CAMOSUN COLLEGE
School of Arts & Science
Department

CHEM 060

Introduction to Chemistry

This course introduces chemical concepts for understanding life and the environment. Topics include: energy, matter and measurement; elements, atoms and the periodic table; atomic structure; names, formulas and inorganic compounds; periodic properties of elements; chemical bonds; chemical quantities; chemical reactions; stoichiometry; gases; nuclear chemistry. Non-science students may also find this course of interest.

(4 credits)
F, W, P (4,2,0,0,)
Prerequisite: Math 10 or Assessment

Teacher:

Dr. Tark Hamilton

Office hours: See Office Door, T-Th 2:30-5:30 or by appointment

Location: F344A

Phone: 250-370-3331

E-mail: Hamilta@camosun.bc.ca

Required Materials:

Textbook: Fundamentals of Chemistry (Ralph Burns)

Chemistry 060 Lab Manual

Safety Glasses

Class Tue & Thurs: F300 6:30-9:20

Course Outline:

Introduction to Energy and Matter: Elements and Compounds; Pure Substances and Mixtures; Physical Properties and Chemical Changes; Energy and Chemical Change.

Measurements: Metric and SI Units; Length and Volume Measurements; Uncertainty in Measurement; Significant Figures; Scientific Notation; Density and Specific Gravity; Measurement of Temperature; Temperature and Heat Energy.

Elements, Atoms and the Periodic Table: Names and Symbols; Abundant and Rare Elements; The Periodic Table of the Elements; Physical Properties of Elements; Atoms; Democritus to Dalton; Dalton's Atomic Theory; Atoms and Subatomic Particles; Isotopes; Atomic Masses of the Elements; Moles; Molar Masses and Chemical Formulas.

Atomic Structure – Atoms and Ions: Discovery of Atomic Structure; The Electromagnetic Spectrum; Excited Electrons and Spectra; Electrons in Atoms; The Quantum Mechanical Model of the Atom; Energy Levels of Electrons; Valence Electrons and Lewis Symbols; Energy Sublevels and Orbitals; Energy Sublevels and the Periodic Table; Electronic Configurations.

Names, Formulas and Inorganic Compounds: Monatomic and Polyatomic Ions; Names and Formulas of Ionic Compounds; Names and Formulas of Binary Nonmetal Compounds; Nonmetals; Oxidation Numbers of Atoms in Polyatomic Compounds; Nomenclature of Acids and Salts; Hydrates; Chemicals and Their Uses.

Periodic Properties of Elements: Discovery of Periodicity; The Periodic Table; Atomic and Ionic Size; Ionization Energy; Melting Point and Boiling Point Trends; Density and Conductivity Trends; A Survey of Elements; Transition Metals.

Chemical Bonds: Ionic Bonds; Covalent Bonds; Electronegativity; Polar Covalent Bonds; Metallic Bonding; Conductivity, Solubility and Chemical Bonding; Lewis Electron-Dot Formulas; Water – A Bent Molecule; Ammonia – A Trigonal Pyramidal Molecule; Ammonium Ions and Coordinate Covalent Bonds; Methane – A Tetrahedral Molecule; Molecular Structures and the Periodic Table; Hydrogen Bonding.

Chemical Quantities: Formula Weights and Molecular Weights; Moles and Molar Masses; Avogadro's Number; Composition Calculations; Mass and

Mole Conversions; Calculations Involving Avogadro's Number; Molarity; Empirical Formulas and Molecular Formulas.

Chemical Reactions: Chemical Reactions and Chemical Equations; Balanced Chemical Equations; Writing and Balancing Chemical Equations; Classifying Reactions; Combustion; Synthesis Reactions; Decomposition Reactions; Reactions of Metals and Nonmetals; Double-Replacement Reactions; Ionic and Net Ionic Equations; Neutralization.

Stoichiometry – Calculations Based on Chemical Equations: Mole Ratios from Chemical Equations; Mole Calculations; Calculations Involving Moles and Masses; Calculations Involving Molar Solutions; Limiting Reagent Calculations; Percent Yield; Energy Changes during Chemical Reactions.

Gases: The Atmosphere; Kinetic Theory of Gases; Gas Pressure Units and Atmospheric Pressure; Boyle's Law – Gas Pressure and Volume; Charles' Law – Gas Volume and Temperature; Gay-Lussac's Law – Gas Pressure and Temperature; Standard Temperature and Pressure; The Combined Gas Law; Avogadro's Law – Gas Volume and Moles; Molar Volume and Gas Density; The Ideal Gas Law; Dalton's Law of Partial Pressures; Gas Stoichiometry.

Fundamentals of Nuclear Chemistry: Natural Radioactivity; Half-Life; Measuring Radioactivity; Practical Uses of Some Radioisotopes; Nuclear fission – Splitting Atoms; Nuclear Fusion.

Student Assessment:

Lab Reports ( )

Midterm Exams ( )

Final Exam ( )

Grading System:

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