Rayat Shikshan Sanstha's

Annasaheb Awate Arts, Commerce and Hutatma Babu Genu Science College

Manchar, Tal. Ambegaon, Dist. Pune

DEPARTMENT OF CHEMISTRY

Course Outcomes (COs)

M.Sc. II Organic Chemistry 2024-25

Semester-III

Sr. No.	Course	Course Outcomes
1	CHO-601 MJ: Organic Reaction Mechanism and Stereochemistry	After completion of this course, the student will student will be able to CO-1: Acquire familiarity with fundamental organic reaction mechanisms and stereochemistry principles. CO-2: Gain a comprehensive understanding of Theoretical Concepts to Predict Reactivity and Selectivity. CO-3: Apply concepts of reaction mechanisms and stereochemistry. CO-4: Design Synthetic Routes and Strategies. CO-5: Analyse the products of different organic reactions. CO-6: Solve Complex Organic Chemistry Problems based on Organic Reaction Mechanism and Stereochemistry.
2	CHO-602 MJ: Advanced Spectroscopic Methods in Structure Determination	CO-1: Learn the fundamental knowledge of ^{1}H NMR, ^{13}C NMR, ^{19}F NMR and Mass Spectral techniques. CO-2: Acquire advanced knowledge of ^{1}H NMR, ^{13}C NMR, ^{19}F NMR and Mass Spectral techniques. CO-3: Apply the knowledge of ^{1}H NMR, ^{13}C NMR, ^{19}F NMR and Mass Spectral techniques for structure determination. CO-4: Discuss probable spectral signals. CO-5: Interpret different types of spectra. CO-6: Deduce the structure of the unknown compound using ^{1}H NMR, ^{13}C NMR, ^{19}F NMR and Mass Spectra.
3	CHO-603 MJ: Heterocyclic Chemistry	CO-1: learn the structures, nomenclature rules, and classifications of heterocyclic compounds. CO-2: understand advanced synthetic methodologies to design and execute the synthesis of various heterocyclic compounds. CO-3: Predict the molecular properties, electronic structures, and the reactivity of heterocyclic systems.

DEPARTMENT OF CHEMISTRY

Course Outcomes (COs)

		CO-4: Distinguish the reactivity of heterocycles, elucidating reaction mechanisms and their pathways. CO-5: Evaluate the heterocyclic compounds with other organic compounds. CO-6: Summarize the significance and applications of heterocyclic chemistry.
4	CHO-604 MJP: Organic Synthesis Experiments	CO-1: Recall the sequential steps involved in the preparation of target compounds from given starting materials in single-stage, and double-stage preparations. CO-2: Recognize the mechanisms of organic preparations and their relevance to product formation. CO-3: Apply knowledge of functional group transformations to troubleshoot and optimize reaction conditions. CO-4: Assess the synthetic pathways for the efficient production of target compounds. CO-5: Examine the structure and reactivity of starting materials to propose viable synthetic routes for heterocyclic compound synthesis. CO-6: Design multistep synthetic strategies for the construction of complex heterocyclic scaffolds from simple starting materials in heterocyclic compound synthesis.
5	CHO-605 MJP: Ternary Mixture Separation	CO-1: understand the concept of type determination and apply separation techniques. CO-2: comprehend different purification techniques. CO-3: accurately record and report physical constants. CO-4: analyze microscale chemical elemental analysis. CO-5: evaluate and execute qualitative estimation of functional groups. CO-6: create a report on ternary mixture separation.
6	CHO-610 (A) MJ: Synthetic Methods in Organic Chemistry	CO-1: Know the concepts of ring formation mechanism and will apply in organic synthesis. CO-2: learn the synthetic applications of Organo-Boron, Organo-Tin and Organo Silicon CO-3: Predict the reaction conditions of organic reactions. CO-4: Analyze the products obtained from the synthetic methods. CO-5: Relate the reaction mechanism and its products. CO-6: Create a summary of synthetic methods in organic chemistry.

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7	CHO: 610 (B) MJ: Carbohydrates and Chiron Approach	CO-1: Recall monosaccharide structures and D/L forms in Fisher projections. CO-2: Understand cyclic hemiacetal forms and anomeric configurations. CO-3: Applying Chiron approaches, they'll design syntheses of complex chiral molecules. CO-4: Analyze protective group strategies between temporary and permanent groups. CO-5: Evaluate glycosylation methods, stereoselectivity, and coupling efficiency. CO-6: Summarize the planning of synthesis, pathways for chiral compound synthesis.
8	CHO-631 RP: Research Project	CO-1: understand key concepts and principles relevant to the research topic. CO-2: learn diverse research methodologies proficiently. CO-3: write and communicate research findings persuasively through various mediums in the form of project report CO-4: analyze and synthesize scholarly literature effectively. CO-5: evaluate research findings and methodologies critically. CO-6: design and execute original research projects independently.

