



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

**CHEM-120-004**  
**College Chemistry 1**  
**Winter 2019**

## **COURSE OUTLINE**

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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.

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### **1. Instructor Information**

(a) Instructor	<u>Dr. Tatiana Popa</u>
(b) Office hours	<u>Wednesday 9:30-10:30 am (Interurban), 11:30 am -1:00 pm (Lansdowne) or by appointment</u>
(c) Location	<u>Room 106E, Fisher Building, Lansdowne Campus Room 232, Technologies Building, Interurban Campus</u>
(d) Phone	<u>(250) 370-3374      Alternative: _____</u>
(e) E-mail	<u>PopaT@camosun.bc.ca</u>
(f) Website	<u>D2L</u>

### **2. Intended Learning Outcomes**

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

(a) **Mastering Chemistry Course Code.** \$50. A Mastering Chemistry Access Code can be purchased from the Pearson Website. <http://www.pearson.com.au/9781442563902> If you choose to purchase a new textbook or ebook (see below) then this includes a Mastering Chemistry Course Code. It is valid for 24 months after activation.

(b) **Chemistry 120 Laboratory Manual** (Neil Meanwell)

#### Other Recommended Materials for the Course

Chemistry, The Central Science, Brown, le May, Bursten. Custom Camosun Edition. ~\$160. (For hard copy and access code). Ebook and access code \$114. Available from the Camosun Bookstore The 2nd and 1st Australian editions are also acceptable if you have a used book. **If you buy a used book that is not the most recent edition you will still need to purchase a Mastering Chemistry access code.**

Chemistry 100, Camosun College course pack is a good source of review material for those students who may have been away from Chemistry for a while.

### 4. Course Content and Schedule

Subject	Material Covered	Lecture Hours (approximate)	Textbook chapters
<b>Intro and Review</b>	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.	<b>3</b>	<b>1,2,3 and 4</b>
<b>Electronic Structure of Atoms</b>	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.	<b>6</b>	<b>5</b>
<b>Periodic Properties</b>	Development of the periodic table, effective nuclear charge, atomic and ionic radius, ionisation energy, electron affinity.	<b>3</b>	<b>6</b>
<b>Chemical Bonding</b>	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.	<b>5</b>	<b>7</b>

<b>Molecular Geometry</b>	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.	<b>5</b>	<b>8</b>
<b>Intermolecular Forces, Liquids and Solids</b>	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.	<b>5</b>	<b>10</b>
<b>Gases</b>	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.	<b>5</b>	<b>9</b>
<b>Chemistry of the Environment</b>	Structure of Earth's atmosphere, ozone layer and its depletion, tropospheric pollution, greenhouse effect and photochemical smog. Oceans and freshwater.	<b>3</b>	<b>18</b>

Lecture	Monday	6:00 pm - 8:50 pm	Fisher Building - Room 214
Laboratory	Wednesday	6:00 pm – 8:50 pm	Fisher Building - Room 356
Test I	Wednesday Feb 13 <sup>th</sup>	(Lab period)	Fisher Building - Room 356
Test II	Wednesday March 20 <sup>th</sup>	(Lab period)	Fisher Building - Room 356

## 5. Basis of Student Assessment (Weighting)

- (a) Online Assignments            25%
- (b) Laboratory work                20%
- (c) Test I and II (2x12.5%)       25%
- (d) Final exam                        30%

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. **Online assignment marks may not be carried over so you must complete these before the due date. You usually have several weeks to do these assignments so no excuses will be accepted, no exceptions.**

To write the final exam you must achieve a minimum final score of **50%** on laboratory work, and you must pass **both** the lecture portion and the laboratory portion in order to pass the course.

## 6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

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

Hard copies of the 1<sup>st</sup>, 2<sup>nd</sup>, & 3<sup>rd</sup> Australian Editions of B-L-B are available in the Library Reserve Room.

## 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.

**Chem 120-004 Laboratory schedule Winter 2018**

<b>Week Number</b>	<b>Date of lab</b>	<b>Experiment</b>
I	Wed, Jan 9 <sup>th</sup>	<i>Laboratory &amp; Safety Orientation</i>
II	Wed, Jan 16 <sup>th</sup>	<b>Expt 2.</b> Densities of Solids & Liquids
III	Wed, Jan 23 <sup>rd</sup>	<b>Expt 3.</b> Stoichiometry of Chemical Reactions – <b>Gr A</b>
IV	Wed, Jan 30 <sup>th</sup>	<b>Expt 3.</b> Stoichiometry of Chemical Reactions – <b>Gr B</b>
V	Wed, Feb 6 <sup>th</sup>	<b>Expt 4.</b> The Spectrophotometric Determination of Nickel in Aqueous Solution
VI	Wed, Feb 13 <sup>th</sup>	<i>Term Test #1</i>
VII	Wed, Feb 20 <sup>th</sup>	Reading Break
VIII	Wed, Feb 27 <sup>th</sup>	<b>Expt 5.</b> Colorimetric Determination of Iron in a Vitamin Tablet
IX	Wed, Mar 6 <sup>th</sup>	<b>Expt 6.</b> Determination of Copper Using Atomic Absorption Spectroscopy
X	Wed, Mar 13 <sup>th</sup>	<b>Expt 7.</b> Hard Water determination
XI	Wed, Mar 20 <sup>th</sup>	<i>Term Test #2</i>
XII	Wed, Mar 27 <sup>th</sup>	<b>Expt 8.</b> Molecular shapes
XIII	Wed, Apr 3 <sup>rd</sup>	<b>Expt 9.</b> The Preparation of Potassium Tris(oxalato)Ferrate(III)
XIV	Wed, Apr 10 <sup>th</sup>	<b>Expt 10.</b> Analysis & Uses of Potassium Tris(oxalato)Ferrate(III)