

Semester: 3 rd	Discipline: MECHANICALENGG	Name of the Teaching Faculty: BALLA PAWANI
Subject: THERMAL ENGINEERING- 1	No. of days/perweek class allotted:4	Semester From date:15.09.2022 To Date:22.12.2022 No.of Weeks:15
WEEK	CLASSES	TOPICS
1 ST	1. Thermodynamic concept & Terminology [12 Periods]	
	1	Thermodynamic Systems (closed, open, isolated)
	2	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement)
	3	Intensive and extensive properties
	4	Define thermodynamic processes, path, cycle , state, path function, point function.
2 ND	1	Thermodynamic Equilibrium.
	2	Quasi-static Process.
	3	Conceptual explanation of energy and its sources
	4	Conceptual explanation of energy and its sources
3 RD	1	Work , heat and comparison between the two
	2	Work , heat and comparison between the two
	3	Mechanical Equivalent of Heat
	4	Work transfer, Displacement work
4 TH	2. Laws of Thermodynamics[12 periods]	
	1	State & explain Zeroth law of thermodynamics.

	2	State & explain Zeroth law of thermodynamics.
	3	State & explain First law of thermodynamics.
	4	State & explain First law of thermodynamics.
5 th	1	Limitations of First law of thermodynamics
	2	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
	3	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
	4	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
6 th	1	Second law of thermodynamics (Clausius & Kelvin Planck statements).
	2	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)
	3	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)
	4	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)
3. Properties Processes of perfect gas [10 periods]		
7 th	1	Laws of perfect gas: Boyle's law, Charles's law, Avogadro's law, Dalton's law of partial pressure, Gay Lussac law, General gas equation, characteristic gas constant, Universal gas constant.
	2	Laws of perfect gas: Boyle's law, Charles's law, Avogadro's law, Dalton's law of partial pressure, Gay Lussac law, General gas equation, characteristic gas constant, Universal gas constant.
	3	Explain specific heat of gas (C_p and C_v)
	4	Relation between C_p & C_v
8 th	1	Enthalpy of a gas.

	2	Work done during a non- flow process
	3	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)
	4	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)
9 th	1	Solve simple problems on above.
	2	Free expansion & throttling process.
	4. Internal combustion engine [8 periods]	
	3	Explain & classify I.C engine.
	4	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM
10 th	1	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM
	2	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
	3	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
	4	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
11 th	1	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
	2	Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.
	5. Gas Power Cycle [10 periods]	
	3	Carnot cycle
	4	Carnot cycle
12 TH	1	Otto cycle
	2	Otto cycle

	3	Diesel cycle.
	4	Diesel cycle.
13 TH		Dual cycle.
	2	Dual cycle.
	3	Solve simple numerical.
	4	Solve simple numerical.
	6. Fuels and Combustion [8 periods]	
14 TH	1	Define Fuel.
	2	Types of fuel.
	3	Application of different types of fuel.
	4	Application of different types of fuel.
15 TH	1	Heating values of fuel.
	2	Heating values of fuel.
	3	Quality of I.C engine fuels Octane number, Cetane number.
	4	Quality of I.C engine fuels Octane number, Cetane number.