



School of Arts & Science
CHEMISTRY AND GEOSCIENCE DEPARTMENT
CHEM 060-03
Introduction to Chemistry
2006F

COURSE OUTLINE

The Approved Course Description is available on the web @

<http://www.camosun.bc.ca/calendar/chem.php#060>

Ω Please note: this outline will be electronically stored for five (5) years only.
It is strongly recommended students keep this outline for your records.

1. Instructor Information

(a)	Instructor:	Jamie Doran, Ph.D.	
(b)	Office Hours:	Monday, 12:30 to 2:20 pm Thursday, 12:30 to 2:20 pm Friday, 11:30 am to 1:15 pm Students are welcome whenever my office door is open. Appointments may be made to meet at other times. Office hours will be extended prior to quiz or exam times.	
(c)	Location:	Room 350A, Fisher Building, Lansdowne Campus	
(d)	Phone:	370-3438	Alternative Phone:
(e)	Email:	jdoran@camosun.bc.ca	
(f)	Website:	http://www.camosun.bc.ca/schools/artsci/chemgeo/doran.php	

2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

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

1. Utilize the specialized vocabulary and nomenclature of chemistry.
2. Use metric and SI units in performing chemical calculations.
3. Describe the experimental discovery of subatomic particles, summarize the characteristics of electrons, protons and neutrons, and identify their roles as components of atoms, ions and isotopes including radioisotopes.
4. Communicate an understanding of 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. Demonstrate an ability to name chemical compounds, and identify and construct chemical formulas.

7. Compare the formation and characteristics of ionic and molecular compounds.
8. Demonstrate an ability to perform mathematical calculations involving chemical formulas, molecular weights, moles, Avogadro's number and Molarity.
9. Balance chemical equations, demonstrate an understanding of the information they provide chemists and solve stoichiometry problems.
10. Identify and account for the general characteristics of the gas state and solve mathematical problems involving Boyle's Law, Charles' Law, Gay-Lussac's Law and Avogadro's Law.
11. Use basic organic chemistry nomenclature and structural representations associated with simple organic molecules and common functional groups.
12. Conduct experiments in basic chemistry utilizing common chemistry laboratory equipment with a knowledge and practice in basic chemical safety procedures.

3. Required Materials

(a)	Texts	<p>Text <i>Chemistry 060 Study Notes</i>, 2006 Edition.</p> <p>Study Question Set <i>Chemistry 060 Supplementary Questions</i>, 2006 Edition</p> <p>Lab Manual <i>Chemistry 060 Laboratory Manual</i>, 2006 Edition.</p>
(b)	Other	<p>General Materials and Supplies</p> <p><u>Safety glasses</u> Safety glasses are required when handling hazardous chemicals. The students are required to provide their own pairs of glasses. Students lacking safety glasses when they are required will not be permitted to work in the laboratory.</p> <p><u>Lab coats</u> Lab coats are required for any experiments involving hazardous chemicals. Students are required to provide their own lab coats. Students lacking lab coats when required will not be permitted to work in the laboratory.</p> <p><u>Latex gloves</u> Latex or similar gloves <u>will be available in the lab</u> and are to be used when appropriate to protect the skin from potentially hazardous chemicals.</p> <p><u>Scientific calculator</u> Calculators may be required in the lab, in class and during exams. Students are required to provide their own calculators.</p>

4. Course Content and Schedule

(Can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

This course introduces chemical concepts for understanding life and the environment. Topics include: atomic structure; the periodic table of elements; molecules and chemical bonding; chemical formulas and

reactions; stoichiometry, gases, liquids and solutions; and organic chemistry. Non-science students will also find this course interesting.

Please note: This outline will not be kept indefinitely. It is recommended students keep it for their records.

Credits	4 credits
In-class workload	4 h of lectures per week. Experiments are conducted in approximately half of the 2 h Friday lab time slots according to the schedule below.
Out-of-class workload	6 hours per week
Number of weeks	14 weeks
Pre-requisite	Math 10 or assessment

Course Times and Locations

Lecture Times Mondays
3:30 to 4:20 PM
Fisher Building, Room 336

Wednesdays
2:30 to 4:20 PM
Fisher Building, Room 360

Thursdays
3:30 to 4:20 PM
Fisher Building, Room 216

Laboratory Periods *Alternate weeks
Friday
1:30 to 3:20 PM
Fisher Building, Room F300 (& possibly F358)

* Due to the large class size, some experiments will be conducted in consecutive weeks with approximately half of the students attending in either week. Once the class meets, a determination of which students are members of either Lab Group A or Lab Group B can be made; hopefully to everyone's liking. There is typically flexibility concerning this schedule that may allow students to accommodate lab periods missed due to illness, family matters or other reasons.

