

C. V. RAMAN POLYTECHNIC, BHUBANESWAR

LESSON PLAN Session (2025-2026)

| | | |
|---|---|---|
| Discipline: Mechanical Engineering | Semester: 3 rd Semester, Winter/2025 | Name of the Faculty: Dr. Shubhashree Mohapatra, Assistant Professor Email ID: shubha.shree@cvrp.edu.in |
| Subject: THERMAL ENGINEERING I Theory- 05 (ME PC209) | No. of Days/week: 03 | Start Date: 14/07/2025 End Date: 15/11/2025 |

| Week | Class Day | Theory Topics |
|------|-----------|--|
| 1st | 1st | Thermodynamic system, Thermodynamic Properties of a system |
| | 2nd | Intensive and extensive properties |
| | 3rd | Define thermodynamic processes, path, cycle, state, path function, point function |
| 2nd | 1st | Thermodynamic Equilibrium ; Quasi-static Process |
| | 2nd | Laws of thermodynamics (statements only) |
| | 3rd | Brief description of energy Sources: Classification of energy sources, Introduction about Renewable, Non-Renewable energy |
| 3rd | 1st | Fossil fuels, CNG, LPG, Solar Energy: Flat plate and concentrating collectors |
| | 2nd | Applications of solar cell (Solar Water Heater, Photovoltaic Cell, Solar Distillation); Wind Energy |
| | 3rd | Tidal Energy; Ocean Thermal Energy; Brief description of Geothermal Energy |
| 4th | 1st | Brief description of Biogas, Biomass, Bio-diesel; Brief description of Hydraulic Energy, Nuclear Energy; Fuel cell. |
| | 2nd | Introduction to Internal Combustion Engines: Assumptions made in air standard cycle analysis |
| | 3rd | Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams; |
| 5th | 1st | Internal and external combustion engines; advantages of I.C. engines over external combustion engines; classification of I.C. engines |
| | 2nd | 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 and inlet valve |
| | 3rd | Working of four-stroke petrol and diesel engines |
| 6th | 1st | Working of two stroke petrol and diesel engines |
| | 2nd | Valve timing and port timing diagrams for four stroke and two stroke engines. |
| | 3rd | Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines |
| 7th | 1st | Brief description of I.C. Engine Systems: Fuel system of Petrol engines |
| | 2nd | Principle of operation of simple and Zenith carburettors |

| | | |
|------|-----|--|
| | 3rd | Fuel system of Diesel engines; Types of injectors and fuel pumps |
| 8th | 1st | Brief description of Cooling system: air cooling, water cooling system with thermo siphon method of circulation and water cooling system with radiator and forced circulation (description with line diagram). |
| | 2nd | Comparison of air cooling and water cooling system |
| | 3rd | Ignition systems – Battery coil ignition and magneto ignition (description and working) |
| 9th | 1st | Comparison of two systems; Types of lubricating systems used in I.C. engines with line diagram |
| | 2nd | Types of governing of I.C. engines – hit and miss method, quantitative method |
| | 3rd | Types of governing of I.C. engines –qualitative method and combination methods of governing; their applications; Objective of super charging |
| 10th | 1st | Performance of I.C. Engines: Brake power; Indicated power |
| | 2nd | Performance of I.C. Engines: Frictional power; Brake and Indicated mean effective pressures |
| | 3rd | Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency |
| 11th | 1st | Performance test; Morse test; Heat balance sheet |
| | 2nd | Methods of determination of B.P., I.P. and F.P |
| | 3rd | Simple numerical problems on performance of I.C. engines |
| 12th | 1st | Simple numerical problems on performance of I.C. engines |
| | 2nd | Simple numerical problems on performance of I.C. engines |
| | 3rd | Air Compressors: Functions of air compressor; Uses of compressed air; Types of air compressors |
| 13th | 1st | 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, axial flow type compressor and vane type compressors |
| 14th | 1st | Refrigeration & Air-conditioning: Refrigeration; Refrigerant and COP |
| | 2nd | Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications |
| | 3rd | Air conditioning; Classification of Air- conditioning systems; Comfort and Industrial Air-Conditioning |
| 15th | 1st | Window Air- Conditioner; Summer Air-Conditioning system |
| | 2nd | Winter Air-Conditioning system, Year-round Air-Conditioning system |
| | 3rd | Revision |

S. Mahalingam
11/7/25
Signature of Faculty

B. Paul
11.07.25
Signature of H.O.D.