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DEPARTMENT OF CHEMISTRY

Course Outcomes (COs)

Semester-IV

Sr. No.	Course	Course Outcomes
1	CHO-651 MJ: Chemistry of Natural Products	After the completion of this course, students will be able to CO-1: Learn the fundamental aspects and knowledge of natural products. CO-2: Know the different pathways and biogenesis of natural products. CO-3: Apply the gained knowledge in the synthesis of natural products. CO-4: Categorize the organic functional group transformations in their synthesis. CO-5: Interpret the logical retrosynthetic analysis. CO-6: Design the mechanism and stereochemistry of Natural products.
2	CHO-652 MJ: Advanced Synthetic Organic Chemistry	CO-1: Learn the fundamental concepts of organometallic reactions and their bonding, reactivity, and mechanism. CO-2: Understand the significance of advanced organometallic reagents in organic chemistry. CO-3: Employ synthetic methodologies for cross-coupling reactions, enabling the formation of CC, C-N, and other bonds. CO-4: Analyze the products of synthetic organic reactions. CO-5: Relate the products of the retrosynthetic transformations with the Target Molecules. CO-6: Design the summary of advanced synthetic reagents, their reactions and the products.
3	CHO-653 MJP: Convergent and Divergent Organic Synthesis	CO-1: Learn new synthetic methodologies for the selective modification of starting materials. CO-2: Recognize the reactivity of starting materials towards different reagents and reaction conditions. CO-3: Apply multi-step synthesis strategies to construct complex molecules from simple starting materials. CO-4: Analyze reaction mechanisms and intermediates to understand the synthesis pathways. CO-5: Evaluate the efficiency and practicality of different synthetic routes based on yield and

DEPARTMENT OF CHEMISTRY

Course Outcomes (COs)

		selectivity. CO-6: Create novel synthesis routes based on the principles of organic chemistry and reactivity patterns.
4	CHO-654 MJP: Green Chemistry Experiments	CO-1: Know the principles of green chemistry and the importance of sustainability in chemical processes. CO-2: Identify solvent-free reactions using appropriate techniques and equipment. CO-3: Optimize green chemistry reactions in the laboratory. CO-4: Analyze the advantages and disadvantages of solvent-free reactions, green catalysts, and green solvents in comparison to traditional chemical methodologies. CO-5: Assess the role of green catalysts in promoting the desired reactions while minimizing waste and environmental impact. CO-6: Communicate experimental procedures, results, and conclusions effectively through written reports and oral presentations.
5	CHO-655 (A) MJ: Asymmetric Synthesis	CO-1: Learn the principles of asymmetric synthesis to achieve stereoselectivity, enantioselectivity, and diastereo-selectivity in cyclic compounds. CO-2: Understand resolution techniques, including Dynamic Kinetic Resolution (DKR), for racemic mixtures of cyclohexane and decalin-based molecules, quantifying enantiomeric excess (EE) values. CO-3: Interpret enantiomeric and diastereomeric excess in reactions, CO-4: Distinguishing between R and S configurations in compounds. CO-5: Evaluate total synthesis examples, integrate multiple asymmetric synthesis strategies to design efficient synthetic routes, and assess the applicability and limitations of different methods in complex synthesis challenges. CO-6: summarize the concepts such as diastereoselectivity, enantiomeric and diastereomeric excess chiral pool, chiral auxiliaries, and chiral reagents and catalysts in asymmetric synthesis
6	CHO-655 (B) MJ: Applied Organic Chemistry	CO-1: Gain a comprehensive understanding of impurities in organic drugs, functional dyes,

DEPARTMENT OF CHEMISTRY

Course Outcomes (COs)

		polymers, and metal-organic frameworks. CO-2: Demonstrate comprehension of the principles, structures, and mechanisms underlying each concept. CO-3: Identify functional dyes, polymers, metal-organic frameworks and impurities present in organic drugs. CO-4: Classify functional dyes, polymers, and metal-organic frameworks and impurities found in drugs according to relevant criteria. CO-5: Compare functional dyes, polymers, metal-organic frameworks, and the impurities in drugs. CO-6: Develop a strategic plan or workflow for the removal of impurities in organic drugs, identification of functional dyes and their properties, polymers properties and their synthesis, and metal-organic framework synthesis.
7	CHO-681 RP: Research Project	CO-1: understand key concepts and principles relevant to the research topic. CO-2: learn diverse research methodologies proficiently. CO-3: write and communicate research findings persuasively through various mediums in the form of project report CO-4: analyze and synthesize scholarly literature effectively. CO-5: evaluate research findings and methodologies critically. CO-6: design and execute original research projects independently.