CHEMISTRY 51- GENERAL CHEMISTRY (accelerated)
FALL, 2011 Syllabus

Each mid-term is worth 15% (total 45%), and the final is worth 30%. Laboratory work constitutes 25%.

Unit I. Thermodynamics

Following a short rundown on statistics, this unit will begin with a discussion on acid-base reactions, redox reactions, and complexation reactions. This unit will mainly focus on the thermodynamics of chemical reactions in the context of enthalpy, entropy, and Gibbs free energy.

[**Reading**: Chapter 4 (classes of reactions), Chapter 9 (internal energy and enthalpy), and Chapter 10 (entropy and Gibbs energy)]

Unit II. Physical and Chemical Equilibria

Equilibria will form a significant component of the unit, and some emphasis will be given to the effects of external stresses on chemical equilibria. There will be particular emphasis on spontaneous changes in redox and electrochemical processes. The unit will conclude with a discussion on electrochemistry and electrochemical cells.

[**Reading**: Chapter 6 (chemical equilibrium), Chapter 7/8 (Acid/base/solubility equilibria), and Chapter 11 (electrochemistry)]

Unit III. Atomic and Molecular Structure

Unit III will introduce quantum mechanics and provide a detailed picture of the electronic structure of atoms and molecules. These ideas will lead into discussions on periodicity and chemical bonding. The unit will also cover molecular orbital theory and basic spectroscopy. This unit will cover the structure, formation, and properties of coordination complexes. There will be significant coverage of crystal field theory. The unit will conclude with an in-depth look at structure and bonding in solids.

[**Reading**: Chapter 12 (atomic theory), Chapter 13/14 (bonding models)]

Unit IV. Chemical Kinetics

The final unit will focus on the rates of chemical reactions. Topics will include rate laws, the effect of temperature on the rate constant, enzyme catalysis, and reaction mechanisms.

[**Reading**: Chapter 15 (chemical kinetics)]

Please note that Wednesday 7 December is the last day of classes. No written work will be accepted after 17:00 on that date. The comprehensive final examination will be held during the exam week. The final exam will cover all the semester's work but will emphasize the material in Unit IV.

EXAM SCHEDULE

Unit 1: Chemical Thermodynamics (**Exam Date**: Wednesday, 28 September)
Unit 2: Physical and Chemical Equilibria (**Exam Date**: Monday, 24 October)
Unit 3: Atomic and Molecular Structure (**Exam Date**: Wednesday, 16 November)
FINAL: Wednesday, 14 December (9:00 am)