LESSON PLAN

Name of course	Chemistry – I
Course Code	B23 –CHE –101
Semester	1st Semester

August 2025	**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, and orthogonal wave functions, significance of ψ and ψ^2 , 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, ionization 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, Sanderson's electron density ratio.
September 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 constar and Van der Waal" s constants (Derivation excluded
October 2025	**Structure and Bonding** Localized and delocalized chemical bond, Van der Waals interactions. Concept of resonance and its applications, hyperconjugation, inductive effect, Electrometric effect and their comparison. **Mechanism of Organic Reactions** Curved arrow notation, homolytic and heterolytic bond fission. Types of reagents: electrophiles and nucleophiles. Types of organic reactions: Substitution, Addition, Condensation, Elimination, Rearrangement, Isomerization and Pericyclic reactions. Reactive intermediates: Carbocations, carbanions. free radicals, carbenes (structure & stability).

November 2025	**Liquid State** Structure of liquids, Properties of liquids - surface tension, refractive index, viscosity, vapour pressure and optical rotation. **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 patter method. depression in freezing point.Applications in calculating molar masses of normal, dissociated and associated solutes in solution.