

CAMOSUN COLLEGE
DEPARTMENT OF CHEMISTRY AND GEOSCIENCE
Chemistry 120-01, College Chemistry I
Course Outline Fall 2009

A. General Information

Instructor: John Lee

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Lectures: Thurs (F 310), 6.30 pm – 9.20 pm

Lab: Tues (F 356): 6.30 pm – 9.20 pm

Office Hours: Tuesday 5.45 - 6.30 pm (F356)

Important Dates: October 12th: Thanksgiving Day (College closed). Remembrance Day (College closed). November 11th: Last day to withdraw without a failing grade. November 12th:

B. Required Materials for the Course

Principal Text: CHEMISTRY, The Central Science: a Broad Perspective, by Brown, Lemay, Bursten, Langford, Sagatys, and Duffy. Prentice Hall. Australian edition

Lab Experiments: Chemistry 120 Laboratory Manual, Fall 2007 Edn (In-house)

C. Summary of Lecture Material with Chapter References

Subject	Material Covered	Lecture Hours (approximate)	Textbook chapters
Intro and Review	Classification of matter, units of measurement, significant figures, atoms, protons, neutrons, electrons, isotopes, atomic masses. Compounds, stoichiometry, formula weights, molecular weights, percent composition by mass, the mole, molar mass, chemical equations, reaction stoichiometry, limiting reagents, percent yield, solution concentration and solution reaction stoichiometry	3	1,2 and 3
Gases	Nature of gases, atmospheric pressure. Gas laws, ideal gas law, gas reaction stoichiometry, gas density, Daltons Law of partial pressures, kinetic molecular theory, molecular speeds. Real gases, limitations of ideal gas law	5	9
Electronic Structure of Atoms	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,	6	5
Periodic Properties	Development of the periodic table, effective nuclear charge, atomic and ionic radius, ionisation energy, electron affinity.	3	6
Chemical Bonding	Ionic bonds, Lewis symbols, lattice energy, properties of ionic compounds. Covalent bonds, octet rule and Lewis structures. Polyatomic species, resonance and formal charge. Exceptions to the octet rule. Electronegativity and bond polarity. Bond enthalpies	5	7
Molecular Geometry	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, hybridization and bonding. Molecular Orbitals (hydrogen atom) and Metallic Bonding	5	8

Intermolecular Forces, Liquids and Solids	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.	6	10
Properties of Solutions	Solution process, solubility, factors affecting solubility, Henry's law, colligative properties.	3	11
Chemistry of the Environment	Structure of Earth's atmosphere, ozone layer and its depletion, tropospheric pollution, greenhouse effect and photochemical smog. Oceans and freshwater.	6	18

D. Course Content and Schedule

The course includes:

- a) 6 in class review quizzes, each 10 multiple choice questions
- b) One 90-minute written midterm test
- c) A 3 hour written final examination at the end of the course on all the material in the course.

Notes

1. There are recommended questions found after each chapter. These problem sets will not be marked but solutions to the red questions may be found at the end of the textbook. Answers to any of the questions in black may be given on request
2. The midterm test will be on material covered in the half of the course. It will take place during the lab period of week
3. The in class quizzes will be on material covered in the previous 2 weeks. They will be given at the start of class, answers will be given after the quiz.
4. At least 2 of the 14 evenings designated for Lab classes may be used for additional lectures or reviews. Sufficient notice will be given

E. Basis of Student Assessment (Weighting)

The course mark will be derived in the following manner:

6 Quizzes	(2% each) = 12 %
1 Midterm test	18 %
Final	37 %
Laboratory work	33 %

If it is advantageous to the student the theory mark will be solely derived from the final examination, or the combination of midterm and final.

In the event of a quiz or midterm test being missed due to illness/other commitments the weight of the missed quiz/test will be carried over to the final. There are no make-up dates for quizzes or midterm.

F. The Laboratory Mark

Detailed information will be presented at the first laboratory meeting.

G. The Grading System

The following scale is used:

>90 A+	77-79 B+	65-69 C+	50-59 D	0-49 F
85-89 A	73-76 B	60-64 C		
80-84 A-	70-72 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

(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 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.

John Lee Fall 2009 Lab Schedule:

Note: Everybody will do Expt. 2 in Week II. Half of the class (14-16 students) will do Expt. 3 in Week III and the other half of the class will do Expt. 3 in Week IV.

Chem 120 (1) – Tuesdays, 6:30-9:20 pm in Fisher 356

Week Number Begins on	Activity & Experiment Number	Actual Date of Lab Tuesdays
I Sept 7 th (Mon), Labour Day	Review & Lab Orientation— attendance mandatory	Sept 8 th
II Sept 14 th	Expt. 2 Densities of Solids & Liquids (sign up for Expt. 3—Group A or B)	Sept 15 th
III Sept 21 st	Group A Expt. 3 Stoichiometry of Chem. Rxns	Sept 22 nd
IV Sept 28 th	Group B Expt. 3 Stoichiometry of Chem. Rxns	Sept 29 nd
V Oct 5 th	Expt. 4 The Spectroscopic Determination of Nickel in Aqueous Solution	Oct 6 th
VI Oct 12 th (Mon), Thanksgiving	Lecture and quiz	Oct 13 th
VII Oct 19 th	Expt. 5 Colorimetric Determination of Iron in a Vitamin Tablet	Oct 20 th
VIII Oct 26 th	Expt. 6 Determination of Copper Using Atomic Absorption Spectroscopy	Oct 27 th
IX Nov 2 nd	Expt. 7 Determination of the Total Hardness of Water Using E.D.T.A.	Nov 3 th
X Nov 9 th Nov 11 th (Wed), Remembrance Day	Test	Nov 10 th
XI Nov 16 th	Expt. 9 The Preparation of Potassium Tris(oxalato)Ferrate(III)	Nov 17 th

XII Nov 23rd	Expt. 10 Analysis & Uses of Potassium Tris(oxalato)Ferrate(III)	Nov 24th
XIII Nov 30th	lecture	Dec 1st
XIV Dec 7th	Exam Info & Review	Dec 8th
Final Exam Period	Final Exams Dec 14th to Dec 19th, and Dec 21st	

Note: This is only a preliminary lab schedule, changes will be made due to equipment &/or glassware problems, or rescheduling of tests... Lab coat and eye protection are both mandatory!!

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