R. K. Institute of Engineering and Technology
Approved by AICTE, New Delhi and Affiliated to SCTE&VT,Odisha

MECHANICAL ENGINEERING

SEMESTER : 3rd (SEC-A)

FROM :01/07/2026 **TO** :05/11/2026

NAME OF THE FACULTY : Er. SIDHANTA S SAMAL

SUBJECT : Thermal Engineering-I

TOTAL CLASS AVAILABLE IN SEMESTER: 45 nos

NO. OF PERIODS : 03/ WEEK

Class No.	Unit	Topic/Sub-topic	Teaching Method	Learning Outcome
1	I	Course Introduction & Thermodynamic Systems	Lecture	Understand course objectives and system types
2	I	Closed, Open & Isolated Systems	Lecture + Discussion	Differentiate system types
3	I	Thermodynamic Properties	Lecture	Define pressure, temperature, volume, etc.
4	I	Intensive & Extensive Properties	Examples	Classify properties
5	I	State, Process, Cycle & Path	Lecture	Explain thermodynamic processes
6	I	Thermodynamic Equilibrium & Quasi-static Process	Lecture	Describe equilibrium conditions
7	I	Laws of Thermodynamics	Lecture	State thermodynamic laws
8	I	Conventional & Renewable Energy Sources	PPT	Compare energy sources
9	I	Solar, Wind, Geothermal, Biomass Energy	Video + Discussion	Explain renewable energy systems
10	I	Nuclear Energy, Fuel Cell & Unit Test-I	Quiz	Assess Unit-I learning
11	II	Air Standard Cycle Assumptions	Lecture	Explain assumptions
12	II	Carnot Cycle	Lecture	Describe Carnot cycle
13	II	Otto Cycle	Lecture	Explain Otto cycle
14	II	Diesel Cycle	Lecture	Explain Diesel cycle
15	II	Comparison of Cycles (P-V & T-S Diagrams)	Problem Solving	Compare cycles
16	II	Classification of I.C. Engines	Lecture	Classify engines

Class No.	Unit	Topic/Sub-topic	Teaching Method	Learning Outcome
17	II	Parts of I.C. Engine	Models/Charts	Identify engine parts
18	II	Working of Four-stroke Engines	Animation	Explain operation
19	II	Working of Two-stroke Engines	Animation	Explain operation
20	II	Comparison, Valve Timing & Unit Test-II	Discussion + Quiz	Analyze engine performance
21	III	Fuel System of Petrol Engine	Lecture	Explain fuel supply
22	III	Carburetors (Simple & Zenith)	Diagram	Understand carburetors
23	III	Diesel Fuel System	Lecture	Explain diesel fuel supply
24	III	Fuel Pumps & Injectors	Lecture	Identify injectors
25	III	Air Cooling & Water Cooling	Charts	Compare cooling methods
26	III	Radiator & Forced Circulation	Lecture	Explain cooling systems
27	III	Ignition System (Battery Coil)	Lecture	Explain ignition
28	III	Magneto Ignition & Comparison	Discussion	Compare ignition systems
29	III	Lubrication, Governing & Supercharging	Lecture	Explain lubrication and governing
30	III	Unit Test-III	Test	Assess Unit-III
31	IV	Brake Power, Indicated Power & Friction Power	Lecture	Calculate engine powers
32	IV	Mean Effective Pressure	Numerical	Solve MEP problems
33	IV	Thermal, Mechanical & Relative Efficiency	Lecture	Calculate efficiencies
34	IV	Performance Test & Morse Test	Demonstration	Explain engine testing
35	IV	Heat Balance Sheet & Numericals	Practice	Solve numerical problems
36	V	Air Compressors: Functions & Uses	Lecture	Explain compressors
37	V	Single-stage Reciprocating Compressor	Diagram	Explain working
38	V	Multistage & Rotary Compressors	Lecture	Compare compressors
39	V	Centrifugal, Axial Flow & Vane Compressors	Lecture	Identify compressor types
40	V	Refrigeration Basics & COP	Lecture	Define refrigeration terms
41	V	Vapour Compression Refrigeration System	Diagram	Explain working
42	V	Air Conditioning Systems	Lecture	Explain A/C systems

Unit	Topic/Sub-topic	Teaching Method	Learning Outcome
V	Comfort & Industrial Air Conditioning	Discussion	Differentiate applications
V	Revision & Numerical Practice	Tutorial	Strengthen concepts
All	Final Revision & Model Test	Test + Discussion	Overall course assessment

S. S. Samal
Sign of Faculty

Sign of HOD

Sign of Principal

Principal
R.K INSTITUTE OF ENGG & TECH
BANTAPADA,NIALI,CUTTACK