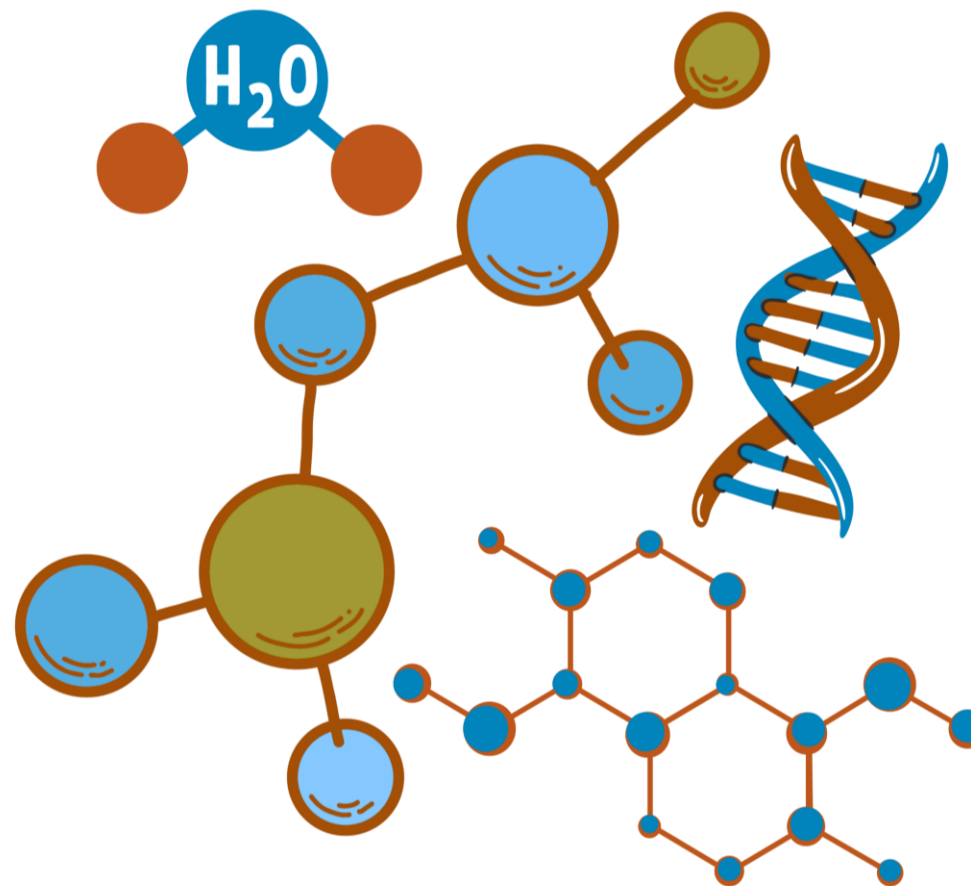


Stereochemistry

CHEM 540



Course Title and General Information

Course Code	Course Title	Program
CHEM 540	Stereochemistry	Master of Science in Chemistry

Credit Hours	Department	College
2 (1 Lectures [2h])	Chemistry Department	Science



Course Content Overview and Reference

No	List of Topics	Contact Hours
1.	Introduction to Stereochemistry and course requirements	2
2.	Stereoisomers, Conformational Isomerism, Ethane Conformations, Butane Conformations, Structural Equivalence and Non-equivalence of Groups, Structural Classification of Atoms or Groups	3
3.	Configurational Stereoisomers of Cycloalkanes, Ring Conformers, Some Conformations of Cyclohexane Rings, Substituted Cyclohexane Compounds	3
4.	Configurational Stereoisomers of Alkene, The Sequence Rule for Assignment of Alkene Configurations, Relationship of Constitutional and Stereoisomers	2
5.	Chirality and Chiral compounds	4
6.	Racemization, Formation of racemic mixtures, Diastereomers, Enantiomers and meso compounds. Chiral resolution, by crystallization, Chiral resolving agents, Chiral column chromatography,	3
7.	Addition to Carbonyl Double Bonds, Models for Addition to Acyclic Substrates, The Chelation Effect, Non-chelating Polar Effects, Diastereoselectivity, Enantioselectivity	3
8.	Elimination: E1 and E2 mechanism	2
9.	Substitution: SN1, SN2 and SE mechanism	4
10.	Rearrangement reactions	4
	Total	30



