Physical Chemistry I (Chemical Engineering)
Fall, 2026

Instructor: T.-S. Yang, Ph.D
Department of Chemistry and Biochemistry, Rm 410, ext: 66415
Office hours: Wed. 16:00 ~ 17:00

Main Text: Laidler, Meiser, and Sanctuary: Physical Chemistry, 5th ed., 2020, Chap. 1~6
Reference: David R. Gaskell: Introduction to the Thermodynamics of Materials, 5th ed., 2008.

Course Outline:

1. Equations of State & Molecular Kinetic Theory (Chap 1)
2. The Thermodynamic First Law (Chap. 2)
3. The Thermodynamic Second and Third Laws (Chap. 3)

Midterm exam (10/28 Wed)

4. Phases and Solutions (Chap. 5)
5. Phase Equilibrium (Chap. 6)
6. Chemical Equilibrium (Chap. 4)

Final exam (12/23 Wed)

Background Knowledge: Calculus, Differential equations
Goal: Understanding the principles and practices of thermodynamics in Chemistry
Grading: Midterm exam 50% and final exam 50%.
Commitment: > 8 hours/week

Learning Objectives:

- Know the zeroth to fourth laws of thermodynamics
- Be familiar with the conversions of heat, work, and energy
- Understand all the thermodynamic state functions and relations between them
- Be able to explain phase transition diagrams of pure materials and mixtures
- Derive the relationship between the chemical equilibrium constant and thermodynamic state functions.