DocuSign Envelope ID: FC095A9D-46FA-43C4-974A-87C87B7A1455

Syllabus
CHEM 2520
Organic Chemistry II
2021

Committee Members:

Mark Boatright, Central Community College
John Masters, Metropolitan Community College
Aaron McLean, Mid-Plains Community College
Irina Weitzman, Northeast Community College
Lisa Malmgren, Southeast Community College
Dave Nelson, Western Nebraska Community College
No Representative, Little Priest Tribal College
Dasha Weatherman, Nebraska Indian Community College
Facilitator: Aaron McLean

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

	08/01/2022	Adopt
Chief Academic Officer, Central Community College		
Loretta Broberg	07/25/2022	Adopt
Chief Academic Officer, Little Priest Tribal College		
Tom McDonnell	07/25/2022	Decline
Chief Academic Officer, Metropolitan Community College		
Jody Tomanek	07/25/2022	Adopt
Chief Academic Officer, Mid-Plains Community College		
	07/25/2022	Adopt
Chief Academic Officer, Nebraska Indian Community College		
Michele Gill	07/25/2022	Adopt
Chief Academic Officer, Northeast Community College		
Joel Michaelis	08/01/2022	Adopt
Chief Academic Officer, Southeast Community College		
Grant Wilson	07/25/2022	Adopt
Chief Academic Officer, Western Nebraska Community College		

DocuSign Envelope ID: FC095A9D-46FA-43C4-974A-87C87B7A1455

COURSE SYLLABUS OUTLINE

CATALOG DESCRIPTION:

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.

I. Organic Chemistry II & Organic Chemistry II Laboratory

Course Number: **CHEM 2520 and CHEM 2521 (lab)**
Course Name: Organic Chemistry II
Pre-Requisites/Co-Requisites: **Organic Chemistry I with a C or higher.**
Description: **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.

DocuSign Envelope ID: FC095A9D-46FA-43C4-974A-87C87B7A1455

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 ^{1}H-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. Understand the chemistry of organic compounds by drawing chemical structures and reaction mechanisms.
2. Remember the nomenclature, physical properties, structural theory and chemical behavior of organic compounds.
3. Display a conceptual and mechanistic understanding of the subject.
4. Apply this knowledge toward the synthesis of organic compounds.
5. Understand the basic mechanistic steps involving organic reactions.
6. Application of principles in the preparation of organic compounds.
7. Determine structure of an organic compound using spectroscopic data.
8. Illustrate the mechanism of reaction pathways using arrow pushing.
9. Understand the factors that affect Electrophilic & Nucleophilic Aromatic Substitution reactions.
10. Differentiate between aromatic, non-aromatic and anti-aromatic compounds.
11. Demonstrate and apply knowledge of reactions with Carbonyl compounds.
12. Demonstrate and apply knowledge of reactions for N-containing compounds.
13. Understand conjugated systems.
14. Demonstrate safe laboratory techniques.

IV. CONTENT/TOPICAL OUTLINE

A. Alcohols, Ethers & Epoxides
B. Spectroscopy (IR, NMR, MS)
C. Aldehydes & Ketones
D. Conjugated Systems
E. Aromatic Compounds
F. Amines

DocuSign Envelope ID: FC095A9D-46FA-43C4-974A-87C87B7A1455

- **G.** Carboxylic Acids & Derivatives
- **H.** Organometallics
- **I.** Radical reactions
- **J.** Condensation reactions with Carbonyl compounds
- **K.** Biomolecules (topic may include carbohydrates, amino acids and nucleic acids)

V. INSTRUCTIONAL MATERIALS:

- **A.** Organic Chemistry with a Biological Emphasis (current edition) by Timothy Soderberg (Chemistry Publications)
- **B.** Organic Chemistry (current edition) by Solomons, Fryhle, & Snyder (Wiley)
- **C.** Organic Chemistry (current edition) by Wade & Simek (Pearson)
- **D.** Organic Chemistry (current edition) by Carey (McGraw Hill)
- **E.** Organic Chemistry (current edition) by Smith (McGraw-Hill)
- **F.** Organic Chemistry (current edition) by Bruice (Pearson)
- **G.** Open Stax-Organic Chemistry (current edition)

VI. METHOD OF PRESENTATION

- **A.** Lecture
- **B.** Discussion
- **C.** Demonstration
- **D.** Group Activity
- **E.** Application
- **F.** On-Line
- **G.** Distance Education
- **H.** Laboratory Activities

VII. METHOD OF EVALUATION

- **A.** 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)