

George Nancollas Fall 2007

CHEM 319A SYLLABUS

EQUILIBRIUM SYSTEMS

Properties of gases. Perfect and real gases.
First Law of Thermodynamics. Work. Heat. Thermochemistry, State functions.
Second Law of Thermodynamics, Direction of spontaneous change.
Efficiencies of thermal processes. Helmholtz and Gibbs energies.
Chemical potential. Real gases and fugacity.
Physical transformations of pure substances. Phase diagrams.
Phase stability and phase transitions.
Thermodynamic description of mixtures. Partial molar quantities.
Colligative properties Properties of solutions. Activities.
The Phase Rule. Two and three component systems.
Chemical Equilibrium. Spontaneous chemical reactions.
Response of equilibria to changes in pressure and temperature.
Equilibrium Electrochemistry. Thermodynamics of ions in solution.
Electrochemical cells.
Applications of standard potentials to electrochemical series, solubility,
pH and pK, potentiometric titrations and thermodynamic properties of cells.

TEXTBOOK. Physical Chemistry, 7th Edition by Peter Atkins,
Freeman Publishers