

**UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING,
ROURKELA**



LESSON PLAN

SESSION-2022-23

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: 14.02.2023 to Date: 23.05.2023 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.
11 th	1 st	Important terms for Boiler.
		Comparison between fire tube & Water tube Boiler.
	2 nd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	3 rd	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	4 th	Boiler Draught (Forced, induced & balanced)
12 th	1 st	Boiler Draught (Forced, induced & balanced)
	2 nd	Boiler mountings & accessories.
	3 rd	Boiler mountings & accessories.
	4 th	5. Steam Power Cycles Carnot cycle with vapour.
13 th	1 st	Derive work & efficiency of the cycle.
	2 nd	Rankine cycle. Representation in P-V, T-S & h-s diagram.
	3 rd	Derive Work & Efficiency.
	4 th	Effect of Various end conditions in Rankine cycle.
14 th	1 st	Reheat cycle & regenerative Cycle.
	2 nd	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
	3 rd	Solve Numerical
	4 th	6. Heat Transfer Modes of Heat Transfer (Conduction, Convection, Radiation).
15 th	1 st	Fourier law of heat conduction and thermal conductivity (k). Newton's laws of cooling.
	2 nd	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem.
	3 rd	Solve Numerical
	4 th	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility.

Learning Resources

<u>Sl No.</u>	<u>Reference Book</u>	<u>Author Name</u>	<u>Publisher Name</u>
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