CAMOSUN COLLEGE
DEPARTMENT OF CHEMISTRY AND GEOSCIENCE
Chemistry 120-04, College Chemistry I
Course Outline Fall 2004

A. Instructor Information

Instructor: Neil J. Meanwell

Office - Fisher 348B. Telephone: 370-3448

E-mail: meanwen@camosun.bc.ca or meanwell@islandnet.com

Office Hours: Monday and Wednesday, 11.30 am to 1.30 pm; Thursday and Friday, 12.30 pm to 1:30 pm.

B. Required Materials for the Course

Principal Text: ACHEMISTRY, The Central Science @ by Brown, Lemay, and Bursten 9 th Edition. Prentice Hall

Lab Experiments: Chemistry 120 Laboratory Manual (In-house)

C. Summary ocf Lecture Material with Chapter References

TOPIC	Chapter(s)
1. Introduction and Review (6 Lectures)	
Classification of matter, units of measurement, significant figures, atoms, protons, neutrons, electrons, isotopes, atomic masses. Compounds, stoichiometry, formulas, nomenclature formula weights, molecular weights, percent composition by mass, the mole, molar mass, chemical equations, reaction stoichiometry, limiting reagent, percent yield, solution concentration and reaction stoichiometry.	Parts of 1, 2, 3 and 4
2. Gases (3 Lectures)	
Nature of gases, states of matter, molecular nature of a gas, pressure. Gas laws, ideal gas law, reaction stoichiometry, gas density, gas mixtures. Molecular motion, diffusion, effusion, kinetic model of gases, molecular speeds. Real gases, limitations of ideal gas law, Joule-Thomson effect..	10
3. Electronic Structure of Atoms and the Periodic	

Properties of the Elements (9 Lectures)

Light, quanta and photons, atomic spectra and energy levels, wave properties of electrons. Atomic orbitals, quantum numbers, electron spin, electronic structure of the hydrogen atom. Many-electron atoms, electron configurations of atoms and ions, relationship to the periodic table. Periodicity of atomic properties, atomic and ionic radius, ionisation energy, inert pair effect, electron affinity. Chemistry and the periodic table, s-block, p-block, and d-block. 6 and 7

4. Chemical Bonding (9 Lectures)

Ionic bonds, Lewis symbols, lattice enthalpies, properties of ionic compounds. Covalent bonds, atoms to molecules, octet rule and Lewis structures. Polyatomic species, Lewis structures, resonance and formal charge. Exceptions to the octet rule. Ionic versus covalent bonds, correcting the ionic and covalent models. Molecules: shape, size, and bond strength. Shapes of molecules and ions, VSEPR theory. Charge distribution in molecules, polar bonds and polar molecules. Bond strengths and bond lengths. Orbitals and bonding. 8 and 9

5. Intermolecular Forces, Liquids and Solids (6 Lectures)

Comparison of liquids and solids, intermolecular forces, ion-dipole, dipole-dipole, London dispersion forces, hydrogen bonding. Properties of liquids, phase changes, heating curves, critical temperature and pressure, vapour pressure, boiling point. Phase diagrams, structures of solids. 11

6. Solutions (3 Lectures)

Solution process, solubility, factors affecting solubility, Henry=s law, colligative properties. 13

7. Chemistry of the Environment (3 Lectures)

Structure of Earth=s atmosphere, ozone layer and its depletion, tropospheric pollution, greenhouse effect and photochemical smog. Oceans and freshwater.

D. Course Content and Schedule

The course includes:

a) The scheduled lectures, Monday, Thursday, and Friday, 10.30 to 11.20 am.
b) Weekly laboratory work, 8.30 to 11.20 am in F 356.
c) Biweekly problem sets[1]
d) Review test.[2]
e) Two 50-minute written term tests.[3]
f) A 2-hour written midterm test.[4]
g) A three-hour written final examination at the end of the course on all the material in the course.

Notes

1. These are set from the questions found after each chapter. These problem sets will not be marked but solutions will be posted outside my office at regular intervals during the term.

2. The review test (**week four**) will be on material covered in the first three weeks of the course. It will take place during the lab period of **week #4**.

3. Tentatively scheduled for **weeks seven** and **thirteen** of the term. The first test will cover material studied from **week four** up to **week seven**, and the second test will cover material studied from **week nine** to **week twelve**.

4. The midterm test will be given in **week ten**. It will cover all the material in the course covered during the first nine weeks. It will take place during the lab period of **week ten**.

E. Basis of Student Assessment (Weighting)

The course mark will be derived in the following manner:

Review test	10 %
2 Term tests (@ 7.5 %)	15 %
Midterm	20 %
Final	30 %
Laboratory work	25 %

If it is advantageous to the student the theory mark will be solely derived from the final examination.

F. The Laboratory Mark

Detailed information will be presented at the first laboratory meeting.

G. The Grading System

The following scale is used:

>95 A+	80-84 B+	65-69 C+	50-59 D	0-49 F
90-94 A	75-79 B	60-64 C		
85-89 A-	70-74 B-			

Notes

1. You must score a minimum of 50 % on laboratory work to be permitted to take the final exam and submit a minimum of 75 % of lab work for marking.

2. You must pass both the lecture portion and the laboratory portion in order to pass the course.

H. Intended Learning Outcomes

(If any changes are made to this part, changes must also be made on the Course Outline)

At the end of the course the student will be able to:

1. Utilize nomenclature rules to name ionic and covalent compounds
2. Demonstrate an understanding of stoichiometry by balancing chemical equations and performing mathematical calculations involving chemical reactions.
3. Describe the electronic structure of any atom in the periodic table and apply it to explain many of the physical and chemical properties of the elements.
4. Utilize simple bonding theories to explain why elements combine to form the compounds they do and also to explain many of the properties of compounds.
5. Apply knowledge of intermolecular interactions to rationalize many important physical properties of bulk matter in the gas, liquid and solid phases.
6. Use standard chemistry lab equipment, including burets, pipets, Buchner filters, and volumetric glassware in the correct manner.
7. Perform many standard laboratory procedures, such as titrations, preparation of standard solutions, the preparation, isolation, and purification of compounds, as well as use spectrophotometers to make analytical measurements.

I. 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/2-8