



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:	Jamie Doran, Ph.D.
(b)	Office Hours:	Monday, 3:00 pm to 4:00 pm Tuesday, 10:00 am to 12:00 pm Wednesday, 11:30 am to 12:30 pm Wednesday, 3:00 pm to 4:00 pm Thursday, 3:00 pm to 4:00 pm
(c)	Location:	Room 350C, Fisher Building, Lansdowne Campus
(d)	Phone:	(250) 370-3441
(e)	Email:	jdoran@camosun.ca

2. Intended Learning Outcomes

At the end of this course, students will be able to:

1. Use dimensional analysis, metric and SI units in performing chemical calculations.
2. Utilize the specialized vocabulary and nomenclature of chemistry and name chemical compounds, and identify and construct chemical formulas.
3. Summarize the characteristics of electrons, protons and neutrons, and identify their roles as components of atoms, ions and isotopes, including radioisotopes.
4. Describe atomic structure, the differences between elements, and the role of the periodic table in organizing elements within a coherent theoretical and empirical system.
5. Describe and account for the periodic table trends concerning atomic number, atomic radius, ionization energy and electronegativity.
6. Compare the formation and characteristics of ionic and molecular compounds.
7. Perform mathematical calculations involving chemical formulas, molecular weights, moles, Avogadro's number and molarity.
8. Balance chemical equations, including use of the mole concept, and solve stoichiometry problems.
9. Account for the general characteristics of the gas, liquid, and solid states.
10. Conduct experiments in basic chemistry, utilizing common chemistry laboratory equipment with an enhanced knowledge and practice in basic lab skills.

3. Required Materials

(a) Course Text & Laboratory Manual

Chemistry 100 Course Notes, Problem Sets, & Laboratory Manual, 2015 Edition. Camosun College Publications.

This course pack is *required* for this course. A copy may be purchased from the Lansdowne Campus book store.

(b) General Materials and Supplies

Safety glasses Safety glasses *are required* when handling hazardous chemicals. Each student is required to provide her or his pair of safety glasses. Students lacking safety glasses when they are required *will not be permitted* to be in the laboratory.

Lab coats Lab coats are *recommended* for all experimental work in the laboratory. Each student has to provide her or his own lab coat.

Latex gloves Latex or other 'non-allergenic' gloves are available if a student has certain allergies and are to be used when appropriate to protect the skin from potentially allergenic chemicals.

Calculator A scientific calculator is *required* at times in the laboratory, in lecture, and during term tests and the final exam. Each student is *required* to provide her or his own scientific calculator. Cell phone-based, tablet-based or computer-based calculators cannot be used during tests or the final exam.

4. Course Content and Schedule

Credits	4 credits
In-class workload	4 h of lectures per week. 2 h lab period per week. The experiments conducted are outlined in the laboratory schedule below.
Out-of-class workload	6 hours per week
Number of weeks	14 weeks
Pre-requisite	One of: Principles of Math 10, or Foundations of Math & Pre-calculus 10, or MATH 053, or MATH 057 or Math 072; or Math 135, or Math 137, or assessment.

Course Times and Locations

Lectures	Monday 8:30 AM to 9:20 AM Fisher Building, Room F360 Tuesday 12:30 to 1:20 PM Fisher Building, Room F360 Wednesday 1:30 to 2:20 PM Fisher Building, Room F360 Thursday 1:30 to 2:20 PM Fisher Building, Room F360
Laboratory Periods	Monday with John Owen 10:00 AM to 11:50 AM Fisher Building, Room F354

Please see the laboratory schedule below.

Lecture Outline

A detailed outline of the lecture material is provided in the Table of Contents of *Chemistry 100 Notes*. Notably, this book has been designed specifically for this course to present many relevant examples of the chemistry of life and the environment including those intended to stimulate interest and curiosity.

1. Measurements and Calculations: SI & other scientific units; SI prefixes; metric conversions; measurements, scientific notation, & significant figures; density calculations; calculations involving energy changes.

2. Introductory Terminology: scientific method; physical & chemical changes; elements, compounds and mixtures; metals and nonmetals; atoms and molecules; protons, neutrons and electrons; ions and isotopes; atomic masses.

3. Chemical Formulas and Names: composition of chemical compounds; formulas and naming of molecular compounds; meaning of ionic formulas and naming of ionic compounds; compounds containing polyatomic ions; formulas and names of acids.

4. Calculations Based Upon Formulas: molecular mass; formula mass; percentage composition; the mole; grams to moles and moles to grams conversions; moles of molecular or ionic compounds; Avogadro's Number.

5. Stoichiometry: balancing chemical equations; stoichiometry - problems based upon chemical equations; limiting reactant calculations; percentage yield calculations; calculations involving exothermic or endothermic chemical reactions.

6. Periodic Table and Electron Distributions: chemical families; electron levels and orbitals (sublevels); electron distribution in atoms; electron dot formulae; trends in atomic radii (size), ionization energies & chemical reactivity.

7. Chemical Bonding: formation of ionic compounds; formation of molecular compounds; electron dot formula representations; electronegativity and bond polarity; molecular geometry and polarity.

