
Course Title : Phase Equilibria Thermodynamics

- **Aim:**

The aim of this course is to familiar students with mixture thermodynamics and phase equilibria for separation process

- **Syllabus:**

- ✓ Introduction to phase equilibria problems, the role of Gibbs energy in phase equilibria, pure species phase equilibria
- ✓ Thermodynamics of Mixtures, Partial Molar Properties, The Gibbs–Duhem Equation
- ✓ Multicomponent Phase Equilibria, The Chemical Potential
- ✓ Definition of Fugacity, Criteria for Chemical Equilibria in Terms of Fugacity, Fugacity in Pure Gases and in a Gas Mixture, Fugacity Coefficient
- ✓ Energy and Temperature and Pressure, Equation of State Approach to the Liquid Phase, Fugacity in the Solid Phase
- ✓ Vapor Liquid Equilibrium, Raoult’s Law, Nonideal Liquids, Azeotropes
- ✓ Solubility of Gases in Liquids, Vapor–Liquid Equilibrium Using the Equations of State Method
- ✓ Liquid - Liquid Equilibrium: LLE, Ternary Diagram
- ✓ Vapor–Liquid - Liquid Equilibrium, Solid–Liquid Equilibrium, Solid–Solid Equilibrium, Pure Solids, Solid Solutions
- ✓ Colligative Properties (Boiling Point Elevation and Freezing Point Depression, Osmotic Pressure)
- ✓ Thermodynamics and Kinetics, Chemical Reaction and Gibbs Energy, Equilibrium for a Single Reaction, Equilibrium Constant K
- ✓ Multiple Reactions, An Introduction to Electrolyte Thermodynamic

- **Reading Resources**

Milo D. Koretsky Engineering and Chemical Thermodynamics, 2nd Edition 2013