Text book:

- 1. Advanced Organic Chemistry.*** Parts A and B, Francis A. Carey, Richard J. Sundberg.
- 2. Organic Chemistry,*** Jonathan Clayden, Nick Greeves, Stuart Warren, Peter Wothers.
- 3. Stereochemistry of Organic Compounds,*** Ernest L. Eliel, Samuel H. Wilen.
- 4. Selectivity in Organic Synthesis,*** Robert S. Ward.
- 5. Asymmetric Synthesis,*** Garry Procter.



Course Objectives

- Understand what stereoisomers are, and the difference between the types of stereoisomers such as: constitutional isomers, stereoisomers, configuration and conformations.
- Understand the concept of chirality and the types of chiral molecules: enantiomers, Diastereomers. Racemic mixtures and meso.
- Assign the absolute configuration (R/S) of the chiral compounds.
- Explain how to incorporate R or S designations into the names of alkanes, and correctly name of chiral compounds with asymmetric carbons.
- Determine the relationship between all possible stereoisomers of a compound, including enantiomers, diastereomers, and identical structures (meso).
- Explain which types of isomers have the same or different physical properties.
- Understand the principles on the optical activity, specific rotation, relationship between optical rotations of enantiomers, determine whether a given solution is optically active, and explain what a racemic mixture, meso.
- Understand the methods of the separation of enantiomers (isolation of a racemic mixtures).
- Application in organic reactions such as SN1, SN2, E1, E2, stereospecific and Stereoselective reactions.



Course Learning Outcomes

Knowledge	Skills	Values
<ul style="list-style-type: none">Recognize the basis of Chirality and Symmetry, Symmetry in Organic Chemistry, Stereogenic Elements and Stereoisomerism, Polarimetry, Optical Activity, Stereogenic Elements and Stereoisomerism, R, S conformer.Understand the Racemization, Formation of racemic mixtures, Diastereomer, Enantiomer, Meso Diastereomers, Chiral resolution, by crystallization, Chiral resolving agents, Chiral column chromatography.Acquire how to write a scheme for converting one organic compound to another isomer.State how to write the mechanisms of the reactions using stereo models.	<ul style="list-style-type: none">Discuss the importance of the configuration of chiral organic compounds, including those with no chiral center, in relation to chemical and physical properties.Critically assess the key stereochemical features of substitution, addition, elimination and pericyclic reaction mechanisms.	<ul style="list-style-type: none">Ability to work as individuals and teams in class.Can communicate the work in groups with others



Assessment:

1. Attendance and participation **(30%)**
(open discussion- mini report- oral presentation- solving problem)
1. Mid-term 1 Exam **(30%)**
2. Final exam **(40%)**



Regulations for Attendance, Absence, and Alternative Examinations

Item	Limit/Rule
Semester Length	15 weeks (15 lectures)
Allowed Absence	25% = max 4 lectures
Lecture Duration	2 × 50 min per day (2 academic hours)
Max Absence in Hours	8 academic hours (4 days)
Absence Excuses	Submit via “Daam” Platform (Common First Year Deanship – KSU)
Alternative Examination Regulations	<ol style="list-style-type: none">1. Student must not have taken the Primary Examination.2. Student must not be denied in the course.3. Request must be submitted to the Common First Year Deanship within one week of the Primary Examination date.4. Excuse must be official and government-approved.5. No alternative for an alternative examination.



*Good
Luck*

