

Lesson Plan

Session 2023-24 (Even Semester)

Name of the Assistant Professor: *Nitin Kumar Verma*

Class: *B.Sc. II (4th Sem)*

Subject: *Organic Chemistry*

Sr. No.	Month	Topic
1	January	<p style="text-align: center;">Infrared (IR) absorption spectroscopy</p> <p>Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds.</p> <p style="text-align: center;">Amines</p> <p>Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines.</p> <p><u>Assignment</u></p>
2	February	<p>Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabriel - phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.</p> <p style="text-align: center;">Diazonium Salts</p> <p>Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO₂ and CN groups, reduction of diazonium salts to hydrazines, coupling reaction and its synthetic application.</p> <p><u>Test</u></p>
3	March	<p style="text-align: center;">Aldehydes and Ketones</p> <p>Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate. Physical properties, Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH₄ and NaBH₄ reductions.</p> <p><u>Assignment</u></p>
4	April & May	Quick Revision and discussion



Nitin Kumar Verma
Chemistry Department
RGGC Saha


Principal
Rajiv Gandhi Govt. College
Saha (Ambala)

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Session 2023-24 (Even Semester)

Name of the Assistant Professor: *Nitin Kumar Verma*

Class: *B.Sc. III (6th Sem)*

Subject: *Organic Chemistry*

Sr. No.	Month	Topic
1	January	<p style="text-align: center;">Organic Synthesis via Enolates</p> <p>Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.</p> <p style="text-align: center;">Heterocyclic Compounds</p> <p>Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.</p> <p><u>Assignment</u></p>
2	February	<p>Introduction to condensed five and six-membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.</p> <p style="text-align: center;">Amino Acids, Peptides & Proteins</p> <p>Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of α-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides.</p> <p><u>Test</u></p>
3	March	<p>Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.</p> <p style="text-align: center;">Synthetic Polymers</p> <p>Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.</p> <p><u>Assignment</u></p>
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