CAMOSUN COLLEGE	***School of Arts & Science*** ***CHEMISTRY AND GEOSCIENCE DEPARTMENT*** **CHEM 110-002** **General College Chemistry 1** **2006F**

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:	Dr. Nasr Khalifa		
(b)	Office Hours:	M, T, W, R 9:30-10:30 am, M 1:30-2:30, F 10:30-11:30		
(c)	Location:	F348C		
(d)	Phone:	370-3201	Alternative Phone:	
(e)	Email:	khalifa@camosun.bc.ca		
(f)	Website:	http://www.camosun.ca/schools/artsci/chemgeo/nasr.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. 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" 5th Edition, by William Masterton and Cecile Hurley (Thomson-Brookes/Cole)
(b)	Other	Chemistry 110 Lab Manual (in-house) *****Both texts are REQUIRED*****

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.)

Chem. 110 Lab Schedule (Fall 2006)
(Subject to Change)

September 4:	**Labor Day. College closed**
September 11:	Introduction, Safety Video
September 18:	Experiment #1, Energy changes
September 25:	**Test #1 (2.5hrs)**
October 2:	Experiment #2, Reaction rates
October 9:	**Thanksgiving Day. College closed**
October 16:	Experiment #3, Shifting equilibria
October 23:	**Test #2 (2.5hrs)**
October 30:	Experiment #4, Precipitation reactions
November 6:	Experiment #5, Qualitative analysis
November 13:	**Remembrance Day Observed. College closed**
November 20:	**Test #3 (2.5hrs)**
November 27:	Experiment #6, Acid-base titrations
December 4:	No lab. Review/Lecture

Grades:

A+ = 95-100%	B- = 70- 74
A = 90- 94	C+ = 65- 69
A- = 85- 89	C = 60- 64
B+ = 80- 84	D = 50- 59
B = 75- 79	F = < 50

Lab experiments	**30%**
Test 1 Monday, September 25 (2.5 hrs)	**10%**
Test 2 Monday, October 23 (2.5 hrs)	**10%**
Test 3 Monday, November 20 (2.5 hrs)	**10%**
Final Examination (Dec., 3 hrs)	**40%**

	100%

*Final exam at the end of the course will cover **all** course material
*At least a passing grade on lab marks must be achieved in order to write the final exam.
*You must pass both the lecture portion and the lab portion in order to pass the course.
*You must provide your own **safety glasses**. Prescription glasses are OK, but sunglasses

are NOT. You must wear these safety glasses at all times while you are in the lab. You will not be allowed to carry out any experiments without safety glasses.

*Office hours are posted on the door. You can, however, drop by the office any time. You will not be wasting my time if you come for help. I'm here to help you learn.

Detailed Course Outline:

1. Chemical bonding/Review (Chapter 7)

-Why bond?
-Electron dot formulas, Lewis dot structures
-Ionic bonds: opposites attract
-Names of simple ionic compounds
-Covalent bonds: a union made by sharing of electrons
-Equal and unequal sharing of electrons, polar covalent bonds
-Octet rule, exceptions to the octet rule
-Names for covalent compounds
-Electronegativity, competition for electrons
-Molecular shapes, important figures

2. Thermochemistry (Chapter 8. Omit sections 8.6, 8.7)

-Energy, temperature
-Specific heat, calculations
-Enthalpy and entropy changes (how about that chaos)
-Endothermic and exothermic processes
-Phase changes (and cool concerts)
-Calorimetry

3. Gases, liquids, and solids (Chapters 5, 9. Omit sections 5.6, 5.7, calculations involving Calusius-Clapeyron equation, section on phase diagrams, section 9.5)

-What is a gas?, definition of gas pressure
-Boyle's law, Charles's law, and the ideal gas law
-Henry's law, heavenly sodas
-Daltons law of partial pressures, each gas counts
-Respiration, by gas diffusion
-Ionic forces (opposites attract)
-Intermolecular forces (dispersion and dipole-dipole)
-Hydrogen bonding, a special type of bond
-Liquids: viscosity and surface tension (how do you think these tall trees grow?)
-Phase changes, liquids to gases; how do they do that?
-Evaporation, vapor pressure, dynamic equilibrium, boiling points
-The solid state: amorphous and crystalline
-Types of crystalline solids, how about those diamonds?
-Melting of solids, energy wanted
-Water: a most special liquid

