

ORGANIC CHEMISTRY

CHEM 241

INSTRUCTOR: Dr. Louis Scerbo

DEPARTMENT: CHEMISTRY

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TEXTS: Organic Chemistry, Wade, Ed. 8 Prentice-Hall

COURSE DESCRIPTION:

This course is an introductory course in organic chemistry. It is the first of a series of courses. The course will emphasize the nomenclature, structures, and reactions of organic molecules. Considerable time will be devoted to reaction mechanisms as a key to understanding the reactivity of molecules. To aid in this objective, a review of kinetics and thermodynamics is included in the course. Also included is a discussion of spectroscopy. An introduction to organic synthesis is presented early in the course.

COURSE OBJECTIVES :

1. Know how to name alkanes, alkenes, and alkynes.
2. Know how to draw the structures of acyclic, cyclic, bicyclic, and spiro compounds.
3. Know how to predict the products of free radical and nucleophilic substitution reactions.
4. Be able to complete elimination and addition reactions
5. Know how to analyze the conformations and configurations of substituted alkanes and cycloalkanes
6. Be able to show the mechanisms for all reactions covered in the course
7. Be able to devise simple synthesis sequences

TESTS:

Two 1 hour exams worth 100 pts each will be given during the quarter. There will also be given a final worth 200 points.

GRADES:

The total number of points in the course is 400 points. The final grade is determined from the percent of the total points earned. Letter grades are on the plus/minus scale

ATTENDANCE : Role will not be kept in lecture. However, all important course material and announcements will be made in class. It is your responsibility to know what occurred in class. This syllabus and some selected powerpoints and problem sets will appear on Blackboard.

COURSE OUTLINE

CHEM 241

- I. Chemical Bonding and Organic Compounds
 - A. Chemical bonds
 - 1. Lewis formulas
 - 2. Electron configurations
 - 3. Valence-bond theory (VB)
 - 4. Hybridization
 - 5. Molecular orbital theory (MO)
 - B. Typical organic compounds
 - 1. Ethane
 - 2. Ethene
 - 3. Ethyne
 - C. Functional groups
 - 1. Organohalides
 - 2. Alcohols
 - 3. Ethers and epoxides
 - 4. Thiols and sulfides
 - 5. Aldehydes and ketones
 - 6. Carboxylic acids and derivatives
 - D. Structure and properties
 - 1. Acid - base properties
 - 2. Physical properties

II. Alkanes and Cycloalkanes

A. Nomenclature and structure

B. Stereochemistry

1. Conformational isomers
2. Configurational isomers
3. Chirality

C. Chemical reactivity

1. Thermodynamics
2. Kinetics
3. Mechanisms
 - a. Homolytic cleavage
 - b. Heterolytic cleavage
 - c. Intermediates

D. Alky Halides

1. Preparations
2. Substitution and Elimination reactions

III. Alkenes and Alkynes

A. Nomenclature and structure

1. Geometric isomerism
2. Relative stabilities of isomers

B. Reactions

1. Addition reactions
 - a. Hydration of alkenes
 - b. Hydroboration/oxidation of alkenes
 - c. Oxymercuration/demercuration
 - d. Of HX , X_2 , H_2
 - e. Oxidations
2. Allylic substitution

COURSE SCHEDULE
CHEM 241

<u>Week</u>	<u>Topic</u>	<u>Chapter</u>
1	Introduction - bonding - carbon compounds	1,2,
2	Alkanes , cycloalkanes, bicycloalkanes, spiroalkanes	3,5
3	Stereochemistry	5
4	Test # 1	X
5	Chemical reactivity, Alkyl Halide Preps	3,4,6
6	Substitution and Elimination Reactions	6
7	Test # 2	X
8	Alkenes and Alkynes	7,8
9	Addition Reactions	9
10	Review	X
11	Final	X