



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF CHEMISTRY  
COURSE SYLLABUS  
WINTER 2018

1. Course: CHEMISTRY 357, Industrial Organic Chemistry for Engineers

LEC	DAY & TIME	ROOM	INSTRUCTOR	OFFICE	EMAIL	OFFICE HOURS
L01	M W F 11:00-11:50	KNB 132	Dr. Ashley Causton	SA 144A	acauston@ucalgary.ca	TBA
L02	M W F 13:00-13:50	ENC 70	Dr. A. Musgrove Richer	SA 144F	amanda.musgroveriche@ucalgary.ca	TBA

*Students in ENCH and ENGO should register in L01. Students in ENME should register in section L02.*

**Course Coordinator:** Dr. Amanda Musgrove Richer ([amanda.musgroveriche@ucalgary.ca](mailto:amanda.musgroveriche@ucalgary.ca))

Please include "CHEM 357" in the subject line of all correspondence.

**Tutorials** begin the week of Jan. 15<sup>th</sup>, and are held in SA 204.

**NOTE:** Students in Lecture 01 must register in one of T01 – T05. Students in Lecture 02 must register in T06 – T11.

Departmental Office: Room SA 229, Tel: 403-220-5341, e-mail: chem.info@ucalgary.ca

2. Course Description:

The hybridization of the carbon atom and covalent bonding. Typical reactions of alkanes, alkenes, alkynes and industrial applications. Substitution; halogenation, nitration and oxidation of aromatic hydrocarbons; polymerization and industrial applications. Functional groups and their reactions; oxidation, reduction, addition and elimination reactions, industrial applications.

3. Recommended / Required Textbook(s):

No required textbook.

Recommended materials:

- Any "Introduction to organic chemistry" textbook and accompanying study guide.
- The CHEM 209 textbook (Chemistry: The Molecular Nature of Matter and Change, 2nd Canadian Ed., Silberberg et al)
- Molecular model kit.

4. Course Goals and Topics:

**Course Goals:** By the end of CHEM 357, students will:

- Develop an understanding of fundamental concepts of organic chemistry
- Understand how the properties of an organic material are linked to its structure

**Course Topics:**

- Basic Organic Nomenclature and Terminology
- Chemical Bonding
- Isomerism
- Physical Properties (intermolecular forces and conformational analysis)
- Kinetics, Thermodynamics, and Equilibrium of Organic Reactions
- Curly Arrows and Reaction Mechanisms, including:
  - Radical Reactions
  - Acid-base chemistry
  - Addition reactions
  - Substitution reactions
  - Elimination reactions
  - Aromatic substitution reactions
- Types of Synthetic Polymers
- Selected Reactions of:
  - Alcohols, phenols, and thiols
  - Ethers and epoxides
  - Carbonyl containing compounds
  - Amines and other nitrogen-containing compounds

Department Approval: Approved by Department Head

Date: January 4<sup>th</sup>, 2018