Government College for Women, Mahendergarh

Lesson Plan (2025-2026)

Name: VIRENDER SINGH

Department: Chemistry Class: BSc- 1ST (NM+MED) 1st Sem Paper Code- 24L4.5-CHE-101

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| **S.No** | **Month** | **Topics** |
| **1** | **AUG**  **2025** | Atomic Structure Dual behaviour of matter and radiation, de Broglie’s  relation, Heinsenberg’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, f orbitals, Rules for filling electrons in various orbitals, effective nuclear charge, Slater’s rules. Periodic table and atomic properties Classification of periodic table, definition of atomic and ionic radii, ionisation energy, electron affinity and electronegativity, trend in periodic table (in s and p-block elements), Pauling, Mulliken, Allred Rachow and  Mulliken Jaffe’s electronegativity scale, |
| **2** | **Septe mber**  **2025** | Gaseous State Kinetic theory of gases, Maxwell’s distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity, and most probable velocity. Collision diameter, collision number, collision frequency and mean free path (Derivations excluded), Deviation of Real gases from ideal behavior, Derivation of Van der Waal’ s Equation of State, its application in the calculation of Boyle’ s temperature (compression factor) Critical Phenomenon Concept of Critical temperature, critical pressure, critical volume, relationship between critical  constants and Van der Waal’ s constants |
| **3** | **OCT 2025** | Liquid State Structure of liquids, Properties of liquids – surface tension, refractive index, viscosity, vapor pressure and optical rotation. |
| **4** | **DEC 2025** | Solid State Classification of solids, Law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry and symmetry elements, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg’s law, a simple account of Laue method, rotating crystal method and powder pattern method. |

Government College for Women, Mahendergarh

Lesson Plan (2025-2026)

Name: VIRENDER SINGH

Department: Chemistry Class: BSc- 2ND (NM+MED) Sem Paper Code: 24L5.0-CHE-301

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| **S.No** | **Month** | **Topics** |
| **1** | **AUG**  **2025** | S and P-Block Elements: Salient features of hydrides, oxides, halides,  hydroxides of s- block elements (methods of preparation excluded). Structure, preparation and properties of Diborane and Borazine.  Catenation, carbides, fluorocarbons, silicates (structural aspects), structure of oxides of Nitrogen and Phosphorous, structure of white and red phosphorus. Structure of oxyacids of Nitrogen, phosphorous, sulphur and chlorine and comparison of acidic strength of oxyacids. Low chemical reactivity of noble gases, chemistry of xenon, structure and bonding in fluorides, oxides and oxyfluorides of xenon |
| **2** | **Septe mber**  **2025** | Electrochemistry-I: Electrolytic conduction, factors affecting electrolytic  conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Application of Kohlrausch’ s Law in calculation of conductance of weak electrolytes at infinite dilution (Numericals) Concepts of pH and pKa, Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action. Electrochemistry-II: Reversible & irreversible cells, Calculation of thermodynamic quantities of cell reaction (▲G, ▲H & K).  Types of reversible electrodes – metal- metal ion, gas electrode, metal –  insoluble salt- anion and redox electrodes. Nernst equation, Standard Hydrogen electrode, reference electrodes, Applications of EMF measurement in solubility product and potentiometric titrations |
| **3** | **OCT 2025** | Alkynes: Nomenclature and its structure. Methods of formation: using Calcium carbide, dehydrohalogenation, Kolbe’s electrolysis. Chemical reactions: Mechanism of electrophilic and nucleophilic addition reactions, formation of metal acetylides, addition of bromine and alkaline KMnO4, ozonolysis. Acidity of alkynes. Stereochemistry of Organic Compounds:  Concept of isomerism: Structural and Stereoisomerism bonds. |
| **4** | **DEC**  **2025** | . Benzene and its derivatives: Nomenclature, Aromatic nucleus and side  chain, Huckels’ rule of aromaticity. Aromatic electrophilic substitution: mechanism of nitration, halogenation, sulphonation, and Friedel- Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation. Alkyl halides: Nomenclature, methods of formation: from alkenes and |

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# Government College for Women, Mahendergarh

# Lesson Plan (2025-2026)

Name: VIRENDER SINGH

Department: Chemistry Class: BSc- 3rd5th sem (NM+MED) Paper Code: CH-501

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| **S.No** | **Month** | **Topics** |
| **1** | **AUG 2025** | Metal-ligand Bonding in Transition Metal Complexes Limitations of valence bond theory, an elementary idea of cr ystal-f ield theory, crystal field split ting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-f ield parameters.  Thermodynamic and Kinetic Aspects of Metal Complexe A brief outline of thermodynamic stability of metal complexes and factors affec ting the s tab ility, substitution reac tions of square planar complexes of Pt(II). |
| **2** | **September**  **2025** | Thermodynamic and Kinetic Aspects of Metal Complexe A brief outline of thermodynamic stability of metal complexes and factors affec ting the s tab ility, substitution reac tions of square planar complexes of Pt(II). |
| **3** | **OCT2025** | Magnetic Properties of Transition Metal Complexe Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of s and eff values, orbital contribution to magnetic moments, application of magnetic moment data for 3dmetal |
| **4** | **DEC2025** | Electron Spectra of Transition Metal Complexes Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series. Orgel-energy level diagram for d1 and d9 states, discussion of the electronic spectrum of [Ti(H2O)6]3+ complex ion |