GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN		
Discipline: **Mechanical Engineering**	Semester: **4TH**	Name of the Teaching Faculty: **Shantanu Kumar Maity**
Subject: **Thermal Engineering-II**	No. of days/week class allotted **4**	Semester From date:04.02.2025 To date:17.05.2025 No. of Week: 15
PRE-REQUISITE	Basic Knowledge about Thermal Engineering	
Course Outcomes	CO1: Understanding the power developed in I.C engine and efficiency. CO2: Understanding the principle, performance and application of air compressor CO3: Determining thermodynamic properties of steam using steam tables and mollier chart. CO4: Comprehending the working of various steam generators i.e. boilers. CO5: Comprehending the vaporpower cycles and computing workdone and efficiency.	

Week	Class Day	Theory/Practical Topics
1st	1st	Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency
	2nd	Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency
	3rd	Overall efficiency ,Mean effective pressure &specific fuel consumption.
	4th	Overall efficiency ,Mean effective pressure &specific fuel consumption.
2nd	1st	Define air-fuel ratio & calorific value of fuel.
	2nd	Work out problems to determine efficiencies & specific fuel consumption.
	3rd	Work out problems to determine efficiencies & specific fuel consumption.
	4th	Work out problems to determine efficiencies & specific fuel consumption.
3rd	1st	Explain functions of compressor & industrial use of compressor air
	2nd	Classify air compressor & principle of operation.
	3rd	Describe the parts and working principle of reciprocating Air compressor
	4th	Describe the parts and working principle of reciprocating Air compressor

4th	1st	Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered &Volumetric efficiency.
	2nd	Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered &Volumetric efficiency.
	3rd	Derive the work done of single stage & two stage compressor with and without clearance.
	4th	Derive the work done of single stage & two stage compressor with and without clearance.
5th	1st	Derive the work done of single stage & two stage compressor with and without clearance.
	2nd	Solve simple problems (without clearance only)
	3rd	Solve simple problems (without clearance only)
	4th	Solve simple problems (without clearance only)
6th	1st	Difference between gas & vapours.
	2nd	Formation of steam.
	3rd	Representation on P-V, T-S, H-S, & T-H diagram.
	4th	Definition & Properties of Steam.
7th	1st	Use of steam table & mollier chart for finding unknown properties.
	2nd	Use of steam table & mollier chart for finding unknown properties.
	3rd	Non flow & flow process of vapour
	4th	Non flow & flow process of vapour
8th	1st	P-V, T-S & H-S, diagram
	2nd	Determine the changes in properties & solve simple numerical
	3rd	Determine the changes in properties & solve simple numerical
	4th	Determine the changes in properties & solve simple numerical
9th	1st	Classification & types of Boiler.
	2nd	Important terms for Boiler.
	3rd	Comparison between fire tube & Water tube Boiler
	4th	Comparison between fire tube & Water tube Boiler
10th	1st	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	2nd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	3rd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	4th	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
11th	1st	Boiler Draught (Forced, induced & balanced)
	2nd	Boiler Draught (Forced, induced & balanced)
	3rd	Boiler mountings & accessories
	4th	Boiler mountings & accessories
12th	1st	Carnot cycle with vapour. Derive work & efficiency of the cycle.
	2nd	Rankine cycle. Representation in P-V, T-S & h-s diagram.
	3rd	Derive Work & Efficiency.

	4th	Effect of Various end conditions in Rankine cycle.
13th	1st	Reheat cycle & regenerative Cycle
	2nd	Reheat cycle & regenerative Cycle
	3rd	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
	4th	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
14th	1st	Modes of Heat Transfer (Conduction, Convection, Radiation).
	2nd	Modes of Heat Transfer (Conduction, Convection, Radiation).
	3rd	Fourier law of heat conduction and thermal conductivity (k).
	4th	Newton's laws of cooling.
15th	1st	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem.
	2nd	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem.
	3rd	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility
	4th	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility

Learning Resources:

R.S Khurmi	Thermal engineering (S. Chand)
P.K. Nag	Engineering Thermodynamics (TMH)
A.R. Basu	Thermal Engineering (Dhanpat Rai)
A.S. Sahoo	Thermal Engineering (Satyaprakash)

Signature of Faculty

Signature of HOD/

Signature of Academic Coordinator

Signature of Principal