



COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/chem.html>

Ω Please note: the College electronically stores this outline for five (5) years only.
It is **strongly recommended** you keep a copy of this outline with your academic records.
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

(a)	Instructor:	Hugh Cartwright		
(b)	Office Hours:	TBA; available most times during the week by request		
(c)	Location:	F106E		
(d)	Phone:		Alternative Phone:	
(e)	Email:	CartwrightH@camosun.bc.ca		
(f)	Website:	http://web.uvic.ca/~hughcart/chem121w2015/chem121resources.html		

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

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.

3. Required Materials

- (a) **Mastering Chemistry Course Code.** A My lab Mastering Chemistry Access Code can be purchased from the Pearson Website: <http://www.pearson.com.au/9781442563902>
If you have purchased a new textbook (Custom Camosun Edition) or ebook (see below) then this includes a My Lab Mastering Chemistry Course Code.
- (b) **Chemistry 121 Laboratory Manual.**

Other Recommended Materials for the Course

Chemistry, The Central Science, Brown, le May, Bursten. *Custom Camosun Edition*. \$145. (For hard copy, ebook access and My lab Mastering Chemistry course code). Ebook and My lab Mastering Chemistry course code only \$114.

The 2nd and 1st Australian editions of this textbook are also acceptable. **Note: New textbooks come with a My Lab Mastering Chemistry Code. If you have recently (2013/2014) purchased a second edition textbook you are eligible to receive an upgraded course code, from John Lee.**

Other Recommended Materials for the Course

Course notes and ancillary material on website.

4. Course Content and Schedule

Area	Main Topics	Classes (approx)
Organic Chemistry	Hydrocarbons: alkanes, alkenes, alkynes, Structural isomerism, Naming of organic compounds, Reactions of alkanes: combustion, substitution, Reaction mechanism, Free radical reactions, Cyclic hydrocarbons, Addition to alkenes, Stereoisomerism, Simple functional groups: alcohols, ethers, carboxylic acids, aldehydes, halogen compounds, Optical isomerism, Synthesis and typical reactions of alcohols and acids, Aromatic compounds: structure and naming, Reactions of aromatic compounds, Polymers	3
Chemical Kinetics	Reaction rate as measured by change in concentration, Factors that influence reaction rate, Collision theory, Rate law: meaning, types, examples, Half-life, Determining a rate law from experimental data, Activation energy, Activated complex theory, Why temperature affects rate, Arrhenius equation, Catalysts, enzymes, Reaction mechanism and the link to rate laws; rate-determining step	2
Thermo-chemistry	Energy, 1 st law, Enthalpy; enthalpy of combustion, fuels, Calorimetry, Enthalpy of reaction, Hess's Law, Calculations	1
Thermo-dynamics	Spontaneity; reversibility, Entropy and the direction of time, Gibbs Energy, 2 nd law, 3 rd law; 3 rd law entropy, Free energy and temperature, Non-spontaneous processes, Calculations	1
Equilibrium	Homogeneous and heterogeneous equilibria, Reaction quotient, Condition of equilibrium, Equilibrium constants; K _c , K _p , Le Chatelier, Link between equilibrium and free energy, Calculating K from experimental data; Haber process, Calculating K from Free Energy changes, Hess's law revisited	1 - 1.5
Acids and Bases	Definitions of acids and bases: Arrhenius, Lewis, Bronsted-Lowery, Weak and strong acids and bases, Conjugate acids/bases, pH; calculations for weak and strong acids, K _a and K _b , Relationship between strength and structure, Auto-ionization of water, Titration	1.5 - 2
Aqueous equilibria	Solubility of ionic compounds, Acid/base nature of salts, Common ion effect, Complex ions, Buffers	1
Electrochemistry	Redox reactions, Electrochemical cells, batteries, Half cells, Balancing redox reactions, Standard electrode potential, Nernst equation, Connection between Free Energy and cell voltage	1

Lecture Times: Monday, and some Wednesdays: 17.30 – 20.20 in WT 103 unless otherwise advertised.

Laboratory Times: Wednesday: 17.30 – 20.20 in F 356

5. Basis of Student Assessment (Weighting)

The course mark will be calculated as follows:

2 Midterm tests	(12.5 % each) = 25 %
Final exam	45 %
Laboratory work	30 %

If you miss a midterm due to illness or unavoidable commitments, the weight of the missed test will be carried over to the final. There are no make-up dates for the midterm tests or the final exam.

If it is advantageous, the mark from the final examination may be more heavily weighted than shown in the table above in calculating an overall theory mark.

Students must achieve a passing grade in both the laboratory and the lecture portion to gain an overall pass in the course.

The Laboratory Mark

The breakdown of the Laboratory mark is as follows:

Arriving punctually, prepared to do the experiment, familiar with the procedure and having the correct safety gear . Ability to work competently and confidently with good attitude. Leaving work space clean and tidy.	20 %
Pre-lab assignments (<u>completed prior to starting the lab class</u>).	10 %
Quality of Lab Reports/Assignments	70 %

No more than **2 laboratory classes may be missed**, during the course. If you are unable to attend a laboratory class you should attempt to obtain data from a partner or perform the class with another section. It is essential that you immediately contact your lab instructor via email in the event that you miss a laboratory class.

A student that attends the laboratory class but does not present a written report will receive a (maximum) score of 40%.

Students are responsible for obtaining their own safety glasses and laboratory jacket from the bookstore. It is not the responsibility of the College to provide you with safety equipment.

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
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I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. <i>(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)</i>
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

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, at Student Services, or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED

8. Winter 2015– Chem 121-003 Provisional Lab Schedule

Wednesdays, 17.30 – 20.20 pm in Fisher 356

Note: This is a preliminary lab schedule, changes may be necessary to address equipment and/or scheduling issues. Lab coat and eye protection are both mandatory and **ARE NOT PROVIDED BY THE DEPARTMENT.**

Week Number Begins on	Activity & Experiment Number	Actual Date of Lab Wednesday
I Jan 5 th	Lecture class	Jan 7 th
II Jan 12 th	Expt. 1 Preparation of Xylene Sulfonic acid	Jan 14 th
III Jan 19 th	Group A Expt. 3 Preparation of Benzoic acid	Jan 21 st
IV Jan 26 th	Group B Expt. 3 Preparation of Benzoic acid	Jan 28 th
V Feb 2 nd	Expt. 2 Analysis of an unknown acid	Feb 4 th
VI Feb 9 th	Class instead of Lab	Feb 11 th
VII Feb 16 th	Midterm test	Feb 18 th
VIII Feb 23 rd	[Expt. 6 The rate of bromination of acetone]	Feb 25 th
IX Mar 2 nd	Expt 4 Banana Oil	Mar 4 th
X Mar 9 th	Expt 10 Thermochemistry	Mar 11 th
XI Mar 16 th	Expt 8 Gravimetric Chloride Analysis	Mar 18 th
XII Mar 23 rd	Midterm test	Mar 25 th
XIII Mar 30 th	Lecture class	Apr 1 st
XIV Apr 6 th	Material Review	Apr 8 th
Final Exam Period	Final Exams	