8. Gases: general nature of gases; factors affecting gas volume; Boyle's Law - gas pressure & volume; absolute temperature scale; Charles' Law - gas temperature & volume; STP standard conditions of gas temperature and pressure; molar gas volume; partial pressures of gases; gases and diving; gas stoichiometry.

9. Liquids and Solutions: general properties of liquids; hydrogen bonding; vapour pressure and boiling point; solubility; solution concentration & diluting solutions; electrolytes, dissociation equations & ion concentrations in solution; pH scale; solution stoichiometry.

10. Organic Chemistry: why so many organic compounds?; structural formulas and isomers; naming of hydrocarbons & alcohols; optional: addition and substitution reactions in organic chemistry.

11. Radioactivity: Radioactive substances; alpha, beta & gamma rays & associated decay; optional: production of radioisotopes; half-life and dating; medical applications.

Laboratory Schedule

Please familiarize yourself in advance with the lab practices and safety information presented on pages 5 & 6 of the Laboratory Manual.

Week 1. Monday, January 9 th	Laboratory & Safety Orientation
Week 2. Monday, January 16 st	Experiment 1. Density
Week 3. Monday, January 23 rd	Experiment 4. Heat of Combustion
Week 4. Monday, January 30 th	Experiment 3. Separating Mixtures
Week 5. Monday, February 6 th	Term Test #1
Week 6. Monday, February 13 th	BC Family Day
Week 7. Monday, February 20 rd	Experiment 5. Recycling Copper, Part 1 (brief) Mini- Experiment. Accuracy & Precision
Week 8. Monday, February 27 th	Experiment 5. Recycling Copper, Parts 2 to 5
Week 9. Monday, March 6 th	Experiment 5. Recycling Copper, Part 6 (completion) Model building – Molecular Geometry & Polarity
Week 10. Monday, March 13 th	Term Test #2
Week 11. Monday, March 20 th	Experiment 7. Copper & Silver Nitrate Reaction
Week 12. Monday, March 27 th	Experiment 11. Magnesium – HCl reaction
Week 13. Monday, April 3 rd	Experiment 12. Neutralization
Week 14. Monday, April 10 th	Lab wrap-up; Final Exam Review

5. Basis of Student Assessment (Weighting)

(a) Laboratory Reports

Attendance in the lab periods is mandatory. No laboratory experiment can be missed without an acceptable reason submitted in writing, such as a letter from a Medical Doctor. Laboratory reports are due in the experimental lab period following completion of an experiment, unless otherwise stated. The laboratory manual has been designed to allow students to hand in the completed pages taken directly from the manual. Each lab partner must hand in a separate report even though lab partners typically share equally in experimental work. The value the lab reports contribute to the final grade is **20%**.

(b) Quizzes

Five quizzes of equal value will be held at appropriate times during the lecture schedule. The best four marks over the five quizzes will be used to calculate a total mark out of 20, as they contribute 20% to the final grade.

- Quiz 1. Chapters 1 & 2
- Quiz 2. Chapters 3 & 4
- Quiz 3. Chapter 5
- Quiz 4. Chapters 6 & 7
- Quiz 5. Chapters 8 & 9

Quizzes will be typically scheduled a few days to a week following the completion of lectures concerning the Chapter(s) from which material is to be tested. Attempts will be made to schedule quizzes on days when students do not have other tests or exams.

If any quiz is missed due to illness or similarly justifiable reason, with accompanying documentation, the percentage value of that quiz will be added to the value of the final exam. Alternatively, an option to write a make-up quiz may be available.

(c) Term Tests

There are two term tests. Each test will contribute to **15%** of the final grade. The delineation of material students will be responsible for in each case will be provided in class about one week before the date of the test.

Term test 1 is scheduled for Monday, February 6th in the laboratory period (10:00 am to 11:50 am) in F354.

Term test 2 is scheduled for Monday, March 13th in the laboratory period (10:00 am to 11:50 am) in F354.

If either term test is missed due to illness or similarly justifiable reason, with accompanying documentation the percentage value of that term test (15%) will be added to percentage value of the final exam.

(d) Final Exam

The final exam is a comprehensive exam that will cover all of the material covered in the lecture portion of the course with an emphasis on material that follows Chapter 3.

The value this exam contributes to the final grade is **30%**.

The time and location of the Chem 100 final exam will be published by the College during the Semester.

Attendance at the final exam is mandatory. Appropriate documentation must accompany an explanation for absence.

6. Grading System

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.

Please Note:

Students may not use recording devices in the classroom without the prior permission of the instructor or DRC. The instructor's permission is not required when the use of a recording device is sanctioned by the College's Disabilities Resource Centre for Students in order to accommodate a student's disability, and when the instructor has been provided with an instructor notification letter which specifies the use of a recording device. Such recordings made in the classroom are for the student's personal use only, and distribution of recorded material is prohibited. Recordings made during the course would include statements, questions and comments made by students in the class, and these are not to be disseminated or repeated in any manner based on the recordings.

Please have cell phones turned off and put away while in lectures. Thank you.