Syllabus
CHEM 2520
Organic Chemistry II
2024

Committee Members:

Rhett Psota, Central Community College
John Masters, Metropolitan Community College
Dr. Aaron McLean, Mid-Plains Community College
Irina Weitzmann, Northeast Community College
Lisa Malmgren, Southeast Community College
Dave Nelson, Western Nebraska Community College
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N/A, Nebraska Indian Community College
Facilitator: Dr. Aaron McLean

The Institution agrees to the contents in this syllabus including course prefix, number, course description and other contents of this syllabus.

Chief Academic Officer, Central Community College	05/20/2024	Adopt
Chief Academic Officer, Little Priest Tribal College	05/07/2024	Adopt
Tom McDonnell Chief Academic Officer, Metropolitan Community College	05/09/2024	Decline
Jody Tomanek Chief Academic Officer, Mid-Plains Community College	05/03/2024	Adopt
Chief Academic Officer, Nebraska Indian Community College	05/23/2024	Adopt
Charlene Widener Chief Academic Officer, Northeast Community College	05/03/2024	Adopt
Joel Michaelis Chief Academic Officer, Southeast Community College	05/14/2024	Adopt
Grant Wilson Chief Academic Officer, Western Nebraska Community College	05/02/2024	Adopt

I. CATALOG DESCRIPTION

CHEM 2520 and CHEM 2521 (lab)
Organic Chemistry II & Organic Chemistry II Laboratory
Pre-Requisites/Co-Requisites: Organic Chemistry I with a C or higher.

A continuation of (CHEM 2510). Topics in this course include the structure and properties of carbon compounds, including nomenclature, stereochemistry and spectroscopy of alcohols, phenols, ethers, epoxides, aromatic compounds, aldehydes, ketones, carboxylic acids & their derivatives, and amines.

Students registering for this course must also register for the laboratory component of the course.

Credit/Contact Hour Designation
Credit Hours: 4 Semester, 6 Quarter
Contact Hours: 45 (Lecture)/ 30 (Laboratory)

II. COURSE OBJECTIVES:

Course will cover:

1. Structure, properties, synthesis, and nomenclature of alcohols, phenols, ethers, epoxides, aromatic compounds, aldehydes, ketones, carboxylic acids & their derivatives, and amines.
2. Illustration of reaction mechanisms.
3. Multi-step synthesis.
4. Free-radical reactions.
5. Reactions of Carbonyl compounds.
6. Organometallics.
7. Conjugated & Aromatic Systems (includes kinetic vs. thermodynamic control, Diels-Alder reaction and Woodward-Hoffman rules/orbital symmetry).
8. Electrophilic and Nucleophilic Aromatic Substitution reactions.
9. Continuation of Substitution, Elimination & Addition reactions.
10. Reactions of Nitrogen containing compounds
11. Spectroscopic principles. (Includes topics of chemical shift, splitting pattern, integration, and structure elucidation based on spectroscopic data.) This includes direct or virtual use of IR and 1H-NMR instrumentation and/or software.
12. Laboratory experiments in the preparations, separation, purification, and identifications of organic compounds.

III. STUDENT LEARNING OUTCOMES:

Students will be able to:

1. Draw the valid chemical structures using correct nomenclature and propose workable reaction mechanisms based on the physical properties and chemical behaviors of organic compounds.
2. Apply conceptual and mechanistic knowledge toward the synthesis of organic compounds.
3. Understand the basic mechanistic steps involving organic reactions.
4. Practice safe laboratory principles in the preparation of organic compounds.
5. Determine structure of an organic compound using spectroscopic data.
6. Illustrate the mechanism of reaction pathways using arrow pushing.
7. Explain and describe the factors that affect Electrophilic & Nucleophilic Aromatic Substitution reactions.
8. Differentiate between aromatic, non-aromatic and anti-aromatic compounds.
9. Apply knowledge of reactions with Carbonyl compounds as well as N-containing compounds.
10. Describe conjugated systems.

IV. CONTENT/TOPICAL OUTLINE

1. Alcohols, Ethers & Epoxides
2. Spectroscopy (IR, NMR, MS)
3. Aldehydes & Ketones
4. Conjugated Systems
5. Aromatic Compounds
6. Amines
7. Carboxylic Acids & Derivatives
8. Organometallics
9. Radical reactions
10. Condensation reactions with Carbonyl compounds
11. Biomolecules (topic may include carbohydrates, amino acids, and nucleic acids)

V. INSTRUCTIONAL MATERIALS:

1. Organic Chemistry with a Biological Emphasis (current edition) by Timothy Soderberg (Chemistry Publications)
2. Organic Chemistry (current edition) by Solomons, Fryhle, & Snyder (Wiley)
3. Organic Chemistry (current edition) by Wade & Simek (Pearson)
4. Organic Chemistry (current edition) by Carey (McGraw Hill)
5. Organic Chemistry (current edition) by Smith (McGraw-Hill)
6. Organic Chemistry (current edition) by Bruice (Pearson)

7. Organic Chemistry (current edition) by Klein (Wiley)
8. Open Stax-Organic Chemistry (current edition)

VI. METHOD OF PRESENTATION

1. Lecture
2. Discussion
3. Demonstration
4. Group Activity
5. Application
6. On-Line
7. Distance Education
8. Laboratory Activities

VII. METHOD OF EVALUATION

1. Course grades, at the determination of the instructor, may be based on Participation, Assignments, Exams, Projects, Papers, and Lab work.

VIII. INSTITUTIONAL DEFINED SECTION

(to be used at the discretion of each community college as deemed necessary)