

**Govt. College for Women, Gharaunda**

**Lesson Plan**

**Jan 2024 to April 2024 (Even Semester)**

**B.Sc. Chemistry 2nd Semester**

**Mr. Sukh Raj & Mrs. Rachna**

**Subject : Chemistry**

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| <b>Week 1</b> | 15/02/2024 to 17/02/2024   |
|               | <b>Covalent Bond</b><br>Valence bond theory approach, shapes of simple inorganic molecules and ions based on valence shell electron pair repulsion (VSEPR) theory          |
| <b>Week 2</b> | 19/02/2024 to 23/02/2024   |
|               | hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements.                             |
| <b>Week 3</b> | 26/02/2024 to 02/03/2024   |
|               | Molecular orbital theory of homonuclear ( $N_2$ , $O_2$ ) and heteronuclear (CO and NO) diatomic molecules, dipole moment and percentage ionic character in covalent bond. |
| <b>Week 4</b> | 04/03/2024 to 09/03/2024   |
|               | <b>Chemical Kinetics</b><br>Concept of reaction rates, rate equation, factors influencing the rate of reaction,  |
| <b>Week 5</b> | 11/03/2024 to 16/03/2024   |
|               | Order and molecularity of a reaction, integrated rate expression for zero, first, second order reactions (for equal conc. of reactants), Half-life period of a reaction.   |
| <b>Week 6</b> | 18/03/2024 to 22/03/2024   |
|               | <b>Alkanes (upto 5 carbon atoms)</b><br>Alkanes, nomenclature, classification of carbon atoms in alkanes. Isomerism in alkanes, sources,                                   |

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| <b>Week 7</b>  | 01/04/2024 to 06/04/2024   |
|                | methods of formation: Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids,            |
| <b>Week 8</b>  | 08/04/2024 to 13/04/2024   |
|                | physical properties. Mechanism of free radical halogenation of alkanes: reactivity and selectivity.                            |
| <b>Week 9</b>  | 15/04/2024 to 20/04/2024   |
|                | <b>Metallic Bond and semiconductors</b><br>Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond |
| <b>Week 10</b> | 22/04/2024 to 30/04/2024   |
|                | (conductors, semiconductors, insulators).<br>Semiconductors – Introduction, types, and applications.                           |
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**Govt. College for Women, Gharaunda**

**Lesson Plan**

**Jan 2024 to April 2024 (Even Semester)**

**B.Sc. Chemistry 4th Semester**

**Mr. Sukh Raj & Mrs. Rachna**

**Subject : Chemistry**

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| <b>Week 1</b> | 02/01/2024 to 06/01/2024   |
|               | Structure and nomenclature of amines, physical properties<br>Separation of a mixture of primary, secondary and tertiary amines   |
| <b>Week 2</b> | 08/01/2024 to 13/01/2024   |
|               | Structural features affecting basicity of amines<br>Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds)  |
| <b>Week 3</b> | 15/01/2024 to 20/01/2024   |
|               | Gabriel -phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.  |
| <b>Week 4</b> | 22/01/2024 to 27/01/2024   |
|               | 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. |
| <b>Week 5</b> | 29/01/2024 to 03/02/2024   |
|               | Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides,  |
| <b>Week 6</b> | 05/02/2024 to 10/02/2024   |
|               | advantage of oxidation of alcohols with chromium trioxide (Sarett reagent)   |

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|                | pyridinium chlorochromate (PCC) and pyridinium dichromate. Physical properties, Comparison of reactivities of aldehydes and ketones.   |
| <b>Week 7</b>  | 12/02/2024 to 17/02/2024   |
|                | Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations   |
| <b>Week 8</b>  | 19/02/2024 to 24/02/2024   |
|                | Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $\text{LiAlH}_4$ and $\text{NaBH}_4$ reductions |
| <b>Week 9</b>  | 26/02/2024 to 02/03/2024   |
|                | Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum   |
| <b>Week 10</b> | 04/03/2024 to 09/03/2024   |
|                | fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.<br>Applications of IR spectroscopy in structure elucidation of simple organic compounds                    |
| <b>Week 11</b> | 11/03/2024 to 16/03/2024   |
|                | Electrolytic and Galvanic cells – reversible & irreversible cells, conventional representation of electrochemical cells.   |
| <b>Week 12</b> | 18/03/2024 to 22/03/2024   |
|                | Calculation of thermodynamic quantities of cell reaction ( $\Delta G$ , $\Delta H$ & $K$ ). Types of reversible electrodes – metal-metal ion, gas electrode  |
| <b>Week 13</b> | 01/04/2024 to 06/04/2024   |
|                | metal-insoluble salt-anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential  |

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**Govt. College for Women, Gharaunda**

**Lesson Plan**

**Jan 2024 to April 2024 (Even Semester)**

**B.Sc. Chemistry 6th Semester**

**Mr. Sukh Raj & Mrs. Rachna**

**Subject : Chemistry**

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| <b>Week 1</b> | 02/01/2024 to 06/01/2024   |
|               | Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine   |
| <b>Week 2</b> | 08/01/2024 to 13/01/2024   |
|               | Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. |
| <b>Week 3</b> | 15/01/2024 to 20/01/2024   |
|               | Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles  |
| <b>Week 4</b> | 22/01/2024 to 27/01/2024   |
|               | Preparation and reactions of indole, quinoline and isoquinoline. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.   |
| <b>Week 5</b> | 29/01/2024 to 03/02/2024   |
|               | Acidity of $\alpha$ -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate  |
| <b>Week 6</b> | 05/02/2024 to 10/02/2024   |
|               | Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler -Natta   |



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| polymerization and vinyl polymers.  |                          |
| <b>Week 7</b>   | 12/02/2024 to 17/02/2024 |
| Condensation or step growth polymer ization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.   |                          |
| <b>Week 8</b>   | 19/02/2024 to 24/02/2024 |
| Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law.   |                          |
| <b>Week 9</b>   | 26/02/2024 to 02/03/2024 |
| Colligative properties: (i) relative lowering of vapour pressure (ii) Elevation in boiling point (iii) depression in freezing point (iv) osmotic pressure   |                          |
| <b>Week 10</b>  | 04/03/2024 to 09/03/2024 |
| Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.. Applications in calculating molar masses of normal, dissociated and associated solutes in solution. |                          |
| <b>Week 11</b>  | 11/03/2024 to 16/03/2024 |
| Statement and meaning of the terms – phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water system.  |                          |

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| <b>Week 12</b> | 18/03/2024 to 22/03/2024  |
|                | Phase equilibria of two component systems solid-liquid equilibria, simple eutectic<br>Example Pb-Ag system, desilverisation of lead |
| <b>Week 13</b> | 01/04/2024 to 06/04/2024  |
|                | Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of $\alpha$ -amino acids.    |

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| <b>Week<br/>14</b> | 08/04/2024 to 12/04/2024   |
|                    | Structure and nomenclature of peptide s and proteins. Classification of proteins. Peptide structure determination, end group analysis,                           |
| <b>Week<br/>15</b> | 15/04/2024 to 20/04/2024   |
|                    | selective hydrolysis of peptides Classical peptide synthesis, solid–phase peptide synthesis. Structures of peptides and proteins : Primary & Secondary structure |
| <b>Week<br/>16</b> | 22/04/2024 to 30/04/2024   |
|                    | Tests and Revision   |