



CAMOSUN COLLEGE
School of Arts & Science
Department of Chemistry & Geoscience

CHEM-121-001
College Chemistry 2
Summer 2018

COURSE OUTLINE

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

Ω Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1. Instructor Information

(a) Instructor	Silvija Smith
(b) Office hours	Posted on D2L or by appointment
(c) Location	P233
(d) Phone	250-370-3372 Alternative: _____
(e) E-mail	smiths@camosun.bc.ca (preferred)
(f) Website	D2L

2. Intended Learning Outcomes

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) Chemistry 121 Laboratory Manual Summer 2018 Edition.
- (b) Safety glasses and laboratory coat for use in the laboratory.
- (c) My Lab Mastering Chemistry course code.

Recommended materials: Chemistry, The Central Science, Brown, Le May. Custom Camosun Edition. Hardcopy or Ebook.

4. Course Content and Schedule

Lecture classes: Monday 9:30 – 11:20 a.m.; Tuesday 9:30 – 11:20 a.m.; Thursday 9:30 – 11:20 a.m.

Lecture content (content, timing, and ordering subject to change)

Organic chemistry (approximately 9 hours)

Hydrocarbons: alkanes, alkene, alkynes, structural isomers, naming of organic compounds, reactions of alkanes: combustion, substitution, reaction mechanism, 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, polymers.

Kinetics (approximately 4 hours)

Reaction rates as determined by change in concentration, factors that influence reaction rate, collision theory, rate law, half-life, determining the rate law from experimental data, activation energy, activated complete theory, Arrhenius equation, catalysts, reaction mechanism, rate determining step.

Thermochemistry/thermodynamics (approximately 6 hours)

Energy, 1st law of the thermodynamics, enthalpy of combustion, calorimetry, enthalpy of reaction, Hess' law, enthalpy of formation, spontaneity, reversibility, entropy, Gibbs free energy, 2nd law of thermodynamics, 3rd law of thermodynamics, free energy and temperature, non-spontaneous processes

Equilibrium (approximately 3 hours)

Equilibria, reaction quotient, equilibrium constants, Le Chatelier's principle, equilibrium and free energy, Haber process, free energy changes

Solutions (approximately 3 hours)

Solubility of ionic compounds, acid/base nature of salts, common ion effect, buffers

Acids & Bases (approximately 6 hours)

Definitions of acids and bases, Arrhenius, Lewis, Bronsted-Lowry, acid and base strength, conjugate acid and bases, pH, K_a and K_b , relationship between strength and structure, auto-ionization of water, titration

Electrochemistry (approximately 6 hours)

Redox reactions, electrochemical cells, batteries, half-cells, balancing redox reactions, standard electrode potential, Nernst equation, free energy and cell voltage

Laboratory Schedule

Note: This is only a preliminary lab schedule and changes will be made due to equipment &/or scheduling.

Date of Lab (Tuesdays & Thursdays)	Activity/Experiment	Lab Report Due Date
Tues. May 8	Safety & Review	
Thurs. May 10	Ex 1 – Synthesis of Aspirin	Thurs. May 17
Tues. May 15	Ex 2 – Synthesis of Banana Oil	Tues. May 22
Thurs. May 17	Ex 3 – Extraction of Caffeine	Tues. May 29
Tues. May 22	Ex 4 – Analysis of an Unknown Acid	Thur. May 31
Thurs. May 24	Midterm I	
Tues. May 29	Ex 5 – Reaction Rate of Bleach with Blue Dye	Tues. June 5
Thurs. May 31	Ex 6 – Thermochemistry	Tues. June 12
Tues. June 5	Ex7 – Gravimetric Determination of Chloride	Thurs. June 14
Thurs. June 7	Midterm II	
Tues. June 12	Ex 8 – pH Measurements and pKa of Acetic Acid	Tues. June 19
Thurs. June 14	Ex 9 – Preparation of Copper (I) Chloride	Thurs. June 21
Tues. June 19	Review	
Thurs. June 21	Review	

