



School of Arts & Science
CHEMISTRY AND GEOSCIENCE DEPARTMENT
CHEM 110-002
General College Chemistry 1
2008F

COURSE OUTLINE

The Approved Course Description is available on the web @ camosun.bc.ca

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:	Devin Mitchell		
(b)	Office Hours:	5:30-6:30 Mon – Thurs		
(c)	Location:	F336/ F356		
(d)	Phone:	370-3472	Alternative Phone:	
(e)	Email:	mitchelld@camosun.bc.ca		
(f)	Website:	www3.telus.net/devinmitchell/Chemistry110		

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. Identify, describe and account for the general characteristics of gases, liquids and solids - interionic and intermolecular forces; vaporization and condensation; melting and freezing; specific characteristics of water.
2. Utilize solution terminology, account for and compare the solubilities of ionic and molecular compounds, and describe the impact of temperature and pressure on solubility.
3. Describe the characteristics of solubility equilibria and use mathematical techniques employed in dealing with this phenomenon.
4. Describe and account for the colligative and osmotic properties of aqueous solutions.
5. Account for differences in the rates of chemical reactions, apply Le Chatelier's Principle to equilibrium processes, and explain how catalysts influence reaction rates.
6. Apply mathematics and equilibrium constant expressions to descriptions of reversible reactions and chemical equilibria.
7. Identify Arrhenius, Bronsted and Lewis acids and bases, and describe the chemical properties of each type of substance.
8. Describe the ionization of water, the pH scale, weak and strong acids and bases, neutralization and the actions of buffer solutions.
9. Perform mathematical calculations involving pH, hydronium ion concentrations and acid-base titrations.

10. Define oxidation and reduction and assign oxidation numbers to the elements of substances involved in oxidation-reduction reactions. Demonstrate the ability to use oxidation numbers in balancing redox reactions.
11. Demonstrate an understanding of electrochemistry and account for the characteristics and uses of the standard hydrogen electrode, standard reduction potentials, electrolytic and voltaic cells.
12. Describe the characteristics of the major types of organic compounds – alkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols, ethers, aldehydes and ketones, carboxylic acids and esters, amines and amides.

3. Required Materials

(a) Texts

- “Chemistry, Principles and Reactions”, by William Masterton and Cecile Hurley (Thomson-Brookes/Cole)
- Chemistry 110 Lab Manual, Fall 2008 (Safety glasses mandatory & lab coat recommended)

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.)

1. Review

- types of matter, measurements, properties of substances (**Chapter 1**)
- atoms, protons, neutrons, electrons, molecules and ions, ionic compounds, formulas, naming compounds (**Chapter 2**)
- atomic mass, mole concept, stoichiometry (**Chapter 3**)
- electronic structure of atoms (**Chapter 6**)
- covalent bonding, Lewis structures and molecular shapes (**Chapter 7**)

2. Thermochemistry (Chapter 8)

- Energy, temperature
- Specific heat, calculations
- Enthalpy and entropy changes
- Endothermic and exothermic processes
- Phase changes
- Calorimetry

3. Reaction Rates: (Chapter 11)

- Measuring rates of reactions, determining rate expressions
- Collision theory of reaction rates
- Reaction mechanisms, rate-determining step
- Activation energy, potential energy and ΔH
- Energy diagrams
- Factors affecting rate, effects of temperature, concentration, and catalysts on rates

4. Equilibrium: (Chapter 12)

- Reversibility of reactions
- Dynamic equilibrium, evaporation and condensation
- Factors affecting equilibrium, a balancing act
- Le Chatelier's principle (minimizing the effects)
- Equilibrium constant, K expressions
- Dependence of K on T
- Mathematical applications of K
- Equilibrium applications
- Solubility equilibrium, solubility and precipitation (**Chapter 16.1**)

-Qualitative analysis, K_{sp} expressions and calculations

5. Solutions (Chapter 10, 16)

- What is a solution?
- Hydrophilic and hydrophobic interactions, local attractions
- Solubility of ionic and covalent compounds
- Low solubility salts, precipitation reactions, solubility product constant
- Molarity, percent concentrations
- Dynamic equilibrium
- Factors affecting solubility
- Colligative properties of solutions

6. Acids and Bases: (Chapter 13, 14)

- Acid-base definitions, Arrhenius acids and bases, Bronsted acids and bases
- Conjugate acid-base pairs, neutralization reactions
- Strong and weak acids and bases, amphiprotic substances
- Vinegar and baking soda: a fizzy affair
- Antacids: from chalk to tums (or how do they spell relief?)
- K_w , autoprotolysis of water
- pH and pOH scales
- Acid dissociation (ionization) constant, K_a
- Base dissociation constant, K_b
- Salt hydrolysis, acids or bases? the pH of a salt solution
- Indicators, acid-base titrations, end point (it comes in color)
- Buffers (omit calculations involving buffer systems), blood buffers
- Lewis acids and bases

7. Oxidation and Reduction/ Electrochemistry: (Chapter 18. Omit sections 18.3, 18.4)

- Definition of oxidation and reduction
- Assigning oxidation numbers, balancing redox equations
- Half-reactions, couples, balancing with half-reactions
- Redox titrations
- Electrochemical cells, E° values
- Standard reduction potentials
- Electrolytic cells, electrolysis
- Fuel cells

COURSE CONTENT

The course includes:

- a) The scheduled lectures
- b) Weekly laboratory work (8 labs)
- c) Two 120-minute term tests.
- e) A three-hour written final examination at the end of the course on ALL the material in the course.

Notes

Term Test #1 will be on material covered in the first four weeks of the course and is scheduled for Oct. 8. Term Test #2 will be on the material covered since Test #1 and is scheduled for lecture period of Nov 5.

Laboratory Work

Experiments are performed on a weekly basis (apart from scheduled tutorials or tests). A report is required for each experiment. Scheduled laboratory experiments are three hours per week. The first hour will be dedicated towards one hour lecture or tutorial. The remaining two hours will be used to conduct hands-on experimental work. Each student will be expected to conduct their **own work** unless otherwise instructed. No student will be allowed to conduct experiments without safety glasses or wearing open toe footwear. If you miss a scheduled experiment, you will be assigned a mark of zero unless you have a medical reason accompanied with an official medical note for your absence.

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

The course mark will be derived in the following manner:

Laboratory (8 labs)	25%
Term Test I	20% (2h) (Oct 8)*
Term Test II	20% (2h) (Nov 5)*
Final (Comprehensive)	35% (3h in December)

* Test dates to be confirmed first week of classes

- 1) Student is encouraged to attempt both tests. If a Test score is not as high as that of the April final exam it will be dropped automatically and its weight redistributed to the final exam. You may choose not to write one or both tests and have each weight redistributed to the final exam. For the gambler who misses both tests, your final exam will then be 75% of the course grade.
- (2) Student must write each test as scheduled. No one is allowed to write late and there will be no make-up test. No exceptions.

6. Grading System

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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