



School of Arts & Science
CHEMISTRY AND GEOSCIENCE DEPARTMENT

CHEM 060-02
Introduction to Chemistry
2007F

COURSE OUTLINE

The Approved Course Description is available on the web @ _____

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: | Graham Shorthill | | |
| (b) | Office Hours: | As posted on F342 | | |
| (c) | Location: | F342 | | |
| (d) | Phone: | 370 3441 | Alternative Phone: | |
| (e) | Email: | Shorthill@camosun.bc.ca | | |
| (f) | Website: | | | |

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 | There is a required text book and laboratory manual for this course prepared by members of the department and is available in the bookstore. In addition, the library has many introductory text books which students can borrow and use to gain a different view or approach to the material covered in this course. |
| (b) | Other | A laminated periodic table, a duotang binder and safety glasses. |

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.)

Course Outline

This course introduces a number of chemical concepts and their usefulness in understanding the world in which we live. Topics include atomic structure; elements and the periodic table; molecules and chemical bonding; physical changes; chemical formulas and reactions; stoichiometry; gases, liquids, solutions; organic and nuclear chemistry.

1 Measurement and Calculation:

SI units; unit conversions, scientific notation; significant figures
density, mass and volume; energy and specific heat; radiant energy

2 Introductory Terminology:

Scientific method, elements, compounds and mixtures; metals and non-metals composition of atoms; isotopes; atomic number and mass

3 Chemical Formulas and Names

Naming simple molecular compounds and ionic compounds
writing chemical formulas; polyatomic ions; naming acids

4 Calculations Based upon Formulas

Molecular mass, percentage composition, the mole; converting between grams, moles and molecules; Avogadro's Number

5 Stoichiometry

Balancing equations; problems based upon equations, limiting reagent, % yield. Exothermic and endothermic reactions.

6 Chemical bonding and periodic trends

Electronic structure of the elements, ionic and covalent bonds, ionization energy and electron affinity, chemical families

7 Gas laws

Boyle's law, Charles' law, Avogadro's hypothesis, gas stoichiometry, gram molecular volume, standard conditions.

8 Solutions

Preparation of solutions of known concentration. Dilutions, dissociation and ionic concentrations; pH

9 Organic chemistry

Hydrocarbons (alkanes, alkenes, alkynes and aromatic) shapes of molecules, addition and substitution reactions Naming organic compounds, functional groups.

10 Nuclear chemistry

Radioactivity (α and β/γ), production of isotopes, the fission and fusion reactions, chain reactions and nuclear power.

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

| | | | |
|-----|---|--------------------------|-----|
| (a) | Assignments | | |
| (b) | Quizzes | | |
| (c) | Exams | Quiz 1 (chapters 1,2,3) | 15% |
| | | Quiz 2 (chapters 4,5,6) | 15% |
| | | Quiz 3 (Chapters 7,8,9) | 15% |
| | | Comprehensive final | 35% |
| (d) | Other (eg, Attendance, Project, Group Work) | Laboratory | 20% |

6. Grading System

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

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 on the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED