

COURSE SYLLABUS



COURSE TITLE: CHEM-150: Engineering Chemistry

CLASS SECTION: X03

TERM: 2024F

COURSE CREDITS: 3

DELIVERY METHOD(S): Face-to face

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

Learn more about Camosun's [Territorial Acknowledgement](#).

INSTRUCTOR DETAILS

NAME: Steve McKinnon

EMAIL: mckinnons@camosun.ca

OFFICE: F 350B

HOURS: Mon 11:00, Tues 11:30, Thurs 11:00, Fri 12:30 and by appointment

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

Important Dates

Sept 30 – College Closed – National Day For Truth and Reconciliation

Oct 14 – College Closed – Thanksgiving

Nov 11 – College Closed – Remembrance Day

Dec 9 to 17 - Final Exam Period (TBA)

CALENDAR DESCRIPTION

Topics include thermochemistry, atomic and molecular structure, chemical bonding, gases, liquids and solids, solutions and phase equilibria, equilibrium, chemical thermodynamics and electrochemistry.

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course students 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.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Scientific Calculator

Safety Glasses

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Laboratory	20%
D2L Quizzes	20%
Midterm Test 1 (Tuesday Lecture week 6)	15%
Midterm Test 2 (Tuesday Lecture week 11)	15%
Final Exam	30%
	TOTAL
	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the [Grade Review and Appeals](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information.
<http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

*In order to pass the course, students must pass the laboratory with a score of 50%. There is an expectation that students complete all laboratory experiments, along with the associated assignments. If you miss a laboratory session due to illness or extenuating circumstances (as outlined in the Academic Concessions Policy**), you must inform your instructor via email before the laboratory session. Your instructor may require you to complete the*

assignment using data provided, or an online version of the experiment. The laboratory assignment due dates are given in the assignments dropbox of before the following lab period. No late assignments will be accepted unless you have prior accommodations through CAL, or you have requested an extension due to illness or extenuating circumstances (as outlined in the Academic Concessions Policy). Even though you may perform the experiments with a partner, and collect identical data, you must submit your own assignment. Duplicate assignments will not be accepted and may be subject to academic infraction. If you complete the practical part of an experiment but fail to upload an assignment by the due date without a granted extension, you may be given a participation mark only.

As chemistry is a practical science, if you miss more than three lab experiments unexcused, you may not be able to gain the 50% passing mark to meet the learning outcomes of the course.

Your instructor expects you to be prepared for the laboratory experiment...arriving excessively late, not knowing which experiment is being performed, not abiding by safety procedures may result in being asked to leave the lab.

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

UNIT	LECTURE TOPIC	Approx. Hours
1	Review	6
2	Introduction to Quantum Mechanics	4
3	Periodic Properties	2
4	Basic Concepts of Bonding	3
5	Molecular Geometry and Bonding	3
6	Gases	3
7	Intermolecular Forces	3
8	Kinetics	4
9	Thermochemistry	5
10	Thermodynamics	3
11	Equilibrium	3
12	Solutions and Solubility	3
13	Acids and Bases	4
14	Electrochemistry	3
15	Materials	2

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

COURSE GUIDELINES & EXPECTATIONS

Lab Schedule – Preliminary schedule, subject to change

	A (Thurs)	B (Mon)	
Week I	Sept 5	Sept 2	No lab
Week II	Sept 12	Sept 9	Exp 1 – Density
Week III	Sept 24	Sept 16	Exp 2 – Stoichiometry
Week IV	Sept 26	Sept 23	Exp 3 – Spectroscopic Determination of Ni
Week V	Oct 5	Sept 30	No lab
Week VI	Oct 12	Oct 7	Exp 4 – Molecular Models
Week VII	Oct 19	Oct 14	No Lab – Midterm Test 1 in Tues Lecture
Week VIII	Oct 26	Oct 21	Exp 5 – Atomic Absorption Spectroscopy
Week IX	Oct 31	Oct 28	Exp 6 – Distillation
Week X	Nov 7	Nov 4	Exp 8 – Thermochemistry
Week XI	Nov 14	Nov 11	No Lab – Midterm Test 2 in Tues Lecture
Week XII	Nov 21	Nov 18	Exp 9 – Equilibrium Constants
Week XIII	Nov 28	Nov 25	Exp 10 – Recycling Copper
Week XIV	Dec 5	Dec 2	No lab - review

SCHOOL OR DEPARTMENTAL INFORMATION

Department Chair: John Lee

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit <http://camosun.ca/students/>.

Support Service	Website
Academic Advising	camosun.ca/services/academic-supports/academic-advising
Accessible Learning	camosun.ca/services/academic-supports/accessible-learning
Counselling	camosun.ca/services/health-and-wellness/counselling-centre
Career Services	camosun.ca/services/co-operative-education-and-career-services
Financial Aid and Awards	camosun.ca/registration-records/financial-aid-awards

Help Centres (Math/English/Science)	camosun.ca/services/academic-supports/help-centres
Indigenous Student Support	camosun.ca/programs-courses/iecc/indigenous-student-services
International Student Support	camosun.ca/international
Learning Skills	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills
Library	camosun.ca/services/library
Office of Student Support	camosun.ca/services/office-student-support
Ombudsperson	camosun.ca/services/ombudsperson
Registration	camosun.ca/registration-records/registration
Technology Support	camosun.ca/services/its
Writing Centre	camosun.ca/services/academic-supports/help-centres/writing-centre-learning-skills

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Integrity

Students are expected to comply with all College policy regarding academic integrity; which is about honest and ethical behaviour in your education journey. The following guide is designed to help you understand your responsibilities:

<https://camosun.libguides.com/academicintegrity/welcome>

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.13.pdf> for Camosun's Academic Integrity policy and details for addressing and resolving matters of academic misconduct.

Academic Accommodations for Students with Disabilities

Camosun College is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging appropriate academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a documented disability and think you may need accommodations, you are strongly encouraged to contact the Centre for Accessible Learning (CAL) and register as early as possible. Please visit the CAL website for more information about the process of registering with CAL, including important deadlines: <https://camosun.ca/cal>

Academic Progress

Please visit <https://camosun.ca/sites/default/files/2023-02/e-1.1.pdf> for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit <https://camosun.ca/sites/default/files/2021-05/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <https://camosun.ca/registration-records/tuition-fees#deadlines>.

Grading Policy

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <https://camosun.ca/sites/default/files/2021-05/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal (see [Medical/Compassionate Withdrawals policy](#)). Please visit <https://camosun.ca/services/forms#medical> to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized Violence Policy: <https://camosun.ca/sites/default/files/2021-05/e-2.9.pdf> and camosun.ca/services/sexual-violence-support-and-education.

To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-370-3841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at <https://camosun.ca/sites/default/files/2021-05/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Looking for other policies?

The full suite of College policies and directives can be found here: <https://camosun.ca/about/camosun-college-policies-and-directives>

Changes to this Syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.