

LESSON PLAN-3<sup>RD</sup> SEMESTER

Subject- **THERMAL ENGINEERING-I (TH-4)**

Name of the Faculty- Sasmita saha

MONTH	MODULE/UNIT	COURSE TO BE COVERED	CLASSES REQUIRED	REMARKS (IF ANY)
July	<b>Module-1</b>	<b>Thermodynamic concept &amp; Terminology</b>	<b>12</b>	
		Thermodynamic Systems (closed, open, isolated)	1	
		Thermodynamic properties of a system (pressure, volume, temperature	2	
		entropy, enthalpy, Internal energy and units of measurement).	1	
		Intensive and extensive properties Define thermodynamic processes, path, cycle, state, path function, point function.	1	
		Thermodynamic Equilibrium. Quasi-static Process	1	
		Conceptual explanation of energy and its sources	1	
		Work, heat and comparison between the two. Mechanical Equivalent of Heat.	3	
		Work transfer, Displacement work	2	
	<b>Module-2</b>	<b>Laws of Thermodynamics</b>	<b>12</b>	
		State & explain Zeroth law of thermodynamics.	1	
		State & explain First law of thermodynamics. Limitations of First law of thermodynamics	1	
		Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)	3	
		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	3	
		solve simple numerical	2	
	<b>Module-3</b>	<b>Properties Processes of perfect gas</b>	<b>10</b>	
		Laws of perfect gas, Boyle's law, Charle's law, Avogadro's law,	1	
		Dalton's law of partial pressure, Guy lussac law	1	
		General gas equation, characteristic gas constant, Universal gas constant.	1	
		Explain specific heat of gas ( $C_p$ and $C_v$ ) Relation between $C_p$ & $C_v$ .	1	

		Enthalpy of a gas. Work done during a non- flow process.	1	
		Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)	2	
		Solve simple problems on above.	2	
		Free expansion & throttling process.	1	
	<b>Module-4</b>	<b>Internal combustion engine</b>	<b>8</b>	
		Explain & classify I.C engine.	1	
		Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed & RPM.	1	
		Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.	4	
		Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.	2	
	<b>Module-5</b>	<b>Gas Power Cycle</b>	<b>10</b>	
		Carnot cycle	1	
		Otto cycle.	2	
		Diesel cycle.	2	
		Dual cycle.	2	
		Solve simple numerical	3	
	<b>Module-6</b>	<b>Fuels and Combustion</b>	<b>08</b>	
		Define Fuel.Types of fuel	2	
		Application of different types of fuel.	2	
		Heating values of fuel	2	
		Quality of I.C engine fuels Octane number, Cetane number	2	