4. Solutions (Chapter 10. Omit calculations involving Fpt. lowering and Bpt. elevation)

-What is a solution?
-Hydrophilic and hydrophilic interactions, local attractions
-Solubility of ionic and covalent compounds, stir that sugar!
-Low solubility salts, a precipitate is born, solubility product constant
-Molarity, percent concentrations, ratio concentrations
-Dynamic equilibrium
-Solubility and temperature, divers bends and soft drink delights
-Colligative properties of solutions, osmosis, dialysis

5. Reaction Rates: (Chapter 11. Omit sections 11.3, 11.5,)

-Measuring rates of reactions, determining rate expressions
-Collision theory, how fast can these molecules hit?
-Reaction mechanisms, rate-determining step
-Activation energy, potential energy and ΔH
-Energy diagrams
-Factors affecting rate, effects of temperature, concentration, and catalysts on rates

6. Equilibrium: (Chapter 12. Omit the section on reaction Quotient)
-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

7. 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 calulations involving buffer systems), regulate that pH, blood buffers
-Lewis acids and bases (yes it is the same Lewis)

8. Oxidation and Reduction/ Electrochemistry: (Chapter 18. Omit sections 18.3, 18.4)
-Definition of oxidation and reduction, ole!!
-Assigning oxidation numbers, balancing redox equations
-Half-reactions, couples, balancing with half-reactions
-Redox titrations
-Electrochemical cells, E^o values
-Standard reduction potentials
-Electrolytic cells, electrolysis
-Fuel cells

9. Hydrocarbons (Chapter 22. Omit section 22.6)
-Why carbon?
-Alkanes, straight and branched
-Isomers, same formula but different build
-Cycloalkanes, join the ends, the story of a chair and a boat
-Unsaturated hydrocarbons, look for multiple bonds
-Geometric isomers, either on the same side or on opposite sides
-Aromatic compounds, pleasant? may be!!
-What do you use them for anyway?

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

(a)	Assignments	**Lab experiments**	**30%**
(b)	Quizzes		
(c)	Exams	**Test 1 Monday, September 25 (2.5 hrs)** **Test 2 Monday, October 23 (2.5 hrs)** **Test 3 Monday, November 20 (2.5 hrs)** **Final Examination (Dec., 3 hrs)**	**10%** **10%** **10%** **40%** **--------** **100%**
(d)	Other (eg, Attendance, Project, Group Work)		

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
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	*Incomplete*: 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	*In progress*: 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	*Compulsory Withdrawal:* 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

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.

Organization Of The Lab Report

Title of the experiment: State the title of the experiment you have just carried out.

Date: Write the date on which you did the experiment.

Name: Your name and lab partner's name (if applicable)

Objective: State what you want to achieve by doing the experiment in one or two sentences. Be very brief and to the point.

Procedures: You can write the following: Please refer to Chem. 110 lab manual, 2006 Edition pp. xx-xx. Record any changes to the given procedures.

Data: Organize any data, whether numerical or descriptive, in a **neat table** (or tables if applicable). Report such things as **unknown numbers**, **concentrations** of solutions, **masses** of reactants and products. Any relevant data recorded on a rough data sheet should be copied here.
Do not forget to write **chemical equations** here.

Discussion and Calculations: In this part of the report, you will make sense out of the data you have obtained. If you obtain a product, calculate the **percentage yield**. Provide a physical description of your product. Show **all** the calculations you do, but there is no need to be repetitive. For example, if you perform 3 or 4 titrations using the same two solutions, then you only need to show the calculation for one trial. In cases where you have not obtained the results you were hoping for, provide a very brief explanation.

Conclusion: In no more than two sentences, state what you have achieved by doing the experiment.

Answers To Questions: In cases where questions are asked during or at end of experimental procedures, provide the answers here.

* Lab reports should be written in **ink, including all calculations**. The report does not have to be typed. If you are not using a computer to graph data, use graph paper. If your report does not follow the format given above, it may be deemed unacceptable and you may have to resubmit it. The new report will be considered late if it is not submitted on the same due date (see below).
* Lab reports are normally due one week after the assigned date for the experiment. You will be informed in advance if there are any changes to the due date.
* The report is marked out of 10. For every day the report is late, you lose 1 (one) mark.
* Make sure to **staple** the pages of your report together, including any **rough data sheets**. You lose 1 (one) mark if the pages of your report are not stapled together.