Monday, September 9, 2006

Course: CHMB21H3S, Chemical Structure and Spectroscopy

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Lectures: Room BV 355 Monday 3:00–5:00

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

Marking Scheme for CHMB21H3S, 2006

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

It is desirable that you take MATB41H3. Note that you must take MATB41H3 if you are going to take a 3rd year physical chemistry course.

Course Outline
This course will use *Quantum Mechanics* extensively to describe atomic structure, and molecular structure and bonding, including valence bond and molecular orbital theory. The spectra associated with atoms and molecules will also be discussed.

- Early Quantum Theory. The crucial experiments: black-body radiation, particles showing wave-like properties and waves showing particle-like properties.
- The time-dependent (TDSE) and time-independent (TISE) Schrödinger Equations. Stationary states; eigenvalue and eigenfunction; observables and complete sets of eigenfunctions.
- Quantum mechanics of simple systems, especially hydrogen-like atoms.
- Many electron atoms.
- Theories of chemical bonding: valence bond theory and molecular orbital theory. This is done in relation the the hydrogen molecule ion H_2^+, the hydrogen molecule, H_2, and more complicated molecules.
- The internal motion of molecules will also be treated.