

ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Mechanical Engineering	Semester: 5th	Name of the faculty : Dharma prakash samal
Subject: Refrigeration and air conditioning	No. Of Days/Week Allotted: 4	Semester from : 14/07/2025 To: 15/11/2025
		No. Of Weeks : 15
Week	Class Day	Theory Topics
1 ^s	1 st	Definition of refrigeration and unit of refrigeration
	2 nd	Definition of COP, Refrigerating effect (R.E)
	3 rd	Principle of working of open and closed air system of refrigeration.
	4 th	Calculation of COP of Bell-Coleman cycle and numerical on it.
2 nd	1 st	Numerical practice
	2 nd	schematic diagram of simple vapors compression refrigeration system'
	3 rd	vapors compression refrigerationTypes
	4 th	Cycle with dry saturated vapors after compression /
3 rd	1 st	Cycle with wet vapors after compression.
	2 nd	Cycle with superheated vapors after compression.
	3 rd	Cycle with superheated vapors before compression
	4 th	Cycle with sub cooling of refrigerant
	1 st	Representation of above cycle on temperature entropy and pressure
	2 nd	Numerical on above (determination of COP,mass flow)
4 th	3 rd	Numerical practice
	4 th	Simple vapor absorption refrigeration system
	1 st	Simple vapor absorption refrigeration system
	2 nd	Practical vapor absorption refrigeration system
5 th	3 rd	Practical vapor absorption refrigeration system
	4 th	COP of an ideal vapor absorption refrigeration system
	1 st	Numerical on COP.
	2 nd	Numerical on COP.
6 th	3 rd	Principle of working and constructional details of reciprocating and rotary compressors
	4 th	Centrifugal compressor only theory
	1 st	Important terms.,Hermetically and semi hermetically sealed compressor
	2 nd	Principle of working and constructional details of air cooled and water
7 th	3 rd	Cooling tower and spray pond
	4 th	Principle of working and constructional details of an evaporator
	1 st	Types of evaporator.,Bare tube coil evaporator
	2 nd	finned evaporator, shell and tube evaporator
8 th	3 rd	EXPANSION VALVES,Capillary tube
	4 th	Automatic expansion valve, Thermostatic expansion valve
	1 st	REFRIGERANTS ,Classification of refrigerants
	2 nd	Desirable properties of an ideal refrigerant ,Designation of refrigerant
9 th	3 rd	Thermodynamic Properties of Refrigerants ,Chemical properties of
	4 th	commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717 ,Substitute
	1 st	Applications of refrigeration ,cold storage
	2 nd	dairy refrigeration
10 th	3 rd	ice plant ,water cooler
	4 th	frost free refrigerator
	1 st	Psychometric terms ,Adiabatic saturation of air by evaporation of water
	2 nd	Psychometric chart and uses.
11 th	3 rd	Psychometric processes ,Sensible heating and Cooling
	4 th	Cooling and Dehumidification
	1 st	Heating and Humidification
	2 nd	Adiabatic cooling with humidification
12 th	3 rd	Total heating of a cooling process

	2 nd	SHR, BPR, Adiabatic mixing
	3 rd	Problems on above
	4 th	Effective temperature and Comfort chart
13 th	1 st	Factors affecting comfort air conditioning
	2 nd	Equipment used in an air-conditioning.
	3 rd	Equipment used in an air-conditioning.
	4 th	Classification of air-conditioning system
14 th	1 st	Classification of air-conditioning system
	2 nd	Winter Air Conditioning System
	3 rd	Winter Air Conditioning System
	4 th	Summer air-conditioning system.
15 th	1 st	Summer air-conditioning system.
	2 nd	Numerical on above
	3 rd	Numerical on above
	4 th	Recap quiz

Dharama Prakash Samal
Signature of the faculty

ACADEMIC LESSON PLAN OF WINTER 2025

Discipline: Mechanical Engineering	Semester: 3RD	Name of the Teaching Faculty: Dharma prakash samal
Subject: Manufacturing process	No. Of Days/Week Allotted: 3	Semester from : 14/07/2025 To: 15/11/2025
		No. Of Weeks : 15
Week	Class Day	Theory Topics
1^s	1st	Introduction to Types of cutting fluids,
	2nd	Fluids and coolants required in turning, drilling, shaping, sawing & broaching
	3rd	Selection of cutting fluids&application of cutting fluid;
2nd	1st	Classification of lubricants (solid, liquid, gaseous), Properties and applications of lubricants.
	2nd	Types of lathes
	3rd	CNC lathe; Specifications; Basic parts and their functions
3rd	1st	Operations and tools – Turning
	2nd	Different operation parting off, Knurling, facing, Boring, drilling, threading
	3rd	Nomenclature of single point cutting tool of lathe.
4th	1st	Recap & Quiz
	2nd	Introduction to broaching
	3rd	Types of broaching machines
5th	1st	Horizontal type broaching
	2nd	Vertical type, pull up, pull down, and push down
	3rd	Elements of broach tool; broach teeth details; Nomenclature; Tool materials.
6th	1st	Classification; Basic parts and their functions; Radial drilling
	2nd	Types of drilling operations
	3rd	Specifications of drilling machine; Types of drills and reamers.
7th	1st	Unit Quiz & Recap
	2nd	Classification; Gas welding techniques
	3rd	Arc Welding – Principle, Equipment, Applications;
8th	1st	Shielded metal arc welding; Submerged arc welding; TIG / MIG welding; Resistance welding
	2nd	Welding defects; Brazing and soldering: Types, Principles, Applications
	3rd	Introduction; Types of milling machines
9th	1st	vertical; constructional details – specificationsof milling
	2nd	Milling operations: simple, compound and differential indexing; Milling cutters – types; Nomenclature of teeth
	3rd	Teeth materials; Tool signature of milling cutter; Tool & work holding devices.
10th	1st	Recap & Evaluation
	2nd	Manufacture of gears by Casting, Moulding
	3rd	, Stamping, Coining Extruding, Rolling, Machining
11th	1st	Gear Shaping with pinion cutter & rack cutter; Gear hobbing
	2nd	Description of gear hob; Operation of gear hobbing machine;Heat treatment processes applied to gears.

