



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

CHEM-150-X01/X02
Engineering Chemistry
Fall 2019

COURSE OUTLINE

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

* 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	Thursdays 12:30 pm – 2:30 pm & by appointment		
(c) Location	TEC232		
(d) Phone	250-370-4447	Alternative:	
(e) E-mail	smiths@camosun.bc.ca		
(f) Website	D2L		

2. Intended Learning Outcomes

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

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

1. Calculate outcomes of chemical reactions based on stoichiometric quantities in general and in aqueous solutions in particular.
2. Describe the electronic configuration of atoms and explain why some atoms have unusual configurations.
3. Determine the shape and symmetry of molecules based on atomic, molecular, and hybrid orbitals.
4. Explain the impacts of bond polarity on molecular interactions on the physical states (phases) of molecules.
5. Determine the properties of polymers, ceramics and other engineering materials based on bonding and molecular interactions.
6. Calculate the properties of ideal gases. Describe the differences between ideal and non-ideal gases.
7. Calculate physical properties of solutions.
8. Determine rate constants, order of reaction and activation energy for simple chemical reactions.
9. Determine concentrations of participating molecules in chemical equilibria, in particular, aqueous equilibria. Determine the pH of dilute aqueous solutions of acids and bases.
10. Explain the importance of total energy, enthalpy, entropy and free energy in chemical processes.
11. Balance redox reactions. Determine the voltages of simple electrochemical cells. Describe the role of electrochemistry in corrosion and corrosion control.
12. Use orbital theory to describe the properties of metals and semiconductors.

3. Required Materials

- (a) CHEM150 Lab Manual, Fall 2019 Edition.
- (b) Safety glass.
- (c) Scientific calculator.
- (d) All required materials are available at the Camosun College Interurban Bookstore.

4. Course Content and Schedule

Lectures: Section X01
Mondays 3:00 pm – 3:50 pm in TEC 110
Tuesdays 8:30 am – 9:20 am in TEC 177
Wednesdays 11:30 am – 12:20 pm in TEC 110
Thursdays 11:30 am – 12:20 pm in TEC 173

Section X02
Mondays 1:30 pm – 2:20 pm in TEC 173
Tuesdays 3:30 pm – 4:20 pm in TEC 173
Wednesdays 8:30 am – 9:20 am in TEC 173
Thursdays 2:30 pm – 3:20 pm in TEC 110

Laboratory: Section X01 – A Fridays 8:30 am – 10:50 am in TEC 230
Section X01 – B Mondays 8:30 am – 10:50 am in TEC 230
Section X02 – A Wednesdays 3:00 pm – 5:20 pm in TEC 230
Section X02 – B Tuesdays 9:30 am – 11:50 am in TEC 230

Lecture Plan (approximate hours in brackets)

Unit 1: Review (5)
Unit 2: Introduction to Quantum Mechanics (3)
Unit 3: Periodic Properties (2)
Unit 4: Basic Concepts of Bonding (3)
Unit 5: Molecular Geometry and Bonding Theories (3)
Unit 6: Gases (3)
Unit 7: Intermolecular Forces (3)
Unit 8: Kinetics (4)
Unit 9: Thermochemistry (5)
Unit 10: Thermodynamics (3)
Unit 11: Equilibrium (3)
Unit 12: Solubility (3)
Unit 13: Acids and Bases (4)
Unit 14: Electrochemistry (3)
Unit 15: Materials (2)

Important Dates

Midterm I 5:30 pm – 6:50 pm on Tuesday October 8, 2019
Midterm II 5:30 pm – 6:50 pm on Tuesday November 5, 2019
Final Exam (TBA)

Lab Schedule

Section	Mondays (X01-B)	Tuesdays (X02-B)	Wednesdays (X02-A)	Fridays (X01-A)
Lab Time	8:30am – 10:50 am	9:30 am – 11:50 am	3:00 pm – 5:20 pm	8:30 am – 10:50 am
Week I	9/2 Labor Day – No Lab	9/3 No Lab	9/4 No Lab	9/6 No Lab
Week II	9/9 Safety Demo Ex 1 – Densities of Solids and Liquids	9/10 Safety Demo Ex 1 – Densities of Solids and Liquids	9/11 Safety Demo Ex 1 – Densities of Solids and Liquids	9/13 Safety Demo Ex 1 – Densities of Solids and Liquids
Week III	9/16 Ex 2 – Stoichiometry Ex 1 Report Due	9/17 Ex 2 – Stoichiometry Ex 1 Report Due	9/18 Ex 2 – Stoichiometry Ex 1 Report Due	9/20 Ex 2 – Stoichiometry Ex 1 Report Due
Week IV	9/23 Ex 3 – Spectroscopic Determination of Ni Ex 2 Report Due	9/24 Ex 3 – Spectroscopic Determination of Ni Ex 2 Report Due	9/25 Ex 3 – Spectroscopic Determination of Ni Ex 2 Report Due	9/27 Ex 3 – Spectroscopic Determination of Ni Ex 2 Report Due
Week V	9/30 Ex 4 – Molecular Models Ex 3 & 4 Reports due	10/1 Ex 4 – Molecular Models Ex 3 & 4 Reports due	10/2 Ex 4 – Molecular Models Ex 3 & 4 Reports due	10/4 Ex 4 – Molecular Models Ex 3 & 4 Reports due
Week VI	10/7 Ex 5 – Atomic Absorption Spectroscopy	10/8 Ex 5 – Atomic Absorption Spectroscopy	10/9 Ex 5 – Atomic Absorption Spectroscopy	10/11 Ex 5 – Atomic Absorption Spectroscopy
Week VII	10/14 Thanksgiving – No Lab	10/15 No Lab	10/16 No Lab	10/18 No Lab
Week VIII	10/21 Ex 6 – Distillation Ex 5 Report due	10/22 Ex 6 – Distillation Ex 5 Report due	10/23 Ex 6 – Distillation Ex 5 Report due	10/25 Ex 6 – Distillation Ex 5 Report due
Week IX	10/28 Ex 7 – Bleach and Blue Dye Ex 6 Report Due	10/29 Ex 7 – Bleach and Blue Dye Ex 6 Report Due	10/30 Ex 7 – Bleach and Blue Dye Ex 6 Report Due	11/1 Ex 7 – Bleach and Blue Dye Ex 6 Report Due
Week X	11/4 Ex 8 – Thermochemistry	11/5 Ex 8 – Thermochemistry	11/6 Ex 8 – Thermochemistry	11/8 Ex 8 – Thermochemistry
Week XI	11/11 Remembrance Day – No Lab	11/12 No Lab	11/13 No Lab	11/15 No Lab
Week XII	11/18 Ex 9 – Gravimetric Determination of Chloride Ex 7 & 8 Reports due	11/19 Ex 9 – Gravimetric Determination of Chloride Ex 7 & 8 Reports due	11/20 Ex 9 – Gravimetric Determination of Chloride Ex 7 & 8 Reports due	11/22 Ex 9 – Gravimetric Determination of Chloride Ex 7 & 8 Reports due
Week XIII	11/25 Ex 10 – Recycling of Copper Ex 9 & 10 Reports due	11/26 Ex 10 – Recycling of Copper Ex 9 & 10 Reports due	11/27 Ex 10 – Recycling of Copper Ex 9 & 10 Reports due	11/29 Ex 10 – Recycling of Copper Ex 9 & 10 Reports due
Week XIV	12/2 No Lab	12/3 No Lab	12/4 No Lab	12/6 No Lab

5. Basis of Student Assessment (Weighting)

- (a) Laboratory – 20% (10 lab reports; 2% each)
 - (b) Midterm I – 20 % (Tues. Oct 8, 2019 from 5:30 pm – 6:50 pm)
 - (c) Midterm II – 20% (Tues. Nov. 5, 2019 from 5:30 pm – 6:50 pm)
 - (d) Final Exam – 40 % (comprehensive, TBA)
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- a. To be eligible to write the final exam a student must achieve a minimum final score of 50% on the laboratory component.
 - b. A student must pass both the lecture component and the laboratory component of the course in to be eligible to pass the course.
 - c. There are no make-up (alternative) dates for midterm exams. The weight of a missed midterm will be reassigned to the final exam.
 - d. If the score on the final exam is higher than one or both midterm exam marks, the final exam mark will replace the inferior midterm mark(s).
 - e. The midterm I exam covers material from units 1-5. The exam consists of 30 multiple choice questions, for a total of 30 marks. There are 6 questions per unit.
 - f. The midterm II exam covers material from units 6-10. The exam consists of 30 multiple choice questions, for a total of 30 marks. There are 6 questions per unit.
 - g. The final exam covers material from units 1-15. The exam consists of 60 multiple choice questions for a total of 60 marks. There are 2 questions per unit for units 1-10 and 8 questions per unit for units 11-15.

The Laboratory Mark

- a. Lab reports are due at the beginning of the laboratory period in which they are due, prior to the experiment commencing. No late lab reports will be accepted and a mark of zero will be assigned.
- b. Wearing of safety glasses and covered footwear is mandatory in all laboratories. Student who forget safety glasses and/or covered footwear or fail to wear them will not be allowed to complete the lab. The student may be asked to leave the lab at any time, prohibiting them to complete the lab, and a mark of zero will be assigned for the experiment portion of the laboratory report.
- c. Punctual attendance to all laboratory periods is mandatory. Arriving after the pre-laboratory talk is finished will prohibit the late student to complete the lab, and thus a mark of zero will be assigned for the experiment. Prior arrangements must be made with the instructor via email, a minimum of 24 hours in advance, if the student will be late or absent from the laboratory experiment.

6. Grading System

Standard Grading System (GPA)

Competency Based Grading System

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

CHEM150 Supplementary Booklet available from the Camosun College Interurban Bookstore.

8. Emergency 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.