NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: TH-5 (THERMAL ENGINNEERING-I)

Name Of The Faculty :- Er. Abhisek Swain
Branch :- Mechanical Engineering **Session :- 2025-26**
Semester :- 3rd **Examination :- 2025 (W)**

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Introduction to Thermodynamics Sources of Energy	10	12
2	Internal Combustion Engines	9	18
3	I.C. Engine Systems:	9	11
4	Performance of I.C. Engines	9	7
5	Air Compressors Refrigeration & Air-conditioning	8	12
	Total Period:	45	60

10/07/2025
Sign of Faculty

10/07/2025
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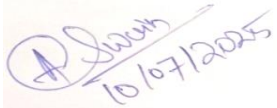
Name of the programme: Diploma in Mechanical Engineering	Semester: 3rd	**Name of the Teaching Faculty:** Er. Abhisek Swain	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code: TH-5	**Course Year:** Second Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60

Week	Class Day	Topics to be Covered
1st	1st	Thermodynamic Systems (closed, open, isolated) Thermodynamic properties of a system (pressure, volume, temperature, entropy,enthalpy, Internal energy and units of measurement)
	2nd	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement)
	3rd	Intensive and extensive properties Define thermodynamic processes, path, cycle , state
	4th	path function, point function; Thermodynamic Equilibrium ; Quasi-static Process
2nd	1st	Laws of thermodynamics
	2nd	Brief description of energy Sources:
	3rd	Classification of energy sources: Renewable, Non-Renewable; Fossil fuels
	4th	Solar Energy: Flat plate and concentrating collectors & its applications
3rd	1st	Solar Energy: Flat plate and concentrating collectors & its applications
	2nd	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Biodiesel; Hydraulic Energy, Nuclear Energy; Fuel cell.
	3rd	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Biodiesel; Hydraulic Energy, Nuclear Energy; Fuel cell.
	4th	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Biodiesel; Hydraulic Energy, Nuclear Energy; Fuel cell.

Week	Class Day	Topics to be Covered
4th	1st	Brief description of Carnot cycles with P-V and T-S diagrams
	2nd	Brief description of Otto cycles with P-V and T-S diagrams
	3rd	Brief description of Diesel cycles with P-V and T-S diagrams
	4th	Internal and external combustion engine
5th	1st	advantages of I.C. engines over external combustion engines
	2nd	classification of I.C. engines; neat sketch of I.C. engine indicating component parts
	3rd	Function of each part and materials used for the component parts Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve
	4th	Function of each part and materials used for the component parts Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve
6th	1st	Working of four-stroke petrol engine
	2nd	Working of four-stroke diesel engine
	3rd	Working of two-stroke petrol engine
	4th	Working of two-stroke diesel engine
7th	1st	Comparison of two stroke and four stroke engines
	2nd	Comparison of C.I. and S.I. engines
	3rd	Valve timing and port timing diagrams for four stroke and two stroke engines.
	4th	Valve timing and port timing diagrams for four stroke and two stroke engines.

Week	Class Day	Topics to be Covered
8th	1st	Valve timing and port timing diagrams for four stroke and two stroke engines.
	2nd	Valve timing and port timing diagrams for four stroke and two stroke engines.
	3rd	Fuel system of Petrol engines; Principle of operation of simple and Zenith carburettors
	4th	Fuel system of Diesel engines; Types of injectors and fuel pumps; Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation
9th	1st	Fuel system of Diesel engines; Types of injectors and fuel pumps; Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation
	2nd	Fuel system of Diesel engines; Types of injectors and fuel pumps; Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation
	3rd	Comparison of air cooling and water cooling system;
	4th	Comparison of Ignition systems – Battery coil ignition and magneto ignition
10th	1st	Types of lubricating systems used in I.C. engines with line diagram
	2nd	Types of governing of I.C. engines – hit and miss method
	3rd	Types of governing of I.C. engines – quantitative method
	4th	Types of governing of I.C. engines – qualitative method and combination methods of governing
11th	1st	Objective of super charging
	2nd	Performance of I.C. Engines: Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures
	3rd	Brake and Indicated thermal efficiencies; Mechanical efficiency;Relative efficiency
	4th	Performance test; Morse test; Heat balance sheet

Week	Class Day	Topics to be Covered
12th	1st	Performance test; Morse test; Heat balance sheet
	2nd	Simple numerical problems on performance of I.C. engines.
	3rd	Simple numerical problems on performance of I.C. engines.
	4th	Simple numerical problems on performance of I.C. engines.
13th	1st	Air Compressors: Functions of air compressor; Uses of compressed air; Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram
	2nd	Multi stage compressors – Advantages over single stage compressors
	3rd	Rotary compressors: Centrifugal compressor
	4th	axial flow type compressor and vane type compressors.
14th	1st	Refrigeration; Refrigerant; COP; Refrigeration effect
	2nd	Air Refrigeration system: components, working & applications
	3rd	Vapour Compression system: components, working & applications
	4th	Classification of Airconditioning systems; Comfort and Industrial Air-Conditioning
15th	1st	Window AirConditioner
	2nd	Summer Air-Conditioning system
	3rd	Winter Air-Conditioning system
	4th	Year-round Air-Conditioning system.



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