Discipline:- MECHANICAL ENGG.	Semester :-3rd	Name of the Teaching Faculty: -Dr. LALATENDU DASH
Subject:-THERMAL ENGINEERING-I (TH-4)	No. of days/per week class allotted:- 04	Semester From date: -01.07.2024 To Date:08.11.2024 No. of Weeks:-15

Week	Class Day	Theory Topics
1st	1st	**1. Thermodynamic concept & Terminology** 1.1 Thermodynamic Systems (closed, open, isolated)
	2nd	1.2 Thermodynamic properties of a system pressure, volume, temperature, entropy, enthalpy,
	3rd	Internal energy and units of measurement
	4th	1.3 Intensive and extensive properties
2nd	1st	1.4 Define thermodynamic processes, path, cycle ,
	2nd	State, path function, point function
	3rd	1.5 Thermodynamic Equilibrium.
	4th	1.6 Quasi-static Process.
3rd	1st	1.7 Conceptual explanation of energy and its sources
	2nd	1.8 Work , heat and comparison between the two
	3rd	1.9 Mechanical Equivalent of Heat.
	4th	1.10 Work transfer, Displacement work
4th	1st	**2. Laws of Thermodynamics** 2.1 State & explain Zeroth law of thermodynamics.
	2nd	2.2 State & explain First law of thermodynamics.
	3rd	2.2 State & explain First law of thermodynamics. Limitations of First law of thermodynamics
	4th	2.3 Limitations of First law of thermodynamics
5th	1st	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine)
	2nd	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to compressor)
	3rd	2.5 Second law of thermodynamics (Claucius & Kelvin Plank Statements).
	4th	2.5 Second law of thermodynamics (Claucius & Kelvin Plank Statements).
6th	1st	2.6 Application of second law in heat engine, heat pump, refrigerator
	2nd	Determination of efficiencies & C.O.P
	3rd	Solve simple numerical
	4th	CLASS TEST
7th	1st	**3. Properties Processes of perfect gas** 3.Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law.
	2nd	General gas equation, characteristic gas constant, Universal gas constant.
	3rd	Solve simple numerical
	4th	3.3 Explain specific heat of gas (Cp and Cv),Relation between Cp&Cv

8th	1st	3.4 Enthalpy of a gas.	
	2nd	3.5 Work done during a non- flow process.	
	3rd	3.6 Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)	
	4th	Solve simple problems on above.	
9th	1st	CLASS TEST	
	2nd	3.7 Free expansion & throttling process	
	3rd	**4. Internal combustion engine** 4.1 Explain & classify I.C engine.	
	4th	4.2 Terminology of I.C Engine such as bore, dead centers, stroke Volume, piston speed & RPM.	
10th	1st	4.3 Explain the working principle of 2-stroke S.I engine	
	2nd	4.3 Explain the working principle of 2-stroke C.I engine	
	3rd	4.3 Explain the working principle of 4- stroke engine S.I engine	
	4th	4.3 Explain the working principle 4- stroke engine C.I engine	
11th	1st	4.4 Differentiate between 2-stroke & 4- stroke engine	
	2nd	4.4 Differentiate between C.I &S.I engine	
	3rd	**5. Gas Power Cycle** 5.1 Carnot cycle	
	4th	Solve simple numerical	
12th	1st	5.2 Otto cycle	
	2nd	Solve simple numerical	
	3rd	5.3 Diesel cycle.	
	4th	Solve simple numerical	
13th	1st	5.4 Dual cycle	
	2nd	5.5 Solve simple numerical	
	3rd	5.5 Solve simple numerical	
	4th	CLASS TEST	
14th	1st	**6. Fuels and Combustion** 6.1 Define Fuel.	
	2nd	6.2 Types of fuel.	
	3rd	6.3 Application of different types of fuel.	
	4th	6.3 Application of different types of fuel.	
15th	1st	6.4 Heating values of fuel.	
	2nd	6.5 Quality of I.C engine fuels Octane number, Cetane number.	
	3rd	6.5 Quality of I.C engine fuels Octane number, Cetane number.	
	4th	6.5 Quality of I.C engine fuels Octane number, Cetane number.	

Learning Resouces:
01. Thermal Engineering, by R.S.Khurmi, S.Chand pub.
02. Thermal Engineering by A.R.Basu, DhanpatRai & Co.
03. Thermal Engineering, by A.S.Sarao, Satya Prakash
04. Engineering Thermodynamic, by P.K.Nag,TMH
05. Thermal Engineering by Mahesh M Rathore,TMH

Lalatendudash.

Prepared by
Dr. Lalatendu Dash
Principal, G.I.E.T (Polytechnic)

Principal
GIET (Polytechnic)
Jagatpur, Cuttack