



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:	Mon: 1.00-1.20, 3.30-4.00; Tues 1.00-1.20, 3.30-4.00; Wed 11.00-11.20; Thurs 12.30-1.20. Note that these times may change; for up-to-date information see office door.		
(c)	Location:	Fisher 106E		
(d)	Phone:	(250) 370-3374	Alternative Phone:	
(e)	Email:	CartwrightH@Camosun.bc.ca		
(f)	Website:			

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 nomenclature rules to name ionic and covalent compounds.
2. Demonstrate an understanding of stoichiometry by balancing chemical equations and performing mathematical calculations involving chemical reactions.
3. Describe the electronic structure of any atom in the periodic table and apply it to explain many of the physical and chemical properties of the elements.
4. Utilize simple bonding theories to explain why elements combine to form the compounds they do and also to explain many of the properties of compounds.
5. Apply knowledge of intermolecular interactions to rationalize many important physical properties of bulk matter in the gas, liquid and solid phases.
6. Use standard chemistry lab equipment, including burets, pipets, Buchner filters, and volumetric glassware in the correct manner.
7. Perform many standard laboratory procedures, such as titrations, preparation of standard solutions, the preparation, isolation, and purification of compounds, as well as use spectrophotometers to make analytical measurements.

3. Required Materials

The recommended text for Chem 120 is "Chemistry: The Central Science" by Brown, LeMay et al. It is not essential that you buy this particular text, but during the course you will need access to a 1st-year-level University Chemistry textbook. There are multiple editions of Brown available; any of these, including the "Camosun" editions, is likely to cover almost all that you need.

The laboratory manual for Chem 120 is available through the College bookstore.

4. Course Content and Schedule

Note that the material, timing and order of topics may not necessarily be identical to what is shown below.

Subject	Material Covered
Introduction and Review	Classification of matter, units of measurement, significant figures, atoms, protons, neutrons, electrons, isotopes, atomic masses. Compounds, nomenclature, the mole, molar mass and percent composition by mass, chemical equations, reaction stoichiometry, solution concentration.
Electronic Structure of Atoms	Light, quanta and photons, atomic spectra and energy levels, wave properties of electrons. Atomic orbitals, quantum numbers, electron spin, electronic structure of the hydrogen atom. Many-electron atoms, electron configurations of atoms and ions,
Periodic Properties	Development of the periodic table, effective nuclear charge, atomic and ionic radius, ionisation energy, electron affinity.
Chemical Bonding	Ionic bonds, Lewis symbols, lattice energy, properties of ionic compounds. Covalent bonds, octet rule and Lewis structures. Polyatomic species, resonance and formal charge. Exceptions to the octet rule. Electronegativity and bond polarity. Bond enthalpies
Molecular Geometry	Molecules: shape, size, and bond strength. Shapes of molecules and ions, VSEPR theory. Charge distribution in molecules, polar bonds and polar molecules. Bond strengths and bond lengths. Orbitals, hybridization and bonding. Molecular Orbitals (hydrogen atom) and Metallic Bonding
Intermolecular Forces, Liquids and Solids	Comparison of liquids and solids, intermolecular forces, ion-dipole, dipole-dipole, London dispersion forces, hydrogen bonding. Properties of liquids, phase changes, heating curves, critical temperature and pressure, vapour pressure, boiling point. Phase diagrams, structures of solids.
Gases	Nature of gases, atmospheric pressure. Gas laws, ideal gas law, gas reaction stoichiometry, gas density, Daltons Law of partial pressures, kinetic molecular theory. Real gases, limitations of ideal gas law
Chemistry of the Environment	Structure of Earth's atmosphere, ozone layer and its depletion, tropospheric pollution, greenhouse effect and photochemical smog. Oceans and freshwater.

Draft Laboratory schedule: Thursday 9.30 – 12.20 p.m., Fisher 356

Week / date	Activity
Week I, Jan. 12	Lab introduction
Week II, Jan. 19	Expt. 2 - densities
Week III, Jan. 26	Expt. 3 – stoichiometry (Group A)
Week IV, Feb. 2	Expt. 3 – stoichiometry (Group B)
Week V, Feb. 9	Midterm 1

Week VI, Feb. 16	Reading break
Week VII, Feb. 23	Expt. 4 - spectrometry
Week VIII, Mar 2	Expt. 5 – iron in a vitamin tablet
Week IX, Mar. 9	Expt. 6 – Atomic absorption
Week X, Mar. 16	Expt. 7 – hardness of water
Week XI, Mar. 23	Midterm 2
Week XII, Mar. 30	Expt. 9 – preparation of a complex
Week XIII, Apr. 6	Expt. 10 – analysis of a complex
Week XIV, Apr. 13	Expt. 8 – molecular shape

5. Basis of Student Assessment (Weighting)

The course mark will be calculated as follows:

Problem sets	5%
2 Midterm tests	(15 % each) = 30 %
Final exam	40 %
Laboratory work	25 %

If you miss a midterm due to illness or unavoidable commitments, the weight of the missed test will be carried over to the final. If you are sick enough to miss an experiment or an exam you are sick enough to visit a doctor; accordingly, a doctor's note will be expected if you miss a class for medical reasons. 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 as shown above in calculating an overall lecture mark. You must achieve a passing grade in both the laboratory and the lecture portion to gain an overall pass in the course.

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
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