

**CAMOSUN COLLEGE**  
**DEPARTMENT OF CHEMISTRY AND GEOSCIENCE**  
**Chemistry 121-003, College Chemistry II**  
**Course Outline Winter 2011**

**A. General Information**

Instructor: Steve McKinnon

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Email is my preferred method of communication however any problems with course material/questions should be addressed in person.

**Lectures:** Thursday (F210), 6:30 pm – 9:20 pm

**Lab:** Tuesday (F 356): 6:30 pm – 9:20 pm

**Office Hours:** TBA

**Important Dates:** January 24<sup>th</sup> Fee deadline, February 24<sup>th</sup> & 25<sup>th</sup> : Reading Break/Connections Day (College closed). March 14<sup>th</sup>: Last day to withdraw without a failing grade. April 18<sup>th</sup> - 21<sup>st</sup> and April 26<sup>th</sup> -29<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.

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

**C. Course Content and Schedule**

The course includes:

- a) Two 2 hour written midterm tests. (February 15<sup>th</sup> and March 15<sup>th</sup>)
- b) A 3 hour written final examination at the end of the course on all the material in the course.

**Notes**

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 first midterm test will be on material covered in the first month of the course. The second midterm will cover the material after the first midterm. Both tests will take place during the lab period of week.

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

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

Midterm 1	15 %
Midterm 2	15 %
Final	45 %
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 with the final.

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

### **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. 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** **{tc \15 "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)

**Steve McKinnon's Winter 2011 Lab Schedule:  
Chem 121 (003) – Tuesdays, 6:30-9:20 pm in Fisher 356**

<b>Week Number Begins on</b>	<b>Activity &amp; Experiment Number</b>	<b>Actual Date of Lab Tuesday</b>
<b>I Jan 10<sup>th</sup></b>	<b>Review &amp; Lab Orientation— attendance mandatory</b>	<b>Jan 11<sup>th</sup></b>
<b>II Jan 17<sup>th</sup></b>	<b>Expt. 1</b> Preparation of Xylene Sulfonic acid	<b>Jan 18<sup>th</sup></b>
<b>III Jan 24<sup>th</sup></b>	<b>Group A Expt. 3</b> Preparation of Benzoic acid	<b>Jan 25<sup>th</sup></b>
<b>IV Jan 31<sup>st</sup></b>	<b>Group B Expt. 3</b> Preparation of Benzoic acid	<b>Feb 1<sup>st</sup></b>
<b>V Feb 7<sup>th</sup></b>	<b>Expt. 2</b> Analysis of an unknown acid	<b>Feb 11<sup>th</sup></b>
<b>VI Feb 14<sup>th</sup></b>	<b>Midterm Exam 1</b>	<b>Feb 15<sup>th</sup></b>
<b>VII Feb 21<sup>st</sup></b>	<b>No Lab Reading Break</b>	<b>Feb 22<sup>nd</sup></b>
<b>VIII Feb 28<sup>th</sup></b>	<b>Expt. 6</b> The rate of bromination of acetone	<b>Feb 29<sup>th</sup></b>
<b>IX Mar 7<sup>th</sup></b>	<b>Expt 10</b> Thermochemistry	<b>Mar 8<sup>th</sup></b>
<b>X Mar 14<sup>th</sup></b>	<b>Midterm Exam 2</b>	<b>Mar 15<sup>th</sup></b>
<b>XI Mar 21<sup>st</sup></b>	<b>Expt. 4</b> Banana Oil	<b>Mar 22<sup>nd</sup></b>
<b>XII Mar 28<sup>th</sup></b>	<b>Expt. 8</b> Gravimetric analysis of chloride	<b>Mar 29<sup>th</sup></b>
<b>XIII Apr 4<sup>th</sup></b>	<b>Expt. 9</b> Synthesis of copper(I) chloride, subject to scheduling	<b>Apr 5<sup>th</sup></b>
<b>XIV Apr 11<sup>th</sup></b>	<b>Exam Info &amp; Review</b>	<b>Apr 12<sup>th</sup></b>
<b>Final Exam Period</b>	<b>Final Exams Apr 18<sup>th</sup> to Apr 21<sup>st</sup> and Apr 26<sup>th</sup> to Apr 29<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**

