

UG
Course Code: CH307
Credit: 4
Version: 1
Prerequisite Course: **Chemical Engineering Thermodynamics-I**

Department: **Chemical Engineering**
Course Name: **Chemical Engineering Thermodynamics-II**
L-T-P: **3-1-0**
Approved on:

Thermodynamic Properties of Fluids: Fundamental property relations, Maxwell's equations, Residual properties, Clapeyron's Equation, Generalized correlations for thermodynamic properties of gases.

Multicomponent Systems: Chemical potential, ideal-gas mixture, ideal solution, Raoult's Law. Partial properties, fugacity and fugacity coefficient, generalized correlations for the fugacity coefficient, excess Gibbs' energy, activity coefficient.

Phase Equilibria at Low to Moderate Pressures: Phase rule, phase behavior for vapor liquid systems, Margules equation, Van Laar equation, Wilson equation, NRTL equation. Dew point, bubble point and flash calculations.

Solution Thermodynamics: Ideal solution, fundamental residual-property relation, fundamental excess-property relation. Evaluation of partial properties. Heat effects of mixing processes. Partially miscible systems.

Chemical Reaction Equilibria: Reaction coordinate, equilibrium criteria to chemical reactions, standard Gibbs' energy change and the equilibrium constant. Effect of temperature on the equilibrium constant, evaluation of equilibrium constants.

Relations between equilibrium constants and compositions: gas-phase reactions, liquid-phase reactions. Calculation of equilibrium compositions for single-phase reactions. Multireaction equilibria.

Introduction to Statistical Thermodynamics.

Books

1. Smith, J. M., Van Ness, H. C. and Abbott, M. M., "*Introduction to Chemical Engineering Thermodynamics*", 6th Ed., McGraw-Hill, 2001.
2. Rao, Y.V.C., "*Chemical Engineering Thermodynamics*", University Press, 1997.
3. Rao, Y. V. C., "*An Introduction to Thermodynamics*," John Wiley, 1993.
1. Kyle, B.G., "*Chemical and Process Thermodynamics*", 3rd ed., PHI New Delhi