

**LESSON-PLAN****(Session 2025-26) Odd Semester****Name of Professor:****Mrs .SEEMA****Subject:****Chemistry****Class:****B.Sc.(N.M.) 3<sup>rd</sup> Semester****Subject/Paper:****Chemistry (Minor)**

Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	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. Structure of oxyacids of Nitrogen, phosphorous, sulphur and chlorine and comparison of acidic strength of oxyacids.	
2.	16-08-2025- 31-08-2025	Low chemical reactivity of noble gases, Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration.	
3.	01-09-2025 to 15-09-2025	Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution (Numericals). Concepts of pH, Buffer solution (Numericals). <b>Thermodynamics-I</b> Definition of thermodynamic terms: system, surrounding etc.	<b>1<sup>st</sup> ASSIGNMEN T &amp; TEST</b>  <b>Group Discussion</b>
4.	16-09-2025- 30-09-2025	Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process Thermodynamic equilibrium, Concept of heat and work.	
5.	01-10-2025 to 18-10-2025	First law of thermodynamics: statement, concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship <b>Mechanism of Organic Reactions</b> : Curved arrow notation, homolytic and heterolytic bond fission. Types of reagents: electrophiles and nucleophiles.	<b>2<sup>ND</sup> ASSIGNMEN T &amp; TEST</b>
6.	19-10-2025- 26-10-2025	<b>Diwali Vacation</b>	

7.	27-10-2025 to 15-11-2025	Types of organic reactions: Substitution, Addition, Condensation, Elimination, Rearrangement, Isomerization and Pericyclic reactions.	REVISION
8.	16-11-2025 to 22-11-2025	Reactive intermediates: Carbocations, carbanions, free radicals, carbenes (structure & stability)	REVISION

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Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	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.	16-08-2025- 31-08-2025	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.	
3.	01-09-2025 to 15-09-2025	Electrochemistry-II  Reversible & irreversible cells, 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. Nernst equation, Standard Hydrogen electrode, reference electrodes, Applications of EMF measurement in solubility product and potentiometric titrations using glass electrode.	1 <sup>st</sup> ASSIGNMENT & TEST  Group discussion

4.	16-09-2025-30-09-2025	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 $\text{KMnO}_4$ , ozonolysis. Acidity of alkynes. Stereochemistry of Organic Compounds Concept of isomerism: Structural and Stereoisomerism. Symmetry elements, enantiomers, optical activity, properties of enantiomers, chiral and achiral molecules (up-to 2 asymmetric centres), diastereomers, threo- and erythro- nomenclature, meso-compounds,	
5.	01-10-2025 to 18-10-2025	Relative and absolute configuration, sequence rules, R and S system of nomenclature. Cis- Trans isomerism, E & Z system of nomenclature, Conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds. Newman and Sawhorse projection formulae 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.	2 <sup>ND</sup> ASSIGNMENT & TEST
6.	19-10-2025-26-10-2025	<b>Divali Vacation</b>	
7.	27-10-2025 to 15-11-2025	Energy profile diagrams. Activating, deactivating substituents and orientation Alkyl halides: Nomenclature, methods of formation: from alkenes and alcohol, nucleophilic substitution reactions of alkyl halides, $\text{S}_\text{N}2$ and $\text{S}_\text{N}1$ reactions with energy profile diagrams. Aryl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the elimination- addition mechanisms of nucleophilic aromatic substitution reactions.	REVISION
8.	16-11-2025 to 22-11-2025	Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides.	REVISION

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**LESSON-PLAN****(Session 2025-26) Odd Semester****Name of Professor:****Mrs .SEEMA****Subject:****Chemistry****Class:****B.Sc.(N.M.) 1<sup>st</sup> Semester****Subject/Paper:****Chemistry (Major)**

Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	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, normal and orthogonal wave functions, significance of $\Psi$ and $\Psi^2$ , shapes of s, p, d, f orbitals, Rules for filling electrons in various orbitals, effective nuclear charge, Slater's rules.	
2.	16-08-2025-31-08-2025	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, Sanderson's electron density ratio.	Assignment I Test & Group discussion
3.	01-09-2025 to 15-09-2025	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 behaviour, Derivation of Van der Waal's Equation of State, its application in the calculation of Boyle's temperature (compression factor)	
4.	16-09-2025-30-09-2025	Critical Phenomenon: Concept of Critical temperature, critical pressure, critical volume, relationship between critical constants and Van der Waal's constants (Derivation excluded)	2 <sup>nd</sup> Assignment & Test

5.	01-10-2025 to 18-10-2025	<p><b>Structure and Bonding:</b> Localized and delocalized chemical bond, Van der Waals interactions. Concept of resonance and its applications, hyperconjugation, inductive effect, Electromeric effect and their comparison.</p> <p><b>Mechanism of Organic Reactions:</b> 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 &amp; stability).</p>	
6.	19-10-2025- 26-10-2025	<b>Diwali Vacation</b>	
7.	27-10-2025 to 15-11-2025	<p><b>Liquid State :</b> Structure of liquids, Properties of liquids – surface tension, refractive index, viscosity, vapour pressure and optical rotation.</p> <p><b>Solid State:</b> 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,</p>	REVISION
8.	16-11-2025 to 24-11-2025	Bragg's law, a simple account of Laue method, rotating crystal method and powder pattern method.	REVISION

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**LESSON-PLAN** (Session 2025-26) Odd Semester

Name of Professor: Mrs .SEEMA

Subject: Chemistry


Class: B.Sc.(N.M.) 5<sup>th</sup> Semester

Subject/Paper: Chemistry (Major)

Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	Coordination Compounds: Werner's theory of coordination compounds, EAN, chelates, nomenclature of coordination compounds, isomerism in coordination compounds. Metal Ligand Bonding in Transition Metal Complexes: Valence bond theory, applications and their Limitation, Elementary idea of CFT (Only structural aspects), Crystal field splitting in octahedral, tetrahedral and square planer complexes. Magnetic properties of transition metal complexes: Types of magnetic materials, magnetic susceptibility, method of determination, spin only formula, basic idea of L-S coupling.	
2.	16-08-2025- 31-08-2025	Thermodynamics-II: Third Law of Thermodynamics, Nernst Heat Theorem, Statement of concept of residual entropy, evaluation