5. Basis of Student Assessment (Weighting)

The course mark will be derived in the following manner:

- Laboratory component: 25 %
- Mastering chemistry assignments: 15 %
- Midterm I: 10 % (Thurs. May, 24 2018 in F336 from 8:30am-10:00am)
- Midterm II: 20 % (Thurs. June, 7 2018 in F336 from 8:30am -11:30am)
- Final exam (cumulative): 30 % (TBA)

If it is advantageous to the student, **if the final exam mark is greater than the mark of either or both midterm exam marks, the midterm exam weight will be carried over to the final exam.** Mastering chemistry assignment marks may not be carried over. 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 alternative dates for midterm exams.

Students must pass the final exam to be eligible to pass the course. Students must pass the lecture component of the course to be eligible to pass the course.

The Laboratory Mark

The breakdown of the Laboratory mark is as follows:

Arriving punctually, prepared to do a lab, familiar with the procedure and having/wearing the correct safety gear. Ability to work competently and confidently with good attitude. Leaving work space clean and tidy.	10 %
Pre-lab assignments (completed prior to starting the lab class).	10 %
Laboratory Reports including experimental work	80 %

Students are required to submit a pre-laboratory assignment and flow chart (outlining the steps of the procedure) prior to the laboratory experiment commencing. Failure to do so will not permit the student to complete the experiment, and a mark of zero will be given for the missed laboratory experiment. No alternative date to perform the laboratory experiment will be granted. Pre-laboratory assignments and flow charts must be completed in pen. Failure to do so will result in a mark of zero given for the pre-laboratory assignment. No late submissions will be accepted.

Students are responsible for obtaining their own safety glasses and laboratory coat from the bookstore. It is not the responsibility of the College to provide you with safety equipment. If a student fails to wear safety equipment (or does not supply their own), the student will not be permitted to complete the experiment, and a mark of zero will be given for the missed laboratory experiment. No alternative date to perform the laboratory experiment will be granted. If a student wears the safety equipment improperly, as determined by the instructor, the student will be refused continuation of the experiment. A mark of zero will be given for the laboratory experiment. No exceptions will be made.

Laboratory reports must be written using an electronic processor, and submitted on D2L via Dropbox by the due date. Failure to do so will result in a mark of zero on the laboratory report portion of the laboratory mark (6 marks of the 10 total). All laboratory reports must be submitted in .pdf format. Failure to submit a laboratory report will result in a mark of zero on the laboratory report portion of the laboratory mark (6 marks of the 10 total.) No late submissions will be accepted. No exceptions will be made.

No more than 2 laboratory classes may be missed, resulting from an absentee as deemed appropriate by the instructor. In the event of a student unable to attend a laboratory experiment, due to being absent, the student should contact the instructor, prior to missing the laboratory experiment, to arrange an alternative date to complete the experiment. If this cannot be arranged, the instructor may excuse the student from the laboratory experiment. In this case, the missed laboratory experiment will not count toward the final grading of the laboratory component of the course. Otherwise, the student may be instructed to collect the data from a member of the course, and submit a laboratory report for the experiment. In this case, the student would only be eligible for the marks allotted for the laboratory report and not the laboratory experiment. In the event a student is not excused from a laboratory experiment and/or an alternative date is not granted or is unavailable, a mark of zero will be given for the laboratory experiment. No exceptions will be made.

Students must pass the laboratory component of the course to be eligible to write the final exam. A student must pass the laboratory component of the course to be eligible to pass the course.

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)

Standard Grading System (GPA)

Competency Based Grading System

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

8. College Supports, Services and Policies



Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @

<http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS <http://camosun.ca/about/policies/index.html>

The following two grading systems are used at Camosun College:

1. 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		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. 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 at <http://camosun.ca/about/policies/index.html> for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
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 are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
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.