

GOVT. POLYTECHNIC, NAYAGARH			
3rd SEMESTER MECHANICAL ENGINEERING			
LESSON PLAN (2025-26)			
SUBJECT- THERMAL ENGINEERING-I			TOTAL PERIODS-45
NAME OF FACULTY: Mrs. Monalisa Sahoo, Sr.Lect.. & HOD			THEORY-3P/WEEK
W.E.F : 14/07/2025 to 15/11/2025			
SI No.	week	Day	Topics to be covered
1	1st	1 st day	Introduction to Thermodynamics: Thermodynamic Systems (closed, open, isolated) ;
		2 nd day	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement)
		3 rd day	Intensive and extensive properties
SI No.	week	Day	Topics to be covered
2	2nd	1 st day	Define thermodynamic processes, path, cycle , state, path function, point function;
		2 nd day	Sources of Energy: Brief description of energy Sources: Classification of energy sources: Renewable, Non-Renewable; Fossil fuels (CNG & LPG)
		3 rd day	Solar Energy: Flat plate and concentrating collectors & its applications (working principles of Solar Water Heater, Photovoltaic Cell, Solar Distillation)
SI No.	week	Day	Topics to be covered
3	3rd	1 st day	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy, Nuclear Energy; Fuel cell.
		2 nd day	Internal Combustion Engines: Assumptions made in air standard cycle analysis; Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams
		3 rd day	Internal and external combustion engines; advantages of I.C. engines over external combustion engines; classification of I.C. engines;
SI No.	week	Day	Topics to be covered
4	4th	1 st day	neat sketch of I.C. engine indicating component parts; 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
		2 nd day	Working of four-stroke and two stroke petrol and diesel engines;
		3 rd day	Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines;
SI No.	week	Day	Topics to be covered
5	5th	1 st day	Valve timing and port timing diagrams for four stroke and two stroke engines.
		2 nd day	I.C. Engine Systems: Fuel system of Petrol engines; Principle of operation of simple and Zenith carburetors
		3 rd day	Fuel system of Diesel engines; Types of injectors and fuel pumps
6		1 st day	Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation
		2 nd day	Comparison of air cooling and water cooling system

		3 rd day	Ignition systems – Battery coil ignition and magneto ignition (description and working).
SI No.	week	Day	Topics to be covered
7		1 st day	Comparison of two systems;;
		2 nd day	Types of lubricating systems used in I.C. engines with line diagram
		3 rd day	Types of governing of I.C. engines – hit and miss method, quantitative method, qualitative method and combination methods of governing; their applications
SI No.	week	Day	Topics to be covered
8		1 st day	Objective of super charging
		2 nd day	Performance of I.C. Engines: Brake power; Indicated power; Frictional power; Brake and Indicated near effective pressures;
		3 rd day	Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency;
SI No.	week	Day	Topics to be covered
9		1 st day	Performance test; Morse test; Heat balance sheet
		2 nd day	Methods of determination of B.P., I.P. and F.P.;
		3 rd day	Simple numerical problems on performance of I.C. engines
SI No.	week	Day	Topics to be covered
10		1 st day	Simple numerical problems on performance of I.C. engines
		2 nd day	Air Compressors: Functions of air compressor; Uses of compressed air;
		3 rd day	Types of air compressors;
SI No.	week	Day	Topics to be covered
11		1 st day	Single stage reciprocating air compressor - its construction and working (with line diagram) using P-V diagram;
		2 nd day	Multi stage compressors – Advantages over single stage compressors;
		3 rd day	Rotary compressors:
SI No.	week	Day	Topics to be covered
12		1 st day	Centrifugal compressor,
		2 nd day	axial flow type compressor and vane type compressors.
		3 rd day	Refrigeration & Air-conditioning: Refrigeration; Refrigerant; COP
SI No.	week	Day	Topics to be covered
13		1 st day	Air Refrigeration system: components, working & applications;
		2 nd day	Vapour Compression system: components, working & applications
		3 rd day	Air conditioning; Classification of Air-conditioning systems;

Sl No.	week	Day	Topics to be covered
14		1 st day	Comfort and Industrial Air-Conditioning
		2 nd day	Window Air- Conditioner;
		3 rd day	Summer Air-Conditioning system,
Sl No.	week	Day	Topics to be covered
15		1 st day	Winter Air-Conditioning system,
		2 nd day	Year-round Air-Conditioning system
		3 rd day	REVISION

REFERENCES:

- 1 Introduction to Renewable Energy – Vaughn Nelson, CRC Press
- 2 Thermal Engineering – P. L. Ballaney, Khanna Publishers, 2002
- 3 A Course in Thermal Engineering – S. Domkundwar & C.P. Kothandaraman, Dhanpat Rai.
- 4 Thermal Engineering – R. S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co, New Delhi.
- 5 Thermal Engineering – R. K. Rajput, 8th Edition, Laxmi publications Pvt Ltd, New Delhi.

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