ASIAN SCHOOL OF TECHNOLOGY, KHORDA
Department of Mechnical Engineering

Semester: 3rd	Discipline: MECHANICALENGG	Name of the Teaching Faculty: **Priyaranjan Pattanaik**
Subject: THERMAL ENGINEERING-1	No. of days/perweek class allotted:4	No.of Weeks:15 **Session - 2024**

WEEK	CLASSES	TOPICS
1ST		**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.
2ND	1	Thermodynamic Equilibrium.
	2	Quasi-static Process.
	3	Conceptual explanation of energy and its sources
	4	Conceptual explanation of energy and its sources
3RD	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
4TH		**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.
5th	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)
6TH	1		Second law of thermodynamics (Claucius & Kelvin Plank 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]**	
7th	1		Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.
	2		Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.
	3		Explain specific heat of gas (Cp and Cv)
	4		Relation between Cp & Cv
8th	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)
9th	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
10th	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.
11th	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
12TH	1	Otto cycle
	2	Otto cycle

	3	Diesel cycle.	
	4	Diesel cycle.	
13TH		Dual cycle.	
	2	Dual cycle.	
	3	Solve simple numerical.	
	4	Solve simple numerical.	

6. Fuels and Combustion [8 periods]

14TH	1	Define Fuel.	
	2	Types of fuel.	
	3	Application of different types of fuel.	
	4	Application of different types of fuel.	
15TH	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.	