M.Sc. Chemistry
M Sc Chemistry Semester-I

Course Code	PS01CCHE52	Title of the Course	Organic Chemistry-I
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To understand the concepts of chirality, topicity, prostereoisomerism, stereoselective, and stereospecific reactions 2. To understand the role of reactive intermediates in molecular rearrangements. 3. To learn addition, elimination, aromatic substitution reactions, and mechanism.

Course Content

Unit	**Description**	**Weightage* (%)**
1.	**Stereochemistry:** Concept of Chirality, Chirality and Symmetry, Sawhorse, Newman and Fischer Projections, Interconversion of Projection formula, Elements of Chirality including Chiral centre, Chiral axis, Chiral plane and Helicity, CIP Nomenclature, Molecules with more than one Chiral centre, Total number of Stereoisomer in such molecules, Enantiomeric and Diastereomeric Relationship, Chirogenicity and Stereogenecity, Pseudochirality, Topicity and Prostereoisomerism, Determination of Topic relationship between Homomorphic ligands in Intact Molecules, Concept of stereoselective and stereospecific reactions, Optical Purity.	25%
2.	**Reactive Intermediates in Molecular Rearrangements:** Molecular Rearrangement involving Non-Classical Carbocation: Neighbouring group participation by π(pi) and σ(sigma) bonds. Molecular Rearrangement involving Carbocation: Wagner-Meerwein, Pinacol-Pinacolone, Demjanov and Beckmann Rearrangement. Molecular Rearrangement involving Carbanion: Favorskii, Benzil-Benzilic Acid, Stevens and Sommelet-Hauser Rearrangement. Molecular Rearrangement involving Free radical: Riemer-Tiemann, Fries Rearrangement Molecular Rearrangement involving Nitrene: Curtius, Schmidt, Lossen and Hoffmann Rearrangement Molecular Rearrangement involving Carbene: Wolf Rearrangement [Emphasizing on Various Techniques for Determination of Mechanism]	25%
3.	**Elimination and Addition Reactions:** **Elimination Reactions:**	25%

	Mechanisms and Orientation, E1, E1cb, E2 spectrum, Effects of Changes in Substrate, Base, Leaving Group and Medium on Reactivity, Hoffman and Saytzef eliminations, Bredt's Rule, Pyrolytic Eliminations- Cope and Chugaev eliminations. **Addition reactions:** Mechanisms, Orientation and Reactivity, Markonikoff and anti-Markonikoff additions, Reactions including Hydro-Halo, Hydro-Hydroxy, Hydro-Alkoxy, Dihydro, Dihydroxy, dihalo, ozonolysis, Woodward-Prevost Hydroxylation.	
4.	**Aromatic substitution reactions (Electrophilic and Nucleophilic):** Mono-substituted benzenes - Reactivity and Orientations, Orientation in Benzene Rings with more than One Substituent, ipso substitution, Orientation in Other Ring Systems, Primary Kinetic Isotope Effect and Mechanisms of Fridel- Craft reactions, Nitration, Sulphonation, Halogenation, Diazocoupling and Formylation. Benzyne Mechanisms for Aromatic Nucleophilic substitution reactions. Addition – Elimination mechanism.	25%
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Teaching-Learning Methodology	To meet the effective teaching and the learning requirements, teaching-learning methodology comprises classroom teaching, use of e-resources, library books, IT tools, encouraging students to participate in seminars/workshops, presentation by students, assigning work based upon subject requirements, etc.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Detect chirality in molecular structure using symmetry
2.	Recognize the relationship between enantiomeric and diastereomeric structures

3.	Understand the concept of topicity and prostereoisomerism
4.	Appreciate the difference between stereoselective and stereospecific reactions
5.	Manipulate the probable reaction mechanism for chemical transformation
6.	Employ various name reactions for their useful applications
7.	Learn the differences between elimination, addition Reactions and substitution reactions
8.	Identify the stereochemical consequences during chemical reactions
9.	Practice various techniques for determination of reaction mechanism

Suggested References:

Sr. No.	References
1.	Organic Reactions, Stereochemistry and Mechanism: P.S. Kalsi (New Age.)
2.	Principles of Organic Synthesis: R.O.C Norman & J.M. Coxon (ELBS)
3.	Mechanism in Organic Chemistry: Peter Sykes (Orient Longman)
4.	Modern Methods of Organic Synthesis: W. Carruthers (Cambridge)
5.	Organic Reaction Mechanism: V.K.Ahluwalia and R.K.Parashar (Narosa)
6.	Organic Chemistry: Clayden, Greeves and Warren (Oxford)
7.	Advanced Organic Chemistry: Jerry March(Wiley)

On-line resources to be used if available as reference material
On-line Resources

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