

M. Sc. (II) Organic Chemistry

Programme Specific Outcome

- PSO1** Familiar with the different branches of chemistry like Stereochemistry, Spectroscopy, Medicinal, Asymmetric Synthesis, Carbohydrate Chemistry Heterocyclic Chemistry
- PSO2** Able to designing organic syntheses in feasible and economically cheaper method
- PSO3** Able to prepare sample for solution preparation, prepare solution of various Concentration for synthesis and analysis purpose
- PSO4** Able to find procedure form literature to synthesize separate & purify compounds in laboratory and characterize using proper instrumentation techniques.
- PSO5** Awarded with use of Organometallic Reagents in Organic Synthesis
- PSO6** Learnt Use of Chemistry software's useful in future career such as Research, Industries & Academia
- PSO7** Develop synthetic methods to maximize rate of reaction along with reduction in Byproducts
- PSO8** Able to use spectroscopic methods for structure determination of Organic Compounds
- PSO9** Able to retrosynthetic approach to design organic syntheses
- PSO10** Learnt methods for preparation of specific groups of heterocyclic systems.

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Course Outcome

M.Sc.- II	Semester- III	CHO-350	Organic Reaction Mechanism and Biogenesis	Semester III: CCTP-7 CHO-350: Organic Reaction Mechanism and Biogenesis At the end of course student will able to CO 1. Write reaction mechanism by understanding basic terminologies like electrophile, nucleophile, solvent effects, structural effects, etc CO 2. Know methods of generations of free radicals, stability of free radicals, their reactions and applications. CO 3. Understand Hammet equation, Hammett plot, reaction constant, Taft equation and solvent effect. CO 4. Define terpenes, Isoprene rule, MVA pathway, classification of terpenes and biogenesis of terpenoids which involve 1,2 methyl shift, 1,3 methyl shift, Wagner meerwein rearrangement, oxidative coupling reaction, role of SAM, oxidation and reduction. CO 5. Define Alkaloids, classification of alkaloids, process involved in biogenesis of alkaloids like decarboxylation, Schiff base formation, Trans amination reaction. CO 6. Understand shikimic acid pathway.
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M.Sc.- II	Semester- III	CHO-351	Structure Determination of Organic Compounds by Spectroscopic Methods	<p>Semester III: CCTP-8</p> <p>CHO-351: Structure Determination of Organic Compounds by Spectroscopic Methods</p> <p>At the end of course student,</p> <p>CO 1. Recognize spectroscopy in H1 NMR, CMR and Mass Spectrometry</p> <p>CO 2. Learn to interpret H1 NMR, CMR, DEPT, COSY, HETCOR & Mass spectra</p> <p>CO 3. Students trained to solve combined spectra problems</p> <p>CO 4. Understand concepts of 2D NMR Spectrometry, different types of spectra & Applications 5. Understand Principles and Applications of Mass spectroscopy</p>
M.Sc.- II	Semester- III	CHO-352	Stereochemistry and Asymmetric Synthesis of Organic Compounds	<p>Semester III: CCTP-9</p> <p>CHO-352: Stereochemistry and Asymmetric Synthesis of Organic Compounds</p> <p>At the end of course student will able to –</p> <p>CO 1. Draw conformations of different polysubstituted cyclohexane compounds and calculate their potential energy by considering butane gauche effect, steric effect.</p> <p>CO 2. Understand stereochemical principles involved in reaction of six</p>

				<p>membered ring and other than six membered rings.</p> <p>CO 3. Describe methods of formation of racemization and resolution of racemic mixture.</p> <p>CO 4. Apply crams rule, crams dipolar model, Felkin-Anh model in diastereoselective reaction.</p> <p>CO 5. Define asymmetric synthesis, chiral pool and chiral auxiliaries.</p> <p>CO 6. Understand transition metal catalyzed homogeneous asymmetric hydrogenation, epoxidation, dihydroxylation.</p> <p>CO 7. Solve problems based on diastereoselectivity by using models.</p>
M.Sc.-II	Semester-III	CHO-353(B)	Designing Organic Syntheses and Heterocyclic Chemistry	<p>Semester III: CCOP-3</p> <p>CHO-353(B): Designing Organic Syntheses and Heterocyclic Chemistry</p> <p>At the end of course student,</p> <p>CO 1. Knowledge of the retrosynthetic approach to plan organic syntheses</p> <p>CO 2. Knowledge of the key reactions in organic chemistry including substitution reactions of heterocycles, enols and enolate's.</p> <p>CO 3. To equip students with the skills to plan how to prepare Organic molecules</p>

				<p>CO 4. Knowledge of retrosynthetic method for the logical disconnection of complex organic molecules and synthetic organic methods</p> <p>CO 5. Understand heterocyclic Chemistry which includes various methods for ring synthesis</p> <p>CO 6. Knowledge of methods for the preparation of specific groups of heterocyclic systems.</p>
M.Sc.-II	Semester-III	CHO-354	Practical-I Solvent Free Organic Synthesis	<p>Semester III: CCPP-3</p> <p>CHO-354: Practical-I Solvent Free Organic Synthesis</p> <p>At the end of course student,</p> <p>CO 1. Student familiar with solvent free synthesis methods</p> <p>CO 2. Need of environmentally friendly synthesis processes</p> <p>CO 3. Think to develop compounds by of sustainable methods</p> <p>CO 4. Understand toxicity and volatile nature of many organic solvents</p> <p>CO 5. Use of clays, zeolites, silica, alumina or other matrices in organic synthesis</p> <p>CO 6. Use techniques to achieve high degree of stereoselectivity in the products,</p> <p>CO 7. Develop synthetic methods to maximize rate of reaction along with reduction in byproducts.</p>

M.Sc.- II	Semester- IV	CHO-450	Chemistry of Natural Products	<p>Semester IV: CCTP-10</p> <p>CHO-450: Chemistry of Natural Products</p> <p>At the end of course student,</p> <p>CO 1. Students should able to learn total synthesis and retrosynthesis of various natural products</p> <p>CO 2. Predict stereochemistry of the intermediate formed in synthesis of drugs</p> <p>CO Understand role of different reagents and reaction mechanism</p> <p>CO 4. Knowledge about importance of drugs , their synthesis ,regio and stereoselectivity</p> <p>CO 5. Knowledge about different techniques for isolation of natural products.</p>
M.Sc.- II	Semester- IV	CHO-451	Organometallic Reagents in Organic Synthesis	<p>Semester IV: CCTP-11</p> <p>CHO-451: Organometallic Reagents in Organic Synthesis</p> <p>Course outcome</p> <p>CO 1. Knowledge about the stability and reactivity of the various types of Organometallic compounds</p> <p>CO 2. Knowledge about transition metal complexes on organic synthesis</p>

				<p>CO 3. Knowledge about carbon – carbon , Carbon – Oxygen , Carbon-Nitrogen Bond formation reactions</p> <p>CO 4. Knowledge about geometrical isomerism that is Syn and anti-stereochemistry</p> <p>CO 5. Knowledge about catalytic cycles for C-O, C-C, C-N bond formation reactions.</p> <p>CO 6. Well known about Reagents in Organic Chemistry.</p>
M.Sc.-II	Semester-IV	CHO-452	Concepts and applications of Medicinal Chemistry	<p>Semester IV: CBOP-4</p> <p>CHO-452(A): Concepts and Applications of Medicinal Chemistry</p> <p>At the end of course student,</p> <p>CO 1. Learnt Chemistry of peptides and proteins , nucleic acids, cofactors/coenzyme</p> <p>CO 2. Learnt Chemistry of TPP, PLP, Folic Acid and other vitamins</p> <p>CO 3. Understood the Chemistry of diseases, Principle of drug design and development</p> <p>CO 4. Learnt Peptides, synthesis , sequencing and their applications in therapeutics</p> <p>CO 5. Understood use modern techniques for biomolecules and disease diagnosis.</p>

				<p>CO 6. Learnt Case Study: Design of Oxamniquine & Statins</p> <p>CO 7. Understood the concepts Pharmacokinetics and Pharmacodynamics of drug</p> <p>CO 8. Use of Structure and activity Relationship i.e. QSAR in drug development</p> <p>CO 9. Developments, SAR, Mode of action, limitations and adverse effect of medicines.</p>
M.Sc.-II	Semester-IV	CHO-453	<p>Practical-III</p> <p>Section-I: Ternary Mixture Separation</p> <p>Section-II: Carbohydrates Synthesis and Isolation Natural Products</p>	<p>Semester IV: CBOP-5</p> <p>CHO-453: Practical-III</p> <p>Section-I: Ternary Mixture Separation</p> <p>Section-II: Carbohydrates Synthesis and Isolation Natural Products</p> <p>At the end of course student,</p> <p>CO 1. Get the idea about monitoring of organic reactions using TLC technique.</p> <p>CO 2. Student will able to learn how to separate ternary mixture.</p> <p>CO 3. Understand about importance and method of synthesis of carbohydrates.</p> <p>CO 4. Knowledge about Various methods for isolation of natural products.</p>

				CO 5. Student will able to handle equipment required for isolation of natural products.
M.Sc.-II	Semester-IV	CHO-454	Practical-II: Convergent and Divergent Organic Syntheses	<p>Semester IV: CCPP-4</p> <p>CHO-454: Practical-II: Convergent and Divergent Organic Syntheses</p> <p>At the end of course student,</p> <p>CO 1. Get the idea about monitoring of organic reactions using TLC technique</p> <p>CO 2. Understand about importance of quality of product by TLC and physical constant</p> <p>CO 3. Knowledge about purification and separation techniques</p> <p>CO 4. Knowledge about importance of green reagents and methods in organic synthesis.</p> <p>CO 5. Knowledge about single stage synthesis, Convergent and Divergent synthesis.</p>

