

# CHM 251 - ORGANIC CHEMISTRY II

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## Course Description

A follow-up to CHM 250. Topics include alcohols, aromatics, ethers and epoxides, arenes, carbonyls, carboxylic and sulfonic acids and their derivatives, amines, phenols, aryl halides, carbohydrates, amino acids, biochemical processes, and others together with appropriate mechanistic theories and structural concepts. Instrumental techniques discussed include infrared spectroscopy (IR), nuclear magnetic resonance (NMR), mass spectrometry (MS), and ultraviolet (UV) spectroscopy. The lab exercises will continue the development of organic chemistry laboratory technique on both semi-microscale and microscale. In addition, analytical techniques using infrared spectroscopy and gas chromatography will be developed. Group 1 lab course.

## Credit Hours

5

## Contact Hours

9

## Lecture Hours

5

## Required Prerequisites

CHM 250, CHM 250L, MTH 111, all with a grade of 2.0 or better.

## Corequisites

CHM 251L

## Recommended Prerequisites or Skills Competencies

ENG 111 with a grade of 2.0 or better

## General Education Outcomes supported by this course

Quantitative Reasoning

## Course Learning Outcomes

### Knowledge:

- Articulate a broad set of chemical knowledge concerning the fundamentals in organic chemistry.
- Explain electron delocalization and its effect on stability and reactivity.

### Application:

- Interpret patterns of reactivity on the basis of mechanistic reasoning.
- Design syntheses of organic molecules of moderate complexity.
- Demonstrate the fundamentals acid/base and electrophile/nucleophile reactions in organic chemistry.
- Use standard laboratory equipment, modern instrumentation, and classical techniques to carry out experiments.
- Perform the experiments, and appropriately record and analyze the results.
- Evaluate analytical tools for organic structure determination including MS, NMR, IR, and UV-Vis.

### Integration:

- Critique the synthesis, labeling, and production of organic chemicals.
- Connect to real world examples of organic chemistry in action.
- Evaluate the consequences (reactivity, properties) of the three-dimensionality of molecules.
- Summarize the concepts and results of their laboratory experiments through effective writing and oral communication skills.

### Human Dimension:

- Develop interpersonal skills by working in groups: through joint assignments, study groups, and most importantly in collaboration during laboratory experiments.

### Caring - Civic Learning:

- Recognize the connections between organic chemistry and real life applications.
- Better appreciate the concepts of this course and how they related to the real world.

### Learning How to Learn:

- Think intuitively about organic chemistry reactions.
- Summarize complicated conceptual ideas.
- Initiate new problem solving skills and strategies.