GUJARAT TECHNOLOGICAL UNIVERSITY
Diploma in Mechanical Engineering
Semester: 3

Subject Code
Subject Name   THERMODYNAMICS

Sr. No.	Course content
1.	**BASIC CONCEPTS OF THERMODYNAMICS :** 1.1 Thermodynamic systems, properties and classification. 1.2 Forms of energy and energy interaction. 1.3 Concepts of heat and work, types of work. 1.4 Zeroth law and temperature measurement. 1.5 Thermodynamic process (reversible-irreversible) and cycle.
2.	**FIRST LAW OF THERMODYNAMICS :** 2.1 Law of conservation of energy. 2.2 First law for closed cycle. 2.3 First law applied to system undergoing a change of state. 2.4 First law applied to open system-steady flow energy equation. (S F E E) 2.5 Application of first law of thermodynamics.
3.	**SECOND LAW OF THERMODYNAMICS :** 3.1 Limitation of first law. 3.2 Concepts of heat reservoir, source, sink, heat engine, heat pump and refrigerator. 3.3 Kelvin-Plank statement and Clausius statement. 3.4 Equivalence of above two statement. 3.5 Concept of reversibility and irreversibility of thermodynamics processes. 3.6 Concept of thermal efficiency and Coefficient of performance. 3.7 Carnot cycle and Carnot theorem - corollary. 3.8 Concept of entropy.
4.	**IDEAL GASES AND PROCESSES :** 4.1 Various ideal gas laws and equations. 4.2 Characteristic gas equation and universal gas constant. 4.3 Specific heats and its relationship. 4.4 Different thermodynamics processes, its representation on P-V, T-S and H-S diagrams. 4.5 Equations for PVT relationship, work transfer, heat transfer for all above processes.

5.	**THERMODYNAMIC CYCLES :**
	5.1 Concept of air Standard efficiency.
	5.2 General assumptions for deriving air-standard efficiency.
	5.3 Classification of cycles
	5.4 Carnot (only gas) cycle.
	5.5 Otto, Diesel and Dual Combustion cycle.
	5.6 Brayton cycle
	5.7 Refrigeration cycles:
	- Reversed Carnot cycle
	- Reversed Brayton cycle
	5.8 Limitations and applications of above cycles.
	5.9 Expression for thermal efficiency of above cycles (Examples)
	5.10 Comparision between the above cycles on basis of following for same.
	- Heat addition
	- Compression ratio.
	- Pressure and temperature.
6.	**STEAM AND TWO PHASE SYSTEM :**
	6.1 Concept of two phase System.
	6.2 P.V., T.S. and H.S. diagram of pure substance
	6.3 Steam formation process on above diagrams .
	6.4 Various quality and property of steam and the derivations of expression for enthalpy, entropy and volumes.
	6.5 Use of Steam tables and Molliear charts.
	6.6 Throttling.
	6.7 Determination of steam quality.

Reference Books:

Sr. No.	Name of Book	Authors
1.	Thermodynamics for Engineers	M.L.Mathur
2.	Heat Engines	C.S.Shah & N.C.Pandya
3.	Elements of Heat Engines Vol.I & II	R.C.Patel & Karamchandani
4.	Heat Engines	P.L.Balleny
5.	Thermodynamics	SAAD
6.	Engineering Themodynamics	P.K.Nag
7.	Applied Thermodynamics	R.C.Patel
8.	Thermodynamics cycles & Processes	Russel Hoyle & P.H.Clarke
9.	Thermodynamics	Gupta, PEARSON
10.	Basic Engineering Thermodynamics	Joel, PEARSON