

Course discipline/number/title: CHEM 2128: Organic Chemistry II

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 3 lab
3. Prerequisites (Course discipline/number): CHEM 2127
4. Other requirements: None
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is a continued study of the chemistry of organic compounds with emphasis on structure, properties, and reactivity. Chemical structures will be determined via multiple spectroscopic methods. The study of reactions will be focused on the mechanisms to explain concepts such as regioselectivity and stereoselectivity. Development and understanding of multistep synthesis will be a focus of this course.

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

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Organic Molecules
  - a) Nomenclature
  - b) Functional Groups
  - c) Physical Properties
  - d) Stability of Species
  - e) Conjugated pi systems
  - f) Aromaticity
2. Representations of Structures and Reactions
  - a) Organic reactions
  - b) Nucleophiles and electrophiles in reactions
  - c) Curved arrow notation
3. Reactions of Organic Molecules
  - a) Nucleophilic addition to polar pi bonds
  - b) Oxidation and Reduction
  - c) Nucleophilic addition-elimination
  - d) Electrophilic aromatic substitution
  - e) Pericyclic reactions
  - f) Free radicals
4. Reaction Considerations
  - a) Competition between mechanisms
  - b) Stereochemistry
  - c) Regiochemistry
  - d) Multistep Synthesis
5. Spectroscopy – Mass, Ultraviolet-Visible, Infrared, and Nuclear Magnetic Resonance Spectroscopy
  - a) Theory
  - b) Interpretation of data
  - c) Identification of unknown compounds
  - d) Analysis of reactions

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. Combine reactions to create logical synthetic strategies.
6. Elucidate structure using spectroscopic methods.

- 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

- H. 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.

- I. 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.