UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SESSION-2023-24

SUBJECT: THERMAL ENGINEERING-II (THEORY-04)

DEPARTMENT OF

MECHANICAL ENGINEERING

Discipline: Mechanical Engineering	Semester: 4th	Name of the Teaching Faculty: Er SISIR KUMAR DALAI
Subject: Thermal Engineering-II (Th-4)	No of Days/Week Class Allotted: 04	Semester starts From Date: 16.01.2024 to Date: 26.04.2024 No. Of Weeks: 15
Week	**Class/Day**	**Theory/Practical Topics**
1st	1st	**1. Performance of I.C engine** Introduction
	2nd	Define mechanical efficiency, Indicated thermal efficiency
	3rd	Relative Efficiency, brake thermal efficiency,
2nd	1st	Overall efficiency Mean effective pressure & specific fuel consumption.
	2nd	Define air-fuel ratio & calorific value of fuel.
	3rd	Work out problems to determine efficiencies & specific fuel consumption.
3rd	1st	Solve Numerical
	2nd	Solve Numerical
	3rd	**2. Air Compressor** Explain functions of compressor & industrial use of compressor air
4th	1st	Classify air compressor
	2nd	principle of operation.
	3rd	Describe the parts and working principle of reciprocating Air compressor.
5th	1st	Explain the terminology of reciprocating compressor
	2nd	Terminology such as bore, stroke, pressure ratio free air delivered &Volumetric efficiency.
	3rd	Derive the work done of single stage compressor.
	4th	Derive the work done of single stage compressor without clearance
6th	1st	Derive the work done of single stage compressor with clearance
	2nd	Work done of Two stage compressor without clearance.
	3rd	Solve Numerical
	4th	Solve Numerical
7th	1st	**3. Properties of Steam** Difference between gas & vapours. Formation of steam.
	2nd	Formation of steam.
	3rd	Representation on P-V, T-S, H-S, & T-H diagram.
	4th	Definition & Properties of Steam.
8th	1st	Use of steam table & mollier chart for finding unknown properties.
	2nd	Non flow & flow process of vapour.
	3rd	P-V, T-S & H-S, diagram.
9th	1st	P-V, T-S & H-S, diagram.
	2nd	Determine the changes in properties
	3rd	Determine the changes in properties
10th	1st	Solve Numerical
	2nd	Solve Numerical
	3rd	**4. Steam Generator**

		Classification & types of Boiler.
11th	1st	Important terms for Boiler.
		Comparison between fire tube & Water tube Boiler.
	2nd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	3rd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	4th	Boiler Draught (Forced, induced & balanced)
12th	1st	Boiler Draught (Forced, induced & balanced)
	2nd	Boiler mountings & accessories.
	3rd	Boiler mountings & accessories.
	4th	**5. Steam Power Cycles** Carnot cycle with vapour.
13th	1st	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.
14th	1st	Reheat cycle & regenerative Cycle.
	2nd	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
	3rd	Solve Numerical
	4th	**6. Heat Transfer** Modes of Heat Transfer (Conduction, Convection, Radiation).
15th	1st	Fourier law of heat conduction and thermal conductivity (k). Newton's laws of cooling.
	2nd	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem.
	3rd	Solve Numerical
	4th	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility.

Learning Resources

Sl No.	Reference Book	Author Name	Publisher Name
01	Thermal Engineering	R.S. Khurmi	S.Chand
02	Thermal Engineering	A.R.Basu	Dhanpat Rai
03	Thermal Engineering	A.S. Sarao	Satya Prakash
04	Engineering Thermodynamics	P.k.Nag	TMH
05	Thermal Engineering	Mahesh M Rathore	TMH