

Discipline : MECHANICALENGG	Semester : 3rd	Name of the Teaching Faculty: BHABANI SANKAR SAHOO
Subject: THERMAL ENGINEERING-I(TH4)	No. of days/per week class allotted: 04	Semester From date: 01.10.2021 To Date: 08.01.2022 No. of Weeks: 15
Week	Class Day	Theory / Practical Topics
1 st	1 st	1. Thermodynamic concept & Terminology 1.1 Thermodynamic Systems (closed, open, isolated)
	2 nd	1.2 Thermodynamic properties of a system pressure, volume, temperature, entropy, enthalpy,
	3 rd	Internal energy and units of measurement
	4 th	1.3 Intensive and extensive properties
2 nd	1 st	1.4 Define thermodynamic processes, path, cycle ,
	2 nd	state, path function, point function
	3 rd	1.5 Thermodynamic Equilibrium.
	4 th	1.6 Quasi-static Process.
3 rd	1 st	1.7 Conceptual explanation of energy and its sources
	2 nd	1.8 Work , heat and comparison between the two
	3 rd	1.9 Mechanical Equivalent of Heat.
	4 th	1.10 Work transfer, Displacement work
4 th	1 st	2. Laws of Thermodynamics 2.1 State & explain Zeroth law of thermodynamics.
	2 nd	2.2 State & explain First law of thermodynamics.
	3 rd	2.2 State & explain First law of thermodynamics. Limitations of First law of thermodynamics
	4 th	2.3 Limitations of First law of thermodynamics
5 th	1 st	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine)
	2 nd	2.4Application of First law of Thermodynamics (steady flow energy equation and its application to compressor)
	3 rd	2.5 Second law of thermodynamics (Claucius& Kelvin Plank statements).
	4 th	2.5 Second law of thermodynamics (Claucius& Kelvin Plank statements).
6 th	1 st	2.6 Application of second law in heat engine, heat pump, refrigerator
	2 nd	Determination of efficiencies & C.O.P
	3 rd	Solve simple numerical
	4 th	Solve simple numerical
7 th	1 st	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.
	2 nd	General gas equation, characteristic gas constant, Universal gas constant.

	3 rd	Solve simple numerical
	4 th	3.3 Explain specific heat of gas (Cp and Cv), Relation between Cp & Cv
8 th	1 st	3.4 Enthalpy of a gas.
	2 nd	3.5 Work done during a non-flow process.
	3 rd	3.6 Application of first law of thermodynamics to various non-flow processes (Isothermal, Isobaric, Isentropic and polytropic process)
	4 th	Solve simple problems on above.
9 th	1 st	Solve simple problems on above.
	2 nd	3.7 Free expansion & throttling process
	3 rd	4. Internal combustion engine 4.1 Explain & classify I.C engine.
	4 th	4.2 Terminology of I.C Engine such as bore, dead center, stroke volume, piston speed & RPM.
10 th	1 st	4.3 Explain the working principle of 2-stroke S.I engine
	2 nd	4.3 Explain the working principle of 2-stroke C.I engine
	3 rd	4.3 Explain the working principle of 4-stroke engine S.I engine
	4 th	4.3 Explain the working principle of 4-stroke engine C.I engine
11 th	1 st	4.4 Differentiate between 2-stroke & 4-stroke engine
	2 nd	4.4 Differentiate between C.I & S.I engine
	3 rd	5. Gas Power Cycle 5.1 Carnot cycle
	4 th	Solve simple numerical
12 th	1 st	5.2 Otto cycle
	2 nd	Solve simple numerical
	3 rd	5.3 Diesel cycle.
	4 th	Solve simple numerical
13 th	1 st	5.4 Dual cycle
	2 nd	5.5 Solve simple numerical
	3 rd	5.5 Solve simple numerical
	4 th	5.5 Solve simple numerical
14 th	1 st	6. Fuels and Combustion 6.1 Define Fuel.
	2 nd	6.2 Types of fuel.
	3 rd	6.3 Application of different types of fuel.
	4 th	6.3 Application of different types of fuel.
15 th	1 st	6.4 Heating values of fuel.
	2 nd	6.5 Quality of I.C engine fuels Octane number, Cetane number.
	3 rd	6.5 Quality of I.C engine fuels Octane number, Cetane number.
	4 th	6.5 Quality of I.C engine fuels Octane number, Cetane number.

Learning Resources:

01. Thermal Engineering, by R.S. Khurmi, S. Chand
02. Thermal Engineering by A.R. Basu, Dhanpat Rai
03. Thermal Engineering, by A.S. Sarao, Satya Prakash
04. Engineering Thermodynamics, by P.K. Nag, TMH
05. Thermal Engineering by Mahesh MRathore, TMH