Please see the laboratory and midterm exam schedule below.

Lecture Outline

A detailed outline of the lecture material is provided in the Table of Contents of *Chemistry 060 Study Notes*. Notably, this book is designed to present many relevant

examples of the chemistry of life and the environment including those intended primarily 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 of 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 & Midterm Exam Schedule & College Closure Dates

Please familiarize yourself in advance with the lab practices and safety information presented on pages 4 & 5 of the Lab Manual.

Students in the class will be divided into two lab groups ('A' or 'B'), taking into account personal preferences as much as possible, and undertake experiments together or separately as indicated below.

<i>Friday, September 8th</i>	Chemistry Laboratory & Safety Orientation (entire class)
<i>Friday, September 15th</i>	Experiment 2. Identifying Liquid Compounds. Lab Group A.
<i>Friday, September 22nd</i>	Experiment 2. Identifying Liquid Compounds. Lab Group B.
<i>Friday, September 29th</i>	Experiment 4. Heat of Combustion. Lab Group A.
<i>Friday, October 6th</i>	Experiment 4. Heat of Combustion. Lab Group B.
<i>Monday, October 9th</i>	Thanksgiving Day Holiday.
<i>Friday, October 13th</i>	Experiment 3. Separating Mixtures. Lab Group A.
<i>Friday, October 20th</i>	Experiment 3. Separating Mixtures. Lab Group B.
<i>Friday, October 27th</i>	Midterm Exam
<i>Friday, November 4th</i>	Experiment 7. Copper - Silver Nitrate Reaction. Lab Group A.
<i>Friday, November 10th</i>	Experiment 7. Copper - Silver Nitrate Reaction. Lab Group B.
<i>Monday, November 13th</i>	Remembrance Day Closure
<i>Friday, November 17th</i>	Experiment 12. Neutralization. Lab Group A.
<i>Friday, November 17th</i>	Experiment 12. Neutralization. Lab Group B.

Friday, December 1st

Experiment 15. Accuracy & Precision in Experimental Results

Entire class: Group A - Hour One; Group B - Hour Two.

Friday, December 9th Final Exam Review Period

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

(a) Laboratory Experiments & Reports

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

(b) Quizzes

These will compose **20%** of the final grade. There will be five quizzes each of equal value. The four *best* grades will be counted and the lowest quiz mark will be discarded.

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 classes concerning the Chapter(s) to be tested. Attempts will be made to schedule quizzes on days when students do not have other tests or exams.

There is no quiz on Chapter 10 or 11 material as it is the last material to be presented in the semester. The material covered will be tested on the Final Exam.

(c) Midterm Exam

This exam will compose **25%** of the final grade, and will test material from Chapters 1 to 5. **It is scheduled for October 27th in the Friday period normally used for a lab experiment.** The date for this test will be confirmed in class, as the pace of the course with this particular class becomes evident, and efforts are made to avoid having this exam scheduled on or very close to the same time as students' other exams.

If any quiz or test is missed due to illness or any other justifiable reason, a student may either take a substitute test scheduled at a mutually agreeable time, or choose to add the percentage value of that test that of the final exam.

(d) Final Exam

The final exam is a comprehensive exam that will cover all of the material presented 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 **35 %**.

The time and location of the Chem 060 final exam will be published by the College during the Fall Semester.

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

6. Grading System

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Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
95-100	A+		9
90-94	A		8
85-89	A-		7
80-84	B+		6
75-79	B		5
70-74	B-		4
65-69	C+		3
60-64	C		2
50-59	D		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 at camosun.ca or 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.

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.

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

You will find that the *Chemistry 060 Study Notes* is very well designed to mirror the lecture content of this course. Importantly, this book provides very many practice questions and their answers, as does the newly written *Chemistry 060 Supplemental Questions*. These practice questions are very representative of those that will appear on the quizzes, the midterm exam and the final exam.

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 on the College web site in the Policy Section.