

Course discipline/number/title: CHEM 2127: Organic Chemistry I

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 3 lab
3. Prerequisites (Course discipline/number): CHEM 1128, can be concurrent with instructor permission.
4. Other requirements: None
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is a thorough study of the chemistry of organic compounds with emphasis on structure, properties, and reactivity. Molecular structure along with isomerization and conformational analysis leads to a deep understanding of physical and chemical properties. The study of reactions will be focused on the mechanisms to explain concepts such as regioselectivity and stereoselectivity.

C. DATE LAST REVISED (Month, year): March, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Structure of Organic Molecules
  - a) Lewis structures, formal charge, and resonance
  - b) Shapes and polarity of covalent compounds
  - c) Intermolecular forces
  - d) Functional groups
2. Nomenclature
  - a) Hydrocarbons
  - b) Functional Groups
  - c) Isomers (cis/trans, E/Z, R,S)
3. Representations of Structures and Reactions
  - a) Bond line structures
  - b) Newman projections
  - c) Fischer projections
  - d) Cyclohexane chair and boat conformations
  - e) Organic reactions
  - f) Nucleophiles and electrophiles in reactions
  - g) Curved arrow notation
4. Isomerism
  - a) Constitutional isomers
  - b) Conformers
  - c) Chirality and stereocenters
  - d) Optical activity
5. Properties of Organic Molecules
  - a) Physical Properties
  - b) Charged species stability
  - c) Nucleophile and base strength
6. Reactions of Organic Molecules
  - a) Proton transfer
  - b) Nucleophilic substitution
  - c) Elimination
  - d) Electrophilic addition
7. Reaction Considerations
  - a) Competition between mechanisms
  - b) Stereochemistry
  - c) Regiochemistry
  - d) Synthesis

- E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Describe the structure of various organic molecules in detail.
  2. Communicate using the tools and terminology of organic chemistry.
  3. Predict physical and chemical properties of molecules based on their structure.
  4. Draw mechanisms for and predict products of reactions presented in the course.
  5. Begin combining reactions to create logical synthetic strategies.
- F. LEARNING OUTCOMES (MNTC): NA
- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Homework, exams, and a cumulative final exam
  2. Written lab reports

- G. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s).  
Communication. Students will communicate appropriately for their respective audiences.

Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

- H. SPECIAL INFORMATION (if any):  
The initial lab session explains and familiarizes the student with general safety equipment in the lab. During the weekly pre-lab discussion, the hazardous characteristics of the chemicals used during the lab are discussed. The students will be instructed on the proper disposal of all products. Students are required to wear necessary eye protective equipment while working with glassware or hazardous materials in lab. Students with special needs and concerns (i.e., people with allergies, pregnant females, sufferers of diseases which lower the effectiveness of their immune system) may wish to make this known to the instructor so that any chemical which might affect your situation can be avoided. A copy of Safety Data Sheets (SDS) for chemicals used is available.