



**School of Arts & Science**  
**CHEMISTRY AND GEOSCIENCE DEPARTMENT**

**CHEM 120-03**  
**College Chemistry 1**  
**Semester/Year, eg, 2006F or 2006Q1**

## 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:	See the posted times on the office door		
(c)	Location:	Fisher 342C		
(d)	Phone:	370-3441	Alternative Phone:	
(e)	Email:	Shorthg@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 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.

### 3. Required Materials

(a)	Texts	<b>Brown, Lemay and Bursten</b>
		Chemistry: The Central Science. tenth edition
		Chemistry 120 laboratory manual Study guide for the text.
(b)	Other	Duotang binder for lab reports

These items are available from the bookstore. Students must have their own set of safety glasses in order to work in the laboratory. People who normally wear glasses do not have to purchase another pair.

#### 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.)

#### Sequence of Topics

Topics:	Chapters
Review	1,2,3, &4
Gases	10
<b>Atomic structure and the periodic table</b>	<b>6&amp;7</b>
Chemical bonding and molecular geometry	8&9
Intermolecular forces of attraction	11
Solutions	13
Introduction to environmental chemistry	18

**Lectures:** These will follow the sequence given above. The examinations will be held in the laboratory periods of weeks five and ten.

***Out of class work will be assigned each week and the answers to problems will be posted. Before each examination, students will receive a copy of a past examination covering the same topics to help the revision and to guide the classroom review of the material covered. Answers will be given to the numerical parts of the paper but each student is responsible for preparing and checking the descriptive parts of the paper.***

## Course content

**Review: For chapters 1 to 4, the topics below will be covered in class. In addition students are responsible for the reviewing the remainder of the these chapters independently; they contain material covered in Chemistry 11 and 12 or Camosun's Chem 060 and 080 /110**

### **Chapter 1**

- 1-1 Why do we study chemistry?**
- 1-2 Classification of matter**
- 1-4 Units of measurement**

### **Chapter 2**

- 2-1 The atomic theory of matter**
- 2-2 Atomic structure**
- 2-3 Isotopes, atomic numbers and mass numbers**
- 2-4 The periodic table**
- 2-5 Molecules and molecular compounds**
- 2-6 Ions and ionic compounds**

### **Chapter 3**

- 3-2 Patterns of chemical reactivity**
- 3-4 The mole**
- 3-5 Empirical formulas and combustion analysis**
- 3-7 Limiting reagents**

### **Chapter 4**

- 4-4 Chemical reactions**
- 4-5 Concentrations of solutions**
- 4- 6 Solution stoichiometry**

Gases

### **Chapter 10**

- 10-1 Characteristics of gases**
- 10-2 Pressure**
- 10-3 The gas laws**
- 10-4 The ideal gas equation**
- 10-5 Application of the ideal gas equation**
- 10-6 Gas mixtures and partial pressures**
- 10-7 Kinetic theory of gases**
- 10-8 Effusion and diffusion**

Atomic structure:

### **Chapter 6**

- 6-1 The wave nature of light**
- 6-2 Quantized energy and photons**
- 6-3 Bohr's model of the atom**
- 6-4 The wave behavior of matter**
- 6-5 Quantum mechanics and atomic orbitals**
- 6-6 Orbital shapes**
- 6-7 The many-electron atom**
- 6-8 Electronic configurations**
- 6-9 The periodic table**

Periodic properties:

### **Chapter 7**

- 7-2 Atomic sizes**
- 7-3 Ionization energy**
- 7-4 Electron affinities**
- 7-5 Metals, non-metals and metalloids**
- 7-6 Group trends for groups 1 and 2**
- 7-7 Group trends for non metal groups**

Bonding:

### **Chapter 8**

- 8-1 Chemical bonds, symbols and the octet rule**
- 8-2 Ionic bonding**
- 8-3 Sizes of the ions**
- 8-4 Covalent bonding**
- 8-5 Bond polarity and electronegativity**
- 8-6 Drawing Lewis structures**
- 8-7 Resonance structures**
- 8-8 Exceptions to the octet rule**

### **Chapter 9**

- 9-1 Molecular shapes**
- 9-2 The V.S.E.P.R. model**
- 9-3 Polarity of polyatomic molecules**
- 9-4 covalent bonding and orbital overlap**
- 9-5 Hybrid orbitals**
- 9-6 Multiple bonds**

## Intermolecular forces

### Chapter 11

11-2 Intermolecular forces of attraction

11-1 A molecular comparison between liquids and solids

10-9 Real gases and deviations from ideal behavior

11-3 Properties of liquids

11-4 Phase changes

11-5 Vapour pressure

11-6 Phase diagrams

11-8 Bonding in solids

Solutions:

### Chapter 13

13-1 The solution process

13-2 Solubility

13-3 Changes in solubility

13-4 Different ways of expressing concentration

13-5 Colligative properties

The Environment:

### Chapter 18

18-1 The earth's atmosphere

18-2 Sunlight and photochemistry

18-3 The ozone layer

18-4 Chemistry of the troposphere

18-5 The oceans

18-6 Fresh water

## 5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

The final grade in the course will be based on the following components

(a)	Assignments		
(b)	Quizzes	Quiz 1	Chapters 1-4 & 10
		Quiz 2	Chapters 6-9
(c)	Exams	Comprehensive final	40%
(d)	Other (eg. Attendance, Project, Group Work)	Laboratory	25%

## 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

**Note:** This table is given only as a guide and the exact equivalency will be determined by the instructor when all the marks are available. In cases where there is a major difference between the mark on the final examination and the composite total, the instructor reserves the right to adjust the final grade to reflect this difference. The passing grade is C and to pass the course, students must obtain passing grades in both the lecture and laboratory portions of it.

### 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](http://camosun.ca) or 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 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	<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.

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](http://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](http://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.