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Wednesday, September 10, 2008 (10.9.2008)

Course: CHMC20H3F, Intermediate Physical Chemistry

Instructor: Simon J. Fraser

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Offices: Scarborough Room SW 506A, and St. George: Room 420C

Office hours: Mondays 13:00–14:30, Wednesday 15:00–17:00

Lectures: Room MW 223, Wednesday 12:00–14:00

Required Text: T. Engel and P. Reid, PHYSICAL CHEMISTRY (Pearson, Toronto, 2006).

Recommended Text: K.J. Laidler, J.H. Meiser, and B.C. Sanctuary, PHYSICAL CHEMISTRY, 4rd Edition (Houghton Mifflin, New York, 2003).

You may have copy of Engel and Reid from CHMB21H3F. The Chapters in the book on Statistical Mechanics seem to be quite good. On the other hand if you have a copy of Laidler, Meiser and Sanctuary this will be fine for the course as I think it is a pretty good book for stat. Mech.

Marking Scheme for CHMC20H3F, Fall 2006

Problem Sets	30%
1 Term Test	30%
Final Exam	40%
TOTAL	100%

Course Outline: See course the description in the UTSC Calendar for 2008–2009.

Basic statistical mechanics and applications to thermochemistry and kinetics; intermolecular interactions; concepts in reaction dynamics.

List of Topics in Statistical Mechanics

1. *Variable types:* mechanical and Thermodynamics
2. *Ensembles:* Microcanonical, Canonical and Grand Canonical
3. *Boltzmann Distribution Law:* Canonical Ensemble, Canonical Partition Function
4. *Molecular Partition Functions:* translational, rotational, vibrational, electronic
5. *Canonical Partition Function in Calculation of Thermodynamic Functions:* Internal Energy, Enthalpy, Gibbs Energy
6. *Canonical Partition Function in Various Calculations:* Equilibrium Constant, Transition State Theory
7. *Statistical mechanics of Solid State:* Einstein and Debye Heat Capacities

8. *Classical and Quantum Statistics:* Boltzmann, Fermi-Dirac and Bose-Einstein Statistics

9. *Statistical Mechanic of Liquids*

List of Topics in Kinetics

1. *Transition State Theory:* See above

   Chemical Kinetic: homogeneous kinetics (well stirred systems) and diffusion controlled reactions

   Classical and Modern Steady-State Kinetics: Enzyme kinetic examples