



FORMAN CHRISTIAN COLLEGE LAHORE
(A Chartered University)
DEPARTMENT OF CHEMISTRY

CHEM 260 Principles of Organic Chemistry
Course outline

Instructor Information:

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Credit hours: 3+1

Course Contents

Basic concepts of organic chemistry like bonding, structure, resonance, inductive effect, isomerism including stereochemistry, geometric isomerism, acids and bases, their relative strength and factors affecting acidity and basicity, significance of pH, pKa and pK_b, chemistry of alcohols, phenols, thiols and ethers and their industrial applications.

Course Objectives

1. To lay a strong foundation for organic chemistry by training students in basic principles such as bonding, structure, reactivity, and mechanisms.
2. To develop an understanding of how a bond is broken and formed, how energy changes during a reaction, what are various intermediates.
3. To enhance critical thinking of how changes in conditions change the mechanism of a reaction.
4. To familiarize students with synthetic applications of various organic reactions.
5. To enable students to predict and write mechanisms of reactions.

Learning Outcomes

At the end of the course a student is expected to:

1. have gained basic understanding of basic principles and concepts of organic chemistry, such as bonding, structure, isomerism and stereochemistry, reactivity, reaction mechanisms.
2. be able to make connections between structure and reactivity in organic compounds (how to explain properties of molecules on the basis of their structures).
3. have developed a strong appreciation of reaction mechanism as a logic to explain them (are able to predict/ propose mechanisms of simple reactions).
4. have developed an ability to outline future learning and research in the field of organic synthesis.
5. have acquired an ability to apply their knowledge to solve problems related to different types of reactions, and isomerism and stereochemistry.

Textbook

Organic Chemistry by Brown and Foote: Chapters 1 (Basic concepts), 3 (Stereoisomerism), 4 (Acids and bases); 10 (Alcohols); 21 (Phenols).

Further Reading: Organic Chemistry by Morrison and Boyd; Organic Chemistry by Solomons; Organic Chemistry by McMurray; Organic Chemistry by David Klein; online learning material.

Week-wise Course Breakup:

Week	Topics and learning/ teaching activities
1	Review of Classification and Nomenclature of organic compounds; different types of organic compounds; hydrocarbons; functional groups.
2	Review of bonding and structure in organic molecules, hybridization; shape of molecules. Quiz
3	Polar and nonpolar bonds, their importance in reactivity; modes of bond cleavage.
4	Nucleophiles, electrophiles, free radicals, carbocations, carbanions. Assignment
5	How to write the Lewis structures of atoms and molecules; resonance and how to write different resonance structures; inductive effect and its importance.
6	Isomerism: constitutional isomerism and its types, Stereoisomerism (geometric isomerism); conformations in alkanes and cycloalkanes. Quiz
7/8	Stereoisomerism (optical isomerism): chiral center and chirality; chiral molecules, enantiomers; diastereomers. Assignment
	Mid Term
9/10	Presentations
11/12	Organic acids and bases; factors affecting acidity and basicity, pH, pKa and pKb and their significance. Quiz
13	Chemistry of alcohols and phenols: Preparations of alcohols and phenols. Assignment
14	Reactions of alcohols: reaction with thionyl chloride, dehydrations, esterification, etc.
15	Acidity of phenols and alcohols and reactions of phenols. Quiz
16	Recap and final examination

Assessment Scheme:

(A) Theory part: weightage 75%

Assignments	10
Quizzes	10
Presentation	10
Attendance (physical/ online)	05
Midterm	20
Final Examination	20

(B) Practical part: weightage 25%

Lab performance; written work; viva