

Monday, January 10, 2011

Course: CHMB21H3S, Chemical Structure and Spectroscopy

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OFFICES:

UTSC: Room SW 506A

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Office Hours at UTSC: Mondays 12:00–14:30, Wednesday 12:00–14:30

Lectures:

Room BV 264	Monday	15:00–17:00
Room BV 264	Wednesday	15:00–16:00

Required Text: T. Engel and P. Reid E&R, PHYSICAL CHEMISTRY Second Edition (Pearson, Toronto, 2010). See the page in the textbook before the dedications to authors families +5 pages from the inside front cover for more information.

Marking Scheme for CHMB21H3S, 2011

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.

Calendar Course Description: Atomic structure and spectra; term symbols and their meaning; valence bond theory: LCAO-MO; molecular spectroscopies.

Course Description: This course uses *Quantum Mechanics* extensively to describe atomic and molecular structure and bonding, including valence bond and molecular orbital theory. The theory of these systems will be treated first and their spectroscopy afterwards.

- The Time-Dependent (TDSE) and Time-Independent (TISE) Schrödinger Equations. Stationary states; operators and observables; eigenvalues and eigenfunctions.
- Quantum mechanics of two-body systems, e.g., diatomic molecules. Reduction to a one-body problem with internal potential and center-of-mass motion.
- Quantum mechanics of simple systems, especially hydrogen-like atoms.
- Many electron atoms.
- Theories of chemical bonding: valence bond theory and molecular orbital theory (LCAO-MO description). This is done in relation to the hydrogen molecule ion H_2^+ , the hydrogen molecule, H_2 , and more complex molecules.
- Quantum mechanics of the internal motion of molecules.

- Spectroscopy of the above atomic and molecular systems.

You should look at the UTSC 2010/2011 Calendar for the course information on page 69.

You will almost certainly have a copy of the E&R textbook from taking CHMB20H3F. I do not mind if your E&R is the first or second edition. However, As I am sure it is on reserve in the UTSC library as E&R Second Edition you should ensure that any assigned or suggested reading I give from E&R Second Edition corresponds you similar material in the E&R First Edition. I will give some indication of this corresponding material.