models	CO3
24	Condensers	Natural & forced draught cooling; comparison	PPT, discussion	CO3
25	Evaporators	Natural and forced convection evaporators	PPT	CO3
26	Flow Control Devices	Capillary tube; working	Real component / PPT	CO3
27	Expansion Valves	Automatic expansion valve	PPT, diagram	CO3
28	Expansion Valves	Thermostatic expansion valve	PPT	CO3
UNIT-IV: Refrigerant flow controls (Total Classes: 08)				
29	Valves	Float valves; solenoid valve	Visual aids	CO4
30	Regulators	Evaporator pressure regulator	Diagram, discussion	CO4
31	Applications of Refrigeration	Slow and quick freezing	PPT, case studies	CO4
32	Storage Systems	Cold storage and frozen storage	Video, PPT	CO4

33	Industrial Applications	Dairy refrigeration; ice plants	PPT	CO4
34	Commercial Applications	Water coolers and domestic units	Real-life examples	CO4
35	Introduction to Air Conditioning	Definition; objectives	PPT	CO4
36	Factors Affecting AC	Temperature, humidity, comfort	PPT, discussion	CO4
UNIT-V: Air conditioning (Total Classes: 09)				
37	Psychrometry	Psychrometric chart and properties	Chart demonstration	CO5
38	Psychrometric Processes	Sensible heating and cooling	Board work	CO5
39	Humidification Processes	Humidifying and dehumidifying	Chart problems	CO5
40	Adiabatic Saturation	Concept and process	PPT	CO5
41	AC Equipment	Components of AC system	PPT, models	CO5
42	AC Units & Plants	Window, split, central AC	Video/PPT	CO5
43	Tools & Installation	Tools used; installation procedure	Tool demonstration	CO5
44	Faults & Servicing	Common faults; servicing methods	Case discussion	CO5
45	Revision & Evaluation	Overall revision; Q&A	Interactive session	All objectives

22.12.25
Signature of Faculty

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Signature of HoD
H.O.D.
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