

**Department:**

Chemistry

**Course Description:**

This course is the second in a two-semester sequence. The course will continue to focus on topics presented in CHM211 and how they apply to chemical synthesis and structure determination. The topics will be applied to aldehydes and ketones, carboxylic acids and their derivatives, amines, aromaticity, benzene and its derivatives, organometallic compounds, conjugated and unconjugated unsaturated systems, and pericyclic reactions. Selected applications to biochemistry, medicinal and pharmaceutical chemistry, and industrial chemistry will also be discussed.

**Course Competencies:**

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents. **(Kansas Regents Shared Number Course and Title: KSRN Course CHM 2020 Organic Chemistry II and Lab.)**

Upon completion of this course, students will be able to:

1. Characterize organic molecules using spectroscopic techniques; mass spec, IR, and NMR
2. Demonstrate an understanding of the fundamentals of bonding and reactivity in conjugated and aromatic systems
3. Demonstrate the ability to apply IUPAC nomenclature rules, including stereogenic centers, and identify functional groups in molecules related to Organic II topics
4. Predict products and demonstrate an understanding of the mechanisms of reactions involving ethers, epoxides, thiols, aldehydes, ketones, carboxylic acids and their derivatives, and amines.
5. Demonstrate an understanding of formation and reactivity of enolates, including thermodynamic versus kinetic control
6. Demonstrate an ability to prepare, separate, purify, and characterize organic compounds, including using spectroscopic data
7. Effectively communicate procedures, results, experimental data, sources of experimental error, and conclusions drawn from data
8. Demonstrate awareness of potential safety hazards and conduct organic experiments safely and responsibly, including proper hazardous waste disposal

**Course Content:**

- A. Conjugation, resonance, dienes
- B. Benzene and aromatic compounds
- C. Electrophilic aromatic substitutions
- D. Carboxylic acids and the acidity of the O-H bond
- E. Introduction to carbonyl chemistry; organometallic reagents; oxidation and reduction
- F. Aldehydes and ketones; nucleophilic addition

- G. Carboxylic acids and their derivatives; nucleophilic substitution
- H. Substitution reactions of carbonyl compounds at the  $\alpha$  carbon
- I. Carbonyl condensation reactions
- J. Amines
- K. Carbon-carbon bond-forming reactions in organic synthesis
- L. Carbohydrates
- M. Amino acids and proteins
- N. Lipids
- O. Synthetic polymers

## Learning Assessments:

Course competencies will be assessed by use of homework assignments, lab work experiments, quizzes, regular exams, and a final exam.

## Instructional Materials:

### Textbook:

Jones, M. & Fleming, S. A. (2014). *Organic Chemistry*, (5th ed.). New York, NY: W. W. Norton. ISBN: 978-0-393-91303-3

### Laboratory Manual:

Svoronos, P. Sarlo, E. & Kulawiec, R. (1997). *Organic Chemistry Laboratory Manual*, (2nd ed.). WCB/McGraw-Hill. ISBN: 978-0-697-33923-8

### Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our [Disability Services website](#).

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

### A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an [online report](#) about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our [Equity Grievance Policy](#).