***Lesson Plan***

**Dr. B.R. Ambedkar Govt. College, Dabwali**

Name of the Assistant Professor:-Rajpal Verma

Class and Section:-B.Sc. I (1st sem) Session-2024-25

Subject:-Organic Chemistry & Inorganic Chemistry

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| **Month** | **Topics** |
| July-Aug 2024 | **General Organic Chemistry**  Localized and Delocalized chemical bond, van der Waal’s interactions, resonance and its  conditions and applications, hyperconjugation, inductive effect, electromeric effect and their  comparison  **Stereochemistry of Organic Compounds**  Types of isomerism, optical isomerism - elements of symmetry, molecular chirality, chiral and  achiral molecules with two stereogenic centres, enantiomers and their properties, |
| Sept 2024 | Diastereomers and their properties, erythro and threo diastereomers, meso compounds, Difference between conformations and configurations, Newmann and Sawhorse projections,  Fischer and Flying wedge configurations  Conformational isomerism – conformational analysis of ethane and n-butane, conformations of  cyclohexane  Relative and absolute configurations, sequence rules, R & S systems of nomenclature  Geometric isomerism – cis, trans isomerism, E & Z system of nomenclature |
| Oct 2024 | **Atomic Structure**  Dual behaviour of matter and radiation, de Broglie’s relation, Heisenberg’s uncertainty principle,  concept of atomic orbitals, Significance of quantum numbers, radial and angular wave functions,  normal and orthogonal wave functions, significance of ψ and ψ2, shapes of s, p, d and f orbitals,  rules for filling electrons in various orbitals, effective nuclear charge, Slater’s rules |
| Nov 2024 | **Periodic Table and Atomic Properties**  Classification of periodic table, definition of atomic and ionic radii, ionization energy, electron  affinity and electronegativity, trends in periodic table (in s and p block elements), Pauling,  Mulliken, Allred Rachow and Mulliken Jaffe’s electronegativity scale. |

***Lesson Plan***

**Dr. B.R. Ambedkar Govt. College, Dabwali**

Name of the Assistant Professor:-Rajpal Verma

Class and Section:-B.Sc. II (3rd sem) Session-2024-25

Subject:-Organic Chemistry & Inorganic Chemistry

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| Month | Topics |
| July-Aug 2024 | **Chapter- Alcohols**  Monohydric alcohols, nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature.  Reactions of alcohols. Dihydric alcohols - nomenclature, methods of formation,  chemical reactions of vicinal glycols, oxidative cleavage[Pb(OAc)4 and HIO4]  pinacol-pinacolone rearrangement |
| Sept 2024 | **Chapter- Phenols**  Nomenclature, structure and bonding. Preparation of phenols,physical properties and acidic character. Comparative ac idic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols — electrophilic aromatic substitution, Mechanisms of Fries rearrangement, Claisen rearrangement, Reimer-Tiemann reaction, Kolbe’s reaction and Schotten and Baumann reactions.  **Chapter- Epoxides**  Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides. |
| Oct 2024 | **Chapter- Ultraviolet (UV) absorption spectroscopy**  Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones,Woodward- Fieser rules, calculation of λm a x of simple conjugated dienes and α,β -unsaturated ketones. Applications of UV Spectroscopy in structure elucidation of simpl e organic compounds.  **Aldehydes and Ketones**  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. |
| Nov 2024 | Wittig reaction. Mannich reaction.Oxidation of aldehydes, Baeyer– Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, WolffKishner, LiAlH4 and NaBH4 reductions.  **Chapter- Coordination Compounds**  Werner’s theory of coordination compounds, effective atomic number, chelates, nomenclature of coordination compounds, Isomerism in coordination compounds, valence bond theory of transition metal complexes.  **Chapter- Non-aqueous solvents**  Physical properties of solvents, types of solvents and their general characteristics, reactions in non aqueous solvents with reference to liquid NH3 and liquid SO2. |

***Lesson Plan***

**Dr. B.R. Ambedkar Govt. College, Dabwali**

Name of the Assistant Professor:-Rajpal Verma

Class and Section:-B.Sc. III (5th sem) Session-2024-25

Subject:-Organic Chemistry & Inorganic Chemistry

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| Month | Topics |
| July-Aug 2024 | **Chapter- Carbohydrates**  Classification and nomenclature of Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose. Formation of glycosides, Determination of ring size of glucose and fructose. Open chain and cyclic structure of D(+)-glucose & D(-) fructose. Mechanism of mutarotation. Structures of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination. |
| Sept 2024 | **Chapter- Organometallic Compounds**  Grignard reagents-formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions  **Chapter- Chapter- NMR Spectroscopy**  Principle of nuclear magnetic resonance, the PMR spectrum, number of signals, peak areas, equivalent and nonequivalent protons positions of signals and chemical shift, shielding and deshielding of protons, proton counting. |
| Oct 2024 | Splitting of signals and coupling constants, magnetic equivalence of protons.Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone. Simple problems on PMR spectroscopy for structure determination of organic compounds.  **Chapter- Metal- Ligand Bonding in Transition Metal complexes**  Limitations of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planer complexes, factors affecting the crystal field parameters. |
| Nov 2024 | **Chapter- Thermodynamics and Kinetic Aspects of metal complexes**  A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, Irving William Series, substitution reactions of square planer complexes of Pt[II], Trans effect.  **Chapter- Electronic spectra of Transition metal complexes**  Selection rules for d-d transition, spectroscopic ground states, spectrochemical series, orgel energy level diagram for d1 and d9 states, discussion of electronic spectrum of [Ti(H2O)6]+3 complex ion. |