	3 rd	Types of presses and Specifications
12th	1 st	Press working operations - Cutting, bending, Drawing, punching, blanking, notching, lancing
	2 nd	Die set components- punch and die shoe,
	3 rd	Punch and die clearances for blanking and piercing, effect of clearance
13th	1 st	Quiz + Recap
	2 nd	Principles of metal removal by Grinding
	3 rd	Natural & Artificial; Bonds and binding processes
14th	1 st	Factors affecting the selection of grind wheels
	2 nd	Standard marking systems: Meaning of letters & numbers sequence of marking, Grades of letters
	3 rd	Grinding machines classification-
15th	1 st	Construction details; Principle of centreless grinding; Advantages & limitations of centreless grinding
	2 nd	Finishing by grinding: Honing Super finishing; Electroplating
	3 rd	Final Review & Test

Dharama prakash Samal
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Discipline: Mechanical Engineering	Semester: 3RD	Name of the Teaching Faculty: Dharma prakash samal
Subject: THERMAL ENGG-1	No. Of Days/Week Allotted: 3	Semester from : 14/07/2025 To: 15/11/2025 No. Of Weeks : 15
Week	Class Day	Theory Topics
1st	1st	Thermodynamic Systems (closed, open, isolated)
	2nd	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement
	3rd	cycle
2nd	1st	state, path function, point function; Thermodynamic Equilibrium
	2nd	Quasi-static Process ; Laws of thermodynamics (statements only
	3rd	Introduction to Energy Sources, Classification of Energy Sources: Renewable & Non-Renewable
3rd	1st	Fossil Fuels: Coal, Oil, Natural Gas (CNG, LPG), Solar Energy: Flat Plate & Concentrating Collectors
	2nd	Applications of Solar Energy, Wind, Tidal & Ocean Thermal Energy
	3rd	Geothermal, Biogas, Biomass, Biodiesel, Hydraulic & Nuclear Energy
4th	1st	Fuel Cell Technology, Recap & quiz
	2nd	Air Standard Cycle: Carnot, Otto, Diesel
	3rd	Combustion Engines: IC vs EC Engines
5th	1st	Classification & Components of IC Engines
	2nd	Parts: Cylinder, Crankshaft, Connecting Rod, Piston, Valves
	3rd	Working of 4-Stroke Petrol & Diesel Engines
6th	1st	Working of 2-Stroke Engines
	2nd	Comparison: 2-Stroke vs 4-Stroke, SI vs CI
	3rd	Valve & Port Timing Diagrams
7th	1st	Unit Quiz & Recap
	2nd	Petrol Engine Fuel System & Carburetor
	3rd	Diesel Engine Fuel System, Injectors, Pumps
8th	1st	Cooling Systems: Air & Water Cooling
	2nd	Thermo Siphon & Radiator Circulation
	3rd	Ignition Systems: Battery Coil & Magneto
9th	1st	Lubrication Systems: Types with Diagrams
	2nd	Governing Methods & Applications
	3rd	Supercharging Objectives
10th	1st	Recap & Evaluation
	2nd	BP, IP, FP Concepts
	3rd	Mean Effective Pressures, Efficiencies
11th	1st	Mechanical & Relative Efficiency
	2nd	Performance Tests & Morse Test
	3rd	Heat Balance Sheet
12th	1st	Determination of BP, IP, FP
	2nd	Numerical Problem Practice - I
	3rd	Numerical Problem Practice - II
13th	1st	Quiz + Recap
	2nd	Functions & Types of Compressors
	3rd	Single Stage Reciprocating Compressors
14th	1st	Multi-Stage Compressors & Advantages
	2nd	Rotary Compressors: Centrifugal, Axial, Vane
	3rd	Refrigeration: Air & Vapor Compression System
15th	1st	Air Conditioning Systems & Classifications
	2nd	Comfort & Industrial AC; Summer, Winter, Year-Round Systems
	3rd	Final Review & Test

Dharma prakash samal

Signature of the faculty