

**CAMOSUN COLLEGE**  
**School of Arts & Science**  
**Department**

**COURSE OUTLINE**

**CHEM 112**

**Introduction to Organic Chemistry**

This course, in combination with Chem 110, constitutes a first year university transfer package for students not planning to take advanced chemistry courses at the second year level. Topics include hydrocarbons; alkyl halides; alcohols; ethers; thiols; amines; aldehydes; ketones; carboxylic acids; esters and amides; carbohydrates; lipids; amino acids and proteins; nucleic acids;

(4 credits)

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Prerequisite: Chem 110 or Chem 12

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

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**1. Instructor Information**

- (a) Howard J. Duncan
- (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 the major differences between organic and inorganic compounds.
2. Use the organic chemistry nomenclature system as it applies to the major organic compounds.
3. Correctly recognize and draw the structural formulas of the major organic compounds.
4. Identify the molecular isomers, physical characteristics and chemical properties of hydrocarbons - alkanes, alkenes, alkynes and aromatic compounds.
5. Identify the molecular isomers, physical characteristics and chemical properties of alcohols, phenols, ethers and thiols.
6. Describe the structural, physical and chemical characteristics of aldehydes, ketones, carboxylic acids, esters, acid chlorides and anhydrides, amines and amides.
7. Construct structural formulas for selected simple sugars and describe the structural, physical and chemical characteristics of monosaccharides, disaccharides, starch, glycogen, cellulose and mucopolysaccharides.

8. Summarize the biological functions of lipids, and identify and account for the physical and chemical properties of fatty acids, glycerol, triacylglycerols, phospholipids, cholesterol, steroid hormones and bile salts.
9. Identify the structural characteristics of amino acids, and describe the formation and properties of the peptide bond.
10. Describe the relationship between the primary, secondary and tertiary structures of fibrous and globular proteins.
11. Compare the biological functions, chemical structures and characteristics of myoglobin and hemoglobin.
12. Recognize the chemical structures of purines and pyrimidines, and describe their functions as chemical constituents of nucleotides, RNA and DNA.
13. Describe the biological roles and structures of RNA and DNA, and account for the physical and chemical characteristics of polynucleotides.

### 3. Required Materials

- (1) Textbook: Chemistry 112 (A selection of chapters from Fundamentals of General, Organic & Biological Chemistry: McMurry/Castellion, available in the Lansdowne Campus bookstore at the cost of printing)
- (2) Chemistry 112 Lab Manual
- (3) Safety Glasses

### 4. Course Content

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INTRODUCTION TO ORGANIC CHEMISTRY: Functional Groups, Hydrocarbons, Alkanes, Nomenclature, Properties and Reactions, Structural Isomers, Cycloalkanes, Alkyl Halides.

ALKENES, ALKYNES AND AROMATIC COMPOUNDS: Structures, Isomers and Nomenclature of Alkenes, Physical Properties and Reactions, Aromatic Hydrocarbons.

ORGANIC COMPOUNDS CONTAINING OXYGEN, SULFUR OR HALOGENS: Alcohols, Phenols, Nomenclature, Properties and Reactions, Ethers, Thiols and Disulfides.

AMINES: Structures and Nomenclature, Basicity of Amines, Heterocyclic Compounds, Purines and Pyrimidines.

ALDEHYDES AND KETONES: Carbonyl Groups, Nomenclature, Physical Properties and Reactions, Oxidation and Reduction Reactions,

CARBOXYLIC ACIDS, ESTERS AND AMIDES: Carboxylic Acids, Properties and Nomenclature, Acidity of Carboxylic Acids, Synthesis of Esters and Amides, Hydrolysis Reactions, Phosphoric Acid Derivatives.

CARBOHYDRATES: Carbohydrate Isomers and Nomenclature, Monosaccharides - Glucose, Fructose and Ribose, Hemiacetals and Acetals, Disaccharides – Maltose, Lactose and Sucrose, Polysaccharides – Starch (Amylose and Amylopectin), Glycogen, Cellulose, Mucopolysaccharides.

LIPIDS: Fatty Acids (Saturated and Unsaturated – Cis/Trans Isomerism), Properties and Nomenclature, Essential Fatty Acids, Triacylglycerols, Hydrogenation and Trans-unsaturated Fatty Acids, Phospholipids and Membrane Fluidity, Essential Fatty Acids and Eicosanoids, Cholesterol, Steroid Hormones, Bile Salts.

AMINO ACIDS AND PROTEINS: Structures and Properties of Amino Acids, Peptide Bonds, Primary Structure, Secondary, Tertiary and Quaternary Protein Structures, Characteristics and Functions of Proteins, Hemoglobin.

NUCLEIC ACIDS: Purines and Pyrimidines, Nucleotides, Ribonucleic Acid (RNA), Deoxyribonucleic Acid (DNA), Structure and Composition of Nucleic Acids, Base-Pairing and the Genetic Code, Introduction to Replication, Transcription and Translation.

## 5. Basis of Student Assessment

- (a) Lab Reports (10%)
- (b) Midterm Exams (20% and 30%)
- (c) Final Exam (40%)

## 6. Grading System

The following percentage conversion to letter grade will be used:

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](http://www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html)