



Chemistry 060- INTRODUCTION TO CHEMISTRY

Course Outline - Spring 2009

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.

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Office Hours:

Monday – Thursday 1:30 – 2:20pm

Appointments can be made at other times, and are encouraged

Email is a good way of asking quick questions and getting quick responses

Course format

Lectures:

Mondays and Wednesdays 2:30-3:20pm Room 334 Fisher Bldg

Tuesdays and Thursdays 2:30-5:20pm Room 334 Fisher Bldg

Labs:

group A - Mondays 3:30-5:20pm Room 358 Fisher Bldg

group B – Wednesdays 3:30-5:20pm Room 358 Fisher Bldg

** everyone comes to first lab period May 4th then alternating days for groups A and B

Intended Learning Outcomes

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

- Utilize the specialized vocabulary and nomenclature of chemistry.
- Use metric and SI units in performing chemical calculations.
- Describe the experimental discovery of subatomic particles, summarize the characteristics of electrons, protons and neutrons, and identify their roles as components of atoms.

- 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.
- Describe and account for the periodic table trends concerning atomic number, atomic radius, ionization energy and electronegativity.
- Demonstrate an ability to name chemical compounds, and identify and construct chemical formulas.
- Compare the formation and characteristics of ionic and molecular compounds.
- Demonstrate an ability to perform mathematical calculations involving chemical formulas, molecular weights, moles, Avogadro's number and molarity.
- Balance chemical equations, demonstrate an understanding of the information they provide chemists and solve stoichiometry problems.
- 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.
- Communicate an understanding of radioisotopes, nuclear fission and nuclear fusion.

Required Materials

(a) Text & Laboratory Manual

Chemistry 060 Study Notes, Supplementary Problems, & Laboratory Manual, 2008 Edition.

(b) General Materials and Supplies

Safety glasses Safety glasses are required when handling hazardous chemicals.

The students are required to provide their own pair of safety glasses. Students lacking safety glasses when they are required will not be permitted to work in the laboratory.

Lab coats 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.

Latex gloves Latex or similar gloves will be available in the lab and are to be used when appropriate to protect the skin from potentially hazardous chemicals.

Scientific calculator Calculators may be required in the lab, in class and during exams. Each student is required to provide her or his own calculator

Lecture Outline

A detailed outline of the lecture material is provided in the Table of Contents of *Chemistry 060 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.

Laboratory & Midterm Exam Schedule

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>Monday, May 4th</i>	Chemistry Laboratory & Safety Orientation (entire class)
<i>Monday, May 11th</i>	Experiment 1. Density. Lab Group A.
<i>Wednesday, May 13th</i>	Experiment 1. Density. Lab Group B.
<i>Week of May 18th</i>	No Labs
<i>Monday, May 25th</i>	Experiment 4. Heat of Combustion. Lab Group A.
<i>Wednesday, May 27th</i>	Experiment 4. Heat of Combustion. Lab Group B.
<i>Monday, June 1st</i>	Experiment 3. Separating Mixtures. Lab Group A.
<i>Wednesday, June 3rd</i>	Experiment 3. Separating Mixtures. Lab Group B.
<i>Monday, June 8th</i>	Experiment 12. Neutralization. Lab Group A.
<i>Wednesday, June 10th</i>	Experiment 12. Neutralization. Lab Group B.
<i>Monday, June 15th</i>	Experiment 15. Accuracy & Precision in Experimental Results Group A.
<i>Wednesday, June 17th</i>	Experiment 15. Accuracy & Precision in Experimental Results Group B.

Basis of Student Assessment

(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. May 12th

Quiz 2. May 19th

Quiz 3. June 2nd

Quiz 4 June 9th

Quiz 5 June 16th

Quizzes will cover the material discussed in class the previous week.

(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 Thursday May 28th.** 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 the same day 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 Spring Semester.

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

Standard Grading System (GPA)

Percentage	Grade	Grade Point Equivalency
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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	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.

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, Registrar's Office or the College web site at <http://www.camosun.bc.ca>

ACADEMIC CONDUCT POLICY

There is an Academic Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.

www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html