

LESSON PLAN

Name of course

Physical Chemistry

Course Code

CHEM – 102

Semester

1st Semester

August 2025	<p>Kinetic Theory of Gases</p> <p>Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation, Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation, Van der Waals equation of state for real gases. Boyle temperature (derivation not required). Critical phenomena, critical constants and their calculation from Van der Waals equation. Andrew's isotherms of CO₂. Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation - derivation not required) and their importance.</p> <p>Temperature dependence of these distributions. Most probable, average and root mean square velocities (no derivation). Collision number, collision frequency, collision diameter and mean free path of molecules.</p>
September 2025	<p>Liquids</p> <p>Structure of liquids, Surface tension and its determination using a stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).</p>
October 2025	<p>Solids</p> <p>Forms of solids. Unit cells, crystal systems, Bravais lattice types and identification of lattice planes.</p> <p>Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices. Elementary idea of symmetry and symmetry elements, X-Ray diffraction by crystals, Bragg's law. Structures of NaCl, KCl and CsCl (qualitative treatment only). Defects in crystals. Glasses and liquid crystals.</p>
November 2025	<p>Solutions and Colligative Properties</p> <p>Methods of expressing concentrations of solutions, Ideal and non-ideal solutions, Recapitulation of Raoult's law and colligative properties, 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.</p>