

CHHATISGARH INSTITUTE OF TECHNOLOGY JASHPUR

(छत्तीसगढ़ इंस्टीट्यूट ऑफ टेक्नोलॉजी जशपुर)

Vill. - Jhargaon, Post- Gholeng, Dist- Jashpur (Chhattisgarh) – 496338

Website- www.gpjashpur.ac.in

Email: govtpolyjashpur@gmail.com

LESSON PLAN SESSION JUL – DEC 2025

SUBJECT: **Refrigeration & Air conditioning** SEMESTER: **5th** BRANCH: - **MECHANICAL ENGINEERING**
SUBJECT CODE-2037574(037)

UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
UNIT 01: Refrigeration and Refrigeration Cycles	1.1&1.2 Introduction to Refrigeration, different terminology of RAC machineries. Conventional Methods of Refrigeration-Ice refrigeration, Dry ice, Steam jet, Gas throttling, Liquid Gas, Air refrigeration, Vapour absorption, Vapour compression	06	
	1.3&1.4 Non-conventional methods of refrigeration –Thermo electric, magnetic, Thermo acoustic, Pulse tube, Vortex tube. Concept of heat pump Refrigerating effect, Units of refrigeration, COP, Reversed Carnot cycle and its representation on PV and TS diagram.		
	1.5 Air Refrigeration Cycles: Bell Coleman cycle - representation on PV and TS diagram, determination of COP, Application of the air refrigeration cycle such as Aircraft refrigeration. Simple numerical.	03	
	1.6 Vapour Compression Cycle: Schematic diagram, representation on PV, TS and PH diagrams and its working. Actual VCC, calculation of COP, Effect of Wet /Dry – compression, superheating and Sub cooling, simple numerical, Multistage Vapour compression cycle- need and advantages, cascade refrigeration and its application.	08	
Unit 02: Vapour compression and Vapour absorption refrigeration systems	2.1 Construction and working of various components- Open type, hermetically sealed, Centrifugal, Screw type compressors, Application of the compressors	02	
	2.2 Evaporators- their functions and types such as extended surface, Plate coil type, Flooded, Dry Direct and Indirect expansion types Capacity of evaporator. Frosting /defrosting of evaporators.	01	
	2.3 Condensers – types of condensers such as Evaporative type, Air cooled [forced and natural convection) Water cooled.	01	
	2.4 Construction and working of various types of expansion devices such as – capillary tube auto expansion and thermostatic expansion valves, solenoid control valves and Low side High side valves	01	

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	<p>2.5 Vapour Absorption System – Schematic diagram, principle, components and working of Ammonia Vapour absorption system, Lithium Bromide absorption system, Electrolux Refrigerators , Comparison with vapor compression system</p>	04	
<p>Unit 03: Refrigerants</p>	<p>3.1 Refrigerants, Description, Function, Composition and its application, Thermodynamic properties and characteristics of ideal refrigerants.</p>	02	
	<p>3.2&3.3 Types of refrigerants as primary / secondary, Properties of the Commonly used refrigerants such as – CO₂, Ammonia, SO₂ , Freon 11, Freon 12 , Freon 22, Azeotropes, Azeotropic and Zeotropic blends. Secondary Refrigerants, Properties of brines and glycols. Application of various brines, Inhibitor and other secondary refrigerants Environmental impact of different refrigerant</p>	03	
	<p>3.4 &3.5 Nomenclature of refrigerant, Selection of refrigerants. Next generation refrigerant, Alternatives of cfc. 3.6&3.7 Types of cylinder, color coding, refrigerant recovery method Safe practices in handling of refrigerants</p>	04	
<p>Unit 04: Psychrometric</p>	<p>4.1&4.2 Difference between refrigeration and air conditioning, Necessity of air conditioning, Concept of body comfort. Properties of air - DBT, WBT , Dew Point Temperature, Relative humidity, Sensible heat, Latent heat, Air as mixture of different gases and water Vapour, Daltons law of partial pressure,</p>	04	
	<p>4.3 Concept of humidity of air, absolute humidity, relative Humidity, Psychrometers and their types , Enthalpy of air, Specific Volume of air, Dew Point Temperature of moist air.</p>	04	
	<p>4.4 Psychrometric charts, psychrometric processes such as sensible heating and cooling, latent heating and cooling , heating and humidification , cooling and dehumidification , evaporative cooling, sensible heat factor , By-pass factor , apparatus dew point, simple numerical problems.</p>	04	
<p>Unit 05: Air Conditioning and Cooling Load Calculation</p>	<p>5.1 Air conditioning systems: Classification – Industrial, Comfort air conditioning, Summer, winter and year round air conditioning, Construction and working of window type, package type and central plant systems.</p>	04	
	<p>5.2 Cooling load calculations: Sources of heat gain – External and internal source, solar radiation through windows, heat addition by occupants and equipments, infiltration of air – ventilation, Sensible heat load, Latent heat load, Total cooling load</p>	04	
Total Class Required		55	

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Lecturer Name & Sign: -