

COURSE OUTLINE
Grading Systems

CAMOSUN COLLEGE
School of Arts & Science
Department

COURSE OUTLINE

CHEM 110

Foundations of General Chemistry

This course is a prerequisite for students planning to study chemistry at higher levels. Topics include: Thermochemistry; reaction rates; chemical equilibria; solubility; acids, bases and salts; oxidation, reduction and electrochemistry.

(4 Credits)

F, W, P (4,2,0,0,)

Prerequisite: Chemistry 060 or Chemistry 11

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

1. Instructor Information

- (a) Instructor: Howard J. Duncan, PhD.
- (b) Office hours: See Timetable on Office Door
- (c) Location: F308B
- (d) Phone: 250-370-3445
- (e) E-mail: duncanh@camosun.bc.ca

2. Intended Learning Outcomes

At the end of this course students will possess an enhanced ability 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.

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5. Account for differences in the rates of chemical reactions, apply Le Chatelier's Principle to equilibrium processes, and explain how catalysts influence the rates of chemical reactions.
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 characteristics of each type of substance.
8. Describe the ionization of water, the pH scale, weak and strong acids and bases, neutralization, the characteristics of conjugate acid-base pairs, 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 cells 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) Chem 110 Lab Manual
- (b) Safety Glasses

Course Content

Gases, Liquids and Solids: General Characteristics of Gases, Liquids and Solids; Interionic and Intermolecular Forces; The Liquid State; Vaporization and Condensation; The Solid State; Melting and Freezing; Heating and Cooling Curves; Water – A Most Unusual Substance.

Solutions: What is a Solution? Solubility Terminology; Solubility of Ionic Compounds; Solubility of Covalent Compounds; Solubility Equilibria; Effects of Temperature and Pressure on Solubility; Solution Concentration; Colligative Properties of Solutions; Colloids; Osmosis and Dialysis.

Reaction Rates and Chemical Equilibrium: Reaction Rates and Collision Theory; Factors Influencing Reaction Rates; Reversible Reactions and Equilibria; Le Chatelier's Principle; Ammonia Synthesis; Catalysts and Reaction Rates; Equilibrium Constant Expressions.

Acids and Bases: The Arrhenius Theory of Acids and Bases; Strong and Weak Acids; Strong and Weak Bases; Acid-Base Neutralization Reactions; Bronsted-Lowry Acids and Bases;

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Conjugate Acid-Base Pairs; Ionization of Water; The pH Scale; Properties of Salts; Buffers – Controlling the pH of Solutions; Acid-Base Titrations; Lewis Acids and Bases.

Oxidation, Reduction and Electrochemistry: Oxidation Numbers; Oxidation and the Properties of Oxygen; Reduction and the Properties of Hydrogen; Oxidizing Agents – Hydrogen Peroxide, Antiseptics and Disinfectants; Reducing Agents; Oxidation and Reduction Half-Reactions; The Hydrogen Electrode and Standard Reduction Potentials; Electrolytic Cells; Voltaic Cells; Corrosion.

5. Basis of Student Assessment

- (a) Lab Reports (10%)
- (b) Midterm Quizzes (15% and 25%)
- (c) Final Exam (50%)

6. Grading System

A+ = 95 - 100%	B = 75 - 79%	D = 50 - 59%
A = 90 - 94%	B- = 70 - 74%	F = 0.0 - 49%
A- = 85 - 89%	C+ = 65 - 69%	
B+ = 80 - 84%	C = 60 - 64%	

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/2-5.html