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

***CHEM-110-D01***
***General College Chemistry 1***
***Winter 2021***

# 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

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| **(a) Instructor** | Silvija Shewaga | | | |
| **(b) Office hours** | Posted on D2L or by virtual appointment | | | |
| **(c) Location** | N/A | | | |
| **(d) Phone** | N/A | | **Alternative:** | |
| **(e) E-mail** | shewagas@camosun.bc.ca | | | |
| **(f) Website** | D2L | | | |

## 2. Intended Learning Outcomes

Upon completion of this course the student will be able to:

1. Identify, describe and account for the general characteristics of gases, liquids and solids - interionic and intermolecular forces; vaporization and condensation; melting and freezing; specific characteristics of water.
2. Utilize solution terminology, account for and compare the solubilities of ionic and molecular compounds, and describe the impact of temperature and pressure on solubility.
3. Describe the characteristics of solubility equilibria and use mathematical techniques employed in dealing with this phenomenon.
4. Describe and account for the colligative and osmotic properties of aqueous solutions.
5. Account for differences in the rates of chemical reactions, apply Le Chatelier's Principle to equilibrium processes, and explain how catalysts influence reaction rates.
6. Apply mathematics and equilibrium constant expressions to descriptions of reversible reactions and chemical equilibria.
7. Identify Arrhenius, Bronsted and Lewis acids and bases, and describe the chemical properties of each type of substance.
8. Describe the ionization of water, the pH scale, weak and strong acids and bases, neutralization and the actions of buffer solutions.
9. Perform mathematical calculations involving pH, hydronium ion concentrations and acid-base titrations.
10. Define oxidation and reduction and assign oxidation numbers to the elements of substances involved in oxidation-reduction reactions. Demonstrate the ability to use oxidation numbers in balancing redox reactions.
11. Demonstrate an understanding of electrochemistry and account for the characteristics and uses of the standard hydrogen electrode, standard reduction potentials, electrolytic and voltaic cells.
12. Describe the characteristics of the major types of organic compounds – alkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols, ethers, aldehydes and ketones, carboxylic acids and esters, amines and amides.

## 3. Required Materials

(a) Lecture notes provided on D2L.
Recommended materials:
Chemistry, The Central Science: a broad perspective, Brown et al. 2014 aka 3rd Australian Custom Edition.
Chemistry, The Central Science, Brown, Le May. Custom Camosun Edition.

(b) Scientific calculator.

## 4. Course Content and Schedule

**Course Content**

| Subject | Material Covered | 2nd Australian Ed. | 3rd Australian Ed. | Custom Text |
|---|---|---|---|---|
| Chemical Kinetics | Reaction rates, change in concentration with time, temperature and rate, reaction mechanisms and catalysis | Ch. 12 | Ch. 15 | Ch. 1 |
| Thermochemistry | Energy, first law of thermodynamics, enthalpy, calorimetry, Hess' Law, enthalpies of formation | Ch. 4 | Ch. 14 | Ch. 3 |
| Equilibrium | Equilibrium constants, heterogeneous equilibria, working with equilibrium constants | Ch. 13 | Ch. 16 | Ch. 2 |
| Solubility | Titrations, common ion effect, buffers, solubility equilibrium | Ch. 1, 3, 15 | Ch. 2, 4, 18 | Ch. 4 |
| Acids and Bases | Acids and bases, pH scale, Ka and Kb, auto-ionization of water, acid strength of ions | Ch. 3, 14, 15 | Ch. 4, 17, 18 | Ch. 5, 6 |
| Electrochemistry | Redox reactions, balancing redox equations, half cells and the Nernst equation | Ch. 3, 16 | Ch. 4, 19 | Ch. 7 |

**Lab Schedule**

| Activity/Experiment | Lab Report Due Date |
|---|---|
| Safety Video Quiz | Jan. 19 |
| Ex 1 – Reaction Rates | Jan. 26 |
| Ex 2 – Energy Changes | Feb. 2 |
| Ex 3 – Shifting Equilibria | Feb. 23 |
| Ex 4 – Precipitation Reactions | Mar. 2 |
| Ex 5 – Acid-Base Titration | Mar. 9 |
| Ex 6 – Vitamin C, ASA, Milk of Magnesia | Mar. 23 |
| Ex 7 – Titration Curves | Mar. 30 |
| Ex 8 – Redox Reactions | Apr. 6 |
| Ex 9 - Electrochemistry | Apr. 13 |

## 5. Basis of Student Assessment (Weighting)

a) Laboratory component: 20 %

b) Midterm I: 20 % (Tues. Feb. 9, 2020)

c) Midterm II: 20 % (Tues. Mar. 16, 2020)

d) Final exam (cumulative): 40 % (TBA)

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 midterm exams.

If it is advantageous to the student, in the event 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.

A student must pass the laboratory component to be eligible to write the final exam. A student must pass the laboratory component to be eligible to pass the course. A student must pass the final exam to be eligible to pass the course. A student must pass both the lecture component and the laboratory component to pass the course.

## 6. Grading System

[X] Standard Grading System (GPA)

[ ] Competency Based Grading System

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

Recommended materials:
Chemistry, The Central Science: a broad perspective, Brown et al. 2014 aka 3rd Australian Custom Edition.
Chemistry, The Central Science, Brown, Le May. Custom Camosun Edition.

## 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 | *Incomplete*: 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 | *In progress*: 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 | *Compulsory Withdrawal*: 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. |