

	<p><b>SCHOOL OF ARTS &amp; SCIENCE</b>  <b>CHEMISTRY AND GEOSCIENCE DEPARTMENT</b></p> <p><b>CHEM 121-002</b></p> <p><b>2012 Winter</b></p>
---	---

## A. General Information

Instructor: John Lee

Office - Fisher 344A (Ph:3446)

Twitter: johnatcamosun

Email: [leejohn@camosun.bc.ca](mailto:leejohn@camosun.bc.ca)

Problems with course material/questions are best addressed in person, phone messages are rarely collected.

**Lectures:** Monday, Wednesday, (F 310) 9.30 am – 10.20 am, Friday, (F 216), 9.30 am – 10.20 am

**Lab:** Thursday (F 356): 9.30 am – 12.20 pm

**Office Hours:** Monday, Wednesday, Friday 10.30 to 11.30 am, Monday 1.20 pm to 2.20 pm any other times by apt.

**Important Dates:** January 23<sup>th</sup> Fee deadline, February 16<sup>th</sup> & 17<sup>th</sup> : Reading Break/Connections Day (College closed). March 13<sup>th</sup>: Last day to withdraw without a failing grade.; Good Friday April 6<sup>th</sup>, college closed; Easter Monday, April 9<sup>th</sup> college closed. April 16<sup>th</sup> - 21<sup>st</sup> and April 23<sup>rd</sup> -24<sup>th</sup> Exam period.

## B. Required Materials for the Course

Principal (Only) Text suitable for this course: CHEMISTRY, The Central Science: a Broad Perspective, by Brown, Lemay, Bursten, Langford, Sagatys, and Duffy. Prentice Hall. Australian edition 2<sup>nd</sup> edition (blue).

The 1<sup>st</sup> edition (purple/green) is acceptable along with the 10<sup>th</sup> and 11<sup>th</sup> US editions if you already have a copy.

Lab Experiments: Chemistry 121 Laboratory Manual, Fall 2007 Edition (From the bookstore)

## C. Course Content and Schedule

The course includes:

- a) 4 in-class review quizzes. (January 27<sup>th</sup>, February 15<sup>th</sup>, March 16<sup>th</sup>, April 4<sup>th</sup>)
- b) One 2 hour written midterm test. (March 1<sup>st</sup>)
- c) A 3 hour written final examination at the end of the course covering all the material in the course.

1. There are recommended questions found after each chapter. These problem sets will not be marked but solutions to the red questions may be found at the end of the textbook or the accompanying CD. Answers to any of the questions in black may be given on request.

2. The midterm test will be on material covered in the first half of the course. It will take place during the lab period of week VIII.

3. The in class quizzes will be on material covered in the previous 2 weeks. They will be given at the start of class and will require 30-45 minutes. Answers will be given after the quiz.

#### D. Summary of Lecture Material with Chapter References

Subject	Material Covered	Classes (approximate)	Textbook chapters*
Organic Chemistry	Alkane/Alkenes structure and properties, including naming simple cycloalkanes/ cycloalkenes, reactions and stereochemistry, functional groups and some reactions. Polymers depending on schedule.	9	21 to 26. Selected topics.
Chemical Kinetics	Reaction rates, change in concentration with time, temperature and rate, reaction mechanisms and catalysis	5	12
Thermochemistry	Energy, first law of thermodynamics, enthalpy, calorimetry, Hess' Law, enthalpies of formation	3	4
Thermodynamics	Spontaneity, second law of thermodynamics, entropy, Gibbs Free Energy, free energy and temperature, free energy and equilibrium	3	4
Equilibrium	Equilibrium constants, heterogeneous equilibria, working with equilibrium constants	4	13
Acids and Bases	Acids and bases, pH scale, $K_a$ and $K_b$ , auto-ionization of water, acid strength of ions	5	14
Aqueous equilibria	Titrations, common ion effect, buffers, solubility equilibrium	3	15
Electrochemistry	Redox reactions, balancing redox equations, half cells and the Nernst equation	3	3, 16

\*textbook chapters are from Brown, LeMay, Bursten; 2<sup>nd</sup> Australian edition

## **E. Basis of Student Assessment (Weighting)**

The course mark will be derived in the following manner:

4 Quizzes	(5% each) = 20 %
1 Midterm test	20 %
Final	35 %
Laboratory work	25 %

If it is advantageous to the student the theory mark will be solely derived from the final examination, or a combination of midterm/quizzes with the final.

In the event of a quiz or midterm test being missed due to illness/other commitments the weight of the missed quiz/test will be carried over to the final. There are no make-up dates for quizzes or midterm.

## **F. The Laboratory Mark**

Detailed information will be presented at the first laboratory class. Students must pass BOTH the laboratory section and the lecture section of the course to obtain a passing grade.

No more than 2 laboratory classes may be missed, during the course unless in extenuating circumstances. If no reason for missing a lab is supplied the student will receive a mark of zero for this lab class. In the event of a student being unable to attend a laboratory class it is advised that the student attempt to obtain data from a partner or perform the class with another section.

The lab mark is based on attendance and the laboratory report. A student that attends the laboratory class but does not present a written report will receive a score of 40%.

Students are responsible for obtaining their own safety glasses and laboratory jacket from the bookstore.

## **G. The Grading System**

The following scale is used by Camosun College:

>90 A+ 77-79 B+ 65-69 C+ 50-59 D 0-49 F

85-89 A 73-76 B 60-64 C

80-84 A- 70-72 B-

## **H. Intended Learning Outcomes**

*(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)*

Upon completion of this course the student will be able to:

1. Utilize the specialized vocabulary and nomenclature based on the IUPAC system of organic compounds to name and draw structures for many simple organic compounds containing the common functional groups.
2. Write chemical reactions to illustrate numerous transformations between organic functional groups.
3. Draw structural and stereoisomers of organic compounds and name stereoisomers based upon the IUPAC system of nomenclature.
4. Demonstrate an understanding of the factors that influence the rate of a chemical reaction, deduce the rate of a chemical reaction from time/concentration data, and utilize rate laws to perform kinetic calculations.
5. Apply the laws of thermodynamics and account for the factors that lead to spontaneous physical and chemical changes.
6. Explain how and why reactions attain equilibrium positions and perform calculations pertaining to equilibrium systems.
7. Describe redox reactions, use electrochemical data to predict the spontaneity of redox reactions, and comprehend the structures of electrochemical cells.
8. Describe various acid-base theories and apply these theories to acid-base reactions in aqueous solution.
9. Perform experiments in the areas of preparative organic, preparative inorganic, physical and analytical chemistry and use the various associated pieces of laboratory equipment.

#### **I. LEARNING SUPPORT AND SERVICES FOR STUDENTS**

**There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Registrar=s Office or the College web site at <http://www.camosun.bc.ca>**

#### **ACADEMIC CONDUCT POLICY**

There is an Academic Conduct Policy. It is the student=s responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.

[www.camosun.bc.ca/divisions/pres/policy/2-education/2-8](http://www.camosun.bc.ca/divisions/pres/policy/2-education/2-8)

**John Lee Winter 2011 Lab Schedule:**  
**Chem 121 (002) - Thursdays, 9:30 am-12:20 pm in Fisher 356**

<b>Week Number Begins on</b>	<b>Activity &amp; Experiment Number</b>	<b>Actual Date of Lab</b> <b>Thursday</b>
<b>I</b> <b>Jan 9<sup>th</sup></b>	<b>Review &amp; Lab Orientation— attendance mandatory</b>	<b>Jan 12<sup>th</sup></b>
<b>II</b> <b>Jan 16<sup>th</sup></b>	<b>Expt. 1</b> Preparation of Xylene Sulfonic acid	<b>Jan 19<sup>th</sup></b>
<b>III</b> <b>Jan 23<sup>rd</sup></b>	<b>Group A</b> <b>Expt. 3</b> Preparation of Benzoic acid	<b>Jan 26<sup>th</sup></b>
<b>IV</b> <b>Jan 30<sup>th</sup></b>	<b>Group B</b> <b>Expt. 3</b> Preparation of Benzoic acid	<b>Feb 2<sup>nd</sup></b>
<b>V</b> <b>Feb 6<sup>th</sup></b>	<b>Expt. 2</b> Analysis of an unknown acid	<b>Feb 9<sup>th</sup></b>
<b>VI</b> <b>Feb 13<sup>th</sup></b>	<b>College closed</b>	<b>Feb 16<sup>th</sup></b>
<b>VII</b> <b>Feb 20<sup>th</sup></b>	<b>[Expt. 6</b> The rate of bromination of acetone]	<b>Feb 23<sup>rd</sup></b>
<b>VIII</b> <b>Feb 27<sup>th</sup></b>	<b>Midterm Test</b>	<b>Mar 1<sup>st</sup></b>
<b>IX</b> <b>Mar 5<sup>th</sup></b>	<b>Expt 10</b> Thermochemistry	<b>Mar 8<sup>th</sup></b>
<b>X</b> <b>Mar 12<sup>th</sup></b>	Class in place of lab/possibly bonus equilibrium lab	<b>Mar 15<sup>th</sup></b>
<b>XI</b> <b>Mar 19<sup>th</sup></b>	<b>Expt 4</b> Banana Oil , subject to material coverage	<b>Mar 22<sup>nd</sup></b>
<b>XII</b> <b>Mar 26<sup>th</sup></b>	<b>Expt. 8</b> Gravimetric analysis of chloride	<b>Mar 29<sup>th</sup></b>
<b>XIII</b> <b>Apr 2<sup>nd</sup></b>	<b>Expt. 9</b> Synthesis of copper(I) chloride, subject to scheduling	<b>Apr 5<sup>th</sup></b>
<b>XIV</b> <b>Apr 9<sup>th</sup></b>	<b>Material Review</b>	<b>Apr 12<sup>th</sup></b>
<b>Final Exam Period</b>	<b>Final Exams</b> <b>Apr 16<sup>th</sup> to Apr 21<sup>st</sup> and Apr 23<sup>rd</sup> to Apr 24<sup>th</sup></b>	

**Note: This is only a preliminary lab schedule, changes will be made due to equipment &/or glassware problems, or rescheduling of tests... Lab coat and eye protection are both mandatory!!**

**\*Lab information will be given in the first class**