Course code	**PE/PC/B/T/213**
Category	Professional Core
Course title	**Engineering Thermodynamics**
Scheme and Credits	**L–T–P: 4–0–0; Credits: 4.0;**

Syllabus

Concept of thermodynamic system, surrounding, state, property, process and cycle. Reversible and irreversible processes. Different energy forms-stored energy, energies in transit. Concepts of Heat and work. Simple problems with ideal gases.
First law of thermodynamics: Statement of the First law for closed systems. PMM I. Corollaries: Concept of internal energy and enthalpy; Analysis of different non-flow processes with perfect gases.
Properties of steam and other vapors; Steam Table and Steam Chart. Problems related to non-flow processes involving steam.
First law analysis for control volumes for steady state and unsteady states. Problems associated with ideal gas and steam.
Second law of thermodynamics: Limitations of the first law of thermodynamics. Statements of the second law of thermodynamics. Heat engine, Heat Pump and Refrigerator. Thermal efficiency. Coefficient of Performance. Carnot cycle. Corollaries of the Second law, Clausius inequality, Concept of Entropy. Second law analysis of closed and open systems, Entropy generation.
Study of power producing and power absorbing cycles: Vapor Power cycles: Performance parameters of cycles, Heat rate, Work ratio, Specific vapor consumption. Carnot vapor cycle, Rankine cycle.
Gas Power Cycles: Air Standard Cycles – Otto, Diesel, Dual, Stirling, Braytoncylces; Use of air tables for gas power cycle analysis.
Vapor compression and absorption refrigeration cycle. P-h Chart, Air Refrigeration cycle.
Mixture of ideal gas and vapor, Laws of thermodynamics for gas-vapor mixtures, Psychrometry, Thermodynamic analysis of psychrometric processes.

Content delivery methods

- ✓ Class room lecture (D1)
- ✓ Visual presentation (D2)
- ✓ Discussion/ Brainstorming (D7)

At the end of the course the students will be able to

- **CO1:** Define thermodynamic systems and their properties, and describe different thermodynamic processes. **(K2)**
- **CO2:** Describe the First and Second laws of thermodynamics for closed and open systems and solve simple problems. **(K3)**
- **CO3:** Apply the laws of thermodynamics for vapor and gas power cycles and solve related problems. **(K3)**
- **CO4:** Apply the laws of thermodynamics for refrigeration cycles and air-conditioning systems and solve related problems. **(K3)**

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1												
CO2	2	3	2	1		1	1						1		
CO3	2	3	1	1		1	1						1		
CO4	2	3	1			1	2						2	1	