B.A. Junior Year – Fall Semester

CEM 383 Introductory Physical Chemistry I

Description: Physical chemistry of macroscopic systems: thermodynamics, kinetics, electrochemistry.

Credit: 3 credits (3 hours lecture and 1 hour recitation per week)

Prerequisite: (CEM 142 or CEM 152 or CEM 182H or LB 172) and (MTH 133 or MTH 153H or MTH 126 or LB 119) Not open to students with credit in CEM 391 or CEM 484.

Lecture Topics:

1. Gases (Ideal Gases, Partial Pressure, Kinetic Molecular Theory)
2. Liquids (Ideal and Real Solutions; Colligative Properties)
3. Phase Diagrams (Pure Substances and Mixtures)
4. Classical Thermodynamics (First, Second, and Third Laws; Heat and Work; Enthalpy, Entropy and Free Energy)
5. Chemical Equilibrium (Chemical Potential and Equilibrium; Temperature, Free Energy, and Equilbrium; Weak Acids/Bases and Buffers; Phase Equilibria)
6. Kinetics (Rates of Reaction; Rate Laws; Rate Constants and Temperature; Reaction Mechanisms; Catalysis)
7. Electrolytic Solutions and Electrochemistry (Coulomb's and Ohms Laws; Debye-Hückel Theory; Half-Cell Reactions; Electromotive Force; Biological Systems and Membranes)
8. Statistical Mechanics (Degeneracy and the Partition Function; Statistical Thermodynamics)