



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF CHEMISTRY  
COURSE SYLLABUS  
WINTER 2020

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

**L01:**

MoWeFr 11:00AM - 11:50AM, EDC 179.

Instructor and Course Co-ordinator: Dr. Jing Li, Office: SA258, Tel. No.: 403-220-8797.

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Desire 2 Learn (D2L) Site: CHEM 357 L01 - (Winter 2020) - Industrial Organic Chemistry for Engineers

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):** None

**Suggested course 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. **Outcome Goals of CHEM 357 Industrial Organic Chemistry for Engineers:**

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

Basic Organic Nomenclature and Terminology

Chemical Bonding

Isomerism

Physical Properties (intermolecular forces and conformational analysis)

Kinetics, Thermodynamics & Equilibrium

Curly Arrows & Reaction Mechanisms of Industrially Relevant Reactions including:

- Radical reactions
- Acid base chemistry
- Addition reactions
- Substitution reactions
- Elimination reactions
- Aromatic substitution reactions

Polymers

- Types of synthetic polymers

Selected Industrially Relevant Reactions of:

- Alcohols, phenols & thiols
- Ethers & epoxides
- Carbonyl containing compounds
- Amines & other nitrogen containing compounds

Department Approval \_\_\_\_\_ Electronically Approved \_\_\_\_\_ Date \_\_\_\_\_ January 6, 2020 \_\_\_\_\_