

**Govt. College for Women, Gharaunda**  
**Lesson Plan**  
**Feb 2023 to May 2023 (Even Semester)**

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

**Mr. Sukh Raj**

**Subject : Chemistry**

<b>Week 1</b>	01/02/2023 to 11/02/2023
	Introduction to alkenes, Nomenclature of alkenes Mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halide The Saytzeff rule, Hofmann elimination
<b>Week 2</b>	13/02/2023 to 18/02/2023
	Physical properties and relative stabilities of alkenes Chemical reactions of alkenes, mechanisms involved in hydrogenation, electrophilic and free radical additions
<b>Week 3</b>	20/02/2023 to 25/02/2023
	Markownikoff's rule, hydroboration-oxidation, oxymercuration-oxymercuration reduction, ozonolysis hydration, hydroxylation and oxidation with $\text{KMnO}_4$ .
<b>Week 4</b>	27/02/2023 to 04/03/2023
	Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene Chemical reactions-1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction
<b>Week 5</b>	13/03/2023 to 18/03/2023
	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
<b>Week 6</b>	20/03/2023 to 25/03/2023
	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
<b>Week 7</b>	27/03/2023 to 01/04/2023
	Aromatic electrophilic substitution -general pattern of the mechanism, mechanism of nitration, halogenation, sulphonation and Friedel-Crafts reaction
<b>Week 8</b>	03/04/2023 to 08/04/2023

Energy profile diagrams. Activating, deactivating substituents and orientation.  
Nomenclature and classes of alkyl halides, methods of formation

Week 9	10/04/2023 to 15/04/2023	chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams
Week 10	17/04/2023 to 21/04/2023	Methods of formation and reactions of aryl halides, The addition elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions.
Week 11	24/04/2023 to 29/04/2023	Relative reactivities of alkyl halides v s allyl, vinyl and aryl halides.
Week 12	01/05/2023 to 06/05/2023	Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them and their variation with concentration. Arrhenius theory of ionization, Ostwald's Dilution Law. Debye-Huckel – Onsager's equation for strong electrolytes (elementary treatment only), Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution.
Week 13	08/05/2023 to 13/05/2023	Applications of conductivity measurements: determination of degree of dissociation, determination of $K_a$ of acids determination of solubility product of sparingly soluble salts. conductometric titrations Concepts of pH and $pK_a$ , Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action
Week 14-15	15/05/2023 to 26/05/2023	Revision and Test of the syllabus

**Govt. College for Women, Gharaunda**

**Lesson Plan**

**Feb 2023 to May 2023 (Even Semester)**

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

**Mr. Sukh Raj**

**Subject : Chemistry**

<b>Week 1</b>	01/02/2023 to 11/02/2023  Structure and nomenclature of amines, physical properties Separation of a mixture of primary, secondary and tertiary amines
<b>Week 2</b>	13/02/2023 to 18/02/2023  Structural features affecting basicity of amines Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds)
<b>Week 3</b>	20/02/2023 to 25/02/2023  Gabriel -phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.
<b>Week 4</b>	27/02/2023 to 04/03/2023  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>	13/03/2023 to 18/03/2023  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>	20/03/2023 to 25/03/2023  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.
<b>Week 7</b>	27/03/2023 to 01/04/2023
	Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations
<b>Week 8</b>	03/04/2023 to 08/04/2023
	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>	10/04/2023 to 15/04/2023
	Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum
<b>Week 10</b>	17/04/2023 to 21/04/2023
	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
<b>Week 11</b>	24/04/2023 to 29/04/2023
	Electrolytic and Galvanic cells – reversible & irreversible cells, conventional representation of electrochemical cells.
<b>Week 12</b>	01/05/2023 to 06/05/2023
	Calculation of thermodynamic quantities of cell reaction ( $\Delta G$ , $\Delta H$ & $K$ ). Types of reversible electrodes – metal-metal ion, gas electrode, metal-insoluble salt-anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential
<b>Week 13</b>	08/05/2023 to 13/05/2023
	Standard Hydrogen electrode, reference electrodes, standard electrode potential, sign conventions Concentration cell Applications of EMF measurement in solubility product and potentiometric titrations using glass electrode numerical problems

Week 14-15

15/05/2023 to 26/05/2023

Revision and Test of the syllabus

Govt. College for Women, Gharaunda

Lesson Plan

Feb 2023 to May 2023 (Even Semester)

B.Sc. Chemistry 6th Semester

Mr. Sukh Raj

Subject : Chemistry

Week 1	01/02/2023 to 11/02/2023
	Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine
Week 2	13/02/2023 to 18/02/2023
	Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives.
Week 3	20/02/2023 to 25/02/2023
	Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles
Week 4	27/02/2023 to 04/03/2023
	Preparation and reactions of indole, quinoline and isoquinoline. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.
Week 5	13/03/2023 to 18/03/2023
	Acidity of $\alpha$ -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate
Week 6	20/03/2023 to 25/03/2023
	Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler -Natta

Week 7	polymerization and vinyl polymers. 27/03/2023 to 01/04/2023
	Condensation or step growth polymerization. Polyesters,  polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.
Week 8 & 9	03/04/2023 to 15/04/2023
	Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law. Colligative properties: (i) relative lowering of vapour pressure (ii) Elevation in boiling point (iii) depression in freezing point (iv) osmotic pressure
Week 10 & 11	17/04/2023 to 29/04/2023
	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. 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.
Week 12 & 13	01/05/2023 to 13/05/2023
	Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of $\alpha$ -amino acids.  Structure and nomenclature of peptides and proteins. 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.

Week 14-15      15/05/2023 to 26/05/2023

Revision and Test of the syllabus