
II Year B.Tech. Chemical Engg. - II-Semester	L	T	P	To	C
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CH218 CHEMICAL ENGINEERING THERMODYNAMICS - I

Course Description & Objectives:

This course covers first, second and third law of thermodynamics, volumetric properties, refrigeration and liquefaction processes.

To understand the theory and applications of classical thermodynamics, thermodynamic properties, equations of state, methods used to describe and predict phase equilibria.

Course Outcomes:

- 1. Ability to apply fundamental concepts of thermodynamics to engineering applications.*
- 2. Ability to estimate thermodynamic properties of substances in gas and liquid states.*
- 3. Capability to determine thermodynamic efficiency of various energy related processes.*

UNIT I- Basic Concepts

The scope of thermodynamics, dimensions and units, Measures of amount or size, force, temperature, pressure, work, energy, heat, zeroth law.

UNIT II - First Law of Thermodynamics

Joule's experiment, internal energy, statement of first law, energy balance for closed system, thermodynamic state and state functions, equilibrium, phase rule, reversible processes, constant-v and constant-p processes, enthalpy, heat capacity, mass and energy balances for open systems.

UNIT III - Volumetric Properties of Pure Fluids

PVT behaviour of pure substances, virial equations of state, Ideal gas, applications of the virial equations, Cubic equations of state, generalized correlations for gases.

UNIT IV - The Second Law of Thermodynamics

Statements of the second law, heat engines, thermodynamic temperature scales, entropy, entropy changes of an ideal gas, Mathematical statement of the Second law, Third law of thermodynamics (Statement).

UNIT V - Refrigeration and Liquefaction

The carnot refrigerator, the vapor compression cycle, the choice of refrigerant, Absorption refrigeration, liquefaction processes.

TEXT BOOKS :

1. J.M.Smith, H.C,Vanness, M.M.Abbot, "Introduction to Chemical Engineering Thermodynamics", 6th ed., Tata McGraw Hill – 2003.
2. Y.V.C.Rao, "Chemical Engineering Thermodynamics", 1st ed., University Publication, 1997.

REFERENCE BOOKS :

1. Dodge B.F. "Chemical Engineering Thermodynamics". 1st ed., Mc Graw Hill, 1960.
2. Kyle B.G. "Chemical and Process Thermodynamics", 1st ed., PHI,1990.