

NAME: DR RAJDEEP YADAV

EXTENSION LECTURER  
DEPT. OF CHEMISTRY,  
SMSD GOVT COLLEGE NANGAL CHOUDHARY

DATE	CURRICULUM (BSc II SEM)	session 2022-23
01-02-23 to 07-02-23	<b>Inorganic chemistry</b> <b>Section-A</b> <b>Hydrogen Bonding &amp; Vander Waals Forces</b> Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander Waals Forces	
08-02-23 to 14-02-23	<b>Metallic Bond and Semiconductors</b> Metallic Bond- Brief introduction to metallic bond, band theory of metallic bond Semiconductors- Introduction, types and applications. Basic properties of halogen, inter halogens types properties, hydro and oxy acids of chlorine – structure and comparison of acid strength.	
15-02-23 to 21-02-23	<b>Section-B</b> <b>s-Block Elements</b> Comparative study of the elements including, diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.	
22-02-23 to 28-02-23	<b>Chemistry of Noble Gases</b> Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.	
01-03-23 to 15-03-23	<b>SECTION – C</b> <b>p-Block Elements</b> Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation). <b>Boron family (13th gp):-</b> Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure Trihalides of Boron – Trends in Lewis acid character structure of aluminium (III) chloride.	
16-03-23 to 22-03-23	<b>Carbon Family (14th group)</b> Catenation, p $\pi$ - d $\pi$ bonding (an idea), carbides, fluorocarbons, silicates structural aspects), silicons – general methods of preparations, properties and uses. <b>SECTION-D</b> <b>Nitrogen Family (15th group)</b> Oxides – structures of oxides of N,P. oxyacids – structure and relative acid	

		strengths of oxyacids of Nitrogen and phosphorus. Structure of white, yellow and red phosphorus.
23-03-23 29-03-23	to	<p><b>Oxygen Family (16th group)</b> Oxyacids of sulphur – structures and acidic strength <math>H_2O_2</math> – structure, properties and uses.</p> <p><b>Halogen Family (17th group)</b> Basic properties of halogen, interhalogens types properties, hydro and oxyacids of chlorine – structure and comparison of acid strength.</p>
30-03-23 05-04-23	to	<p><b>Organic chemistry</b> <b>Section-A</b> <b>Alkenes</b> Nomenclature of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration–oxidation, oxymercurationreduction, ozonolysis, hydration, hydroxylation and oxidation with <math>KMnO_4</math>.</p>
06-04-23 12-04-23	to	<p><b>Section-B</b> <b>Arenes and Aromaticity</b> Nomenclature of benzene derivatives: Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds.</p>
13-04-23 19-04-23	to	Aromatic electrophilic substitution general pattern of the mechanism, mechanism of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating, deactivating substituent and orientation.
20-04-23 26-04-23	to	<p><b>Section-C</b> <b>Dienes and Alkynes</b> Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene, Chemical reactions 1,2 and 1,4 additions (Electrophilic &amp; free radical mechanism), Diels-Alder reaction,</p>
27-04-23 02-05-23	to	Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration- oxidation of alkynes
03-05-23 09-05-23	to	<p><b>Section-D</b> <b>Alkyl and Aryl Halides</b> Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, <math>S_N2</math> and <math>S_N1</math> reactions with energy profile diagrams.</p>

10-05-23 to 16-05-23	Methods of formation and reactions of aryl halides, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.
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DATE	CURICULUM (BSc IV SEM)
17-01-23 to 24-01-23	<b>Inorganic chemistry</b> <b>Section-C</b> <b>Theory of Qualitative and Quantitative Inorganic Analysis-I</b> Chemistry of analysis of various acidic radicals,
25-01-23 to 31-01-23	Chemistry of identification of acid radicals in typical combinations, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
01-02-23 to 07-02-23	<b>Section-D</b> <b>Theory of Qualitative and Quantitative Inorganic Analysis-II</b> Chemistry of analysis of various groups of basic radicals,
08-02-23 to 14-02-23	Theory of precipitation, co-precipitation, Post- precipitation, purification of precipitates.
15-02-23 to 21-02-23	<b>Organic Chemistry</b> <b>Section-A</b> <b>Infrared (IR) absorption spectroscopy</b> Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum,
22-02-23 to 28-02-23	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.
01-03-23 to 15-03-23	<b>Diazonium Salts</b> Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO <sub>2</sub> and CN groups, reduction of diazonium salts to hydrazines, coupling reaction and its synthetic application.
16-03-23 to 22-03-23	<b>Section-B</b> <b>Amines</b> Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines.Structural features affecting basicity of amines.
23-03-23 to 29-03-23	Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds.
30-03-23 to 05-04-23	Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.
06-04-23 to 12-04-23	<b>Section-C</b> <b>Nitro Compounds</b>

		Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.
13-04-23 19-04-23	to	<b>Section-D</b> <b>Aldehydes and Ketones</b> Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides.
20-04-23 26-04-23	to	Advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.
27-04-23 02-05-23	to	Physical properties. Comparison of reactivities of aldehydes and ketones.
03-05-23 09-05-23	to	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.
10-05-23 16-05-23	to	Mannich reaction. Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $\text{LiAlH}_4$ and $\text{NaBH}_4$ reductions.
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17-01-23 to 24-01-23	<b>Inorganic chemistry</b> <b>Section—C</b> <b>Bioinorganic Chemistry</b> Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin.
25-01-23 to 31-01-23	Biological role of alkali and alkaline earth metal ions with special reference to Ca <sup>2+</sup> . Nitrogen fixation.
01-02-23 to 07-02-23	<b>Section—D</b> <b>Silicones and Phosphazenes</b> Silicones and phosphazenes, their preparation, properties, structure and uses
08-02-23 to 14-02-23	<b>Organic chemistry</b> <b>SECTION – A</b> <b>Heterocyclic Compounds-I</b> 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.
15-02-23 to 21-02-23	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole
22-02-23 to 28-02-23	<b>SECTION – B</b> <b>1. Heterocyclic Compounds-II</b> Introduction to condensed five and six- membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to
01-03-23 to 15-03-23	Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline
16-03-23 to 22-03-23	<b>2. Organosulphur Compounds</b> Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers,
23-03-23 to 29-03-23	sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.
30-03-23 to 05-04-23	<b>SECTION – C</b> <b>1. Organic Synthesis via Enolates</b>

		Acidity of -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate.
06-04-23 12-04-23	to	Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.
13-04-23 19-04-23	to	<b>2. Synthetic Polymers</b> Addition or chain-growth polymerization. Free radical vinyl polymerization,
20-04-23 26-04-23	to	ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.
27-04-23 02-05-23	to	Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers.
03-05-23 09-05-23	to	<b>Section – D</b> <b>Amino Acids, Peptides &amp; Proteins</b> Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of $\alpha$ -amino acids. Structure and nomenclature of peptides and proteins.
10-05-23 16-05-23	to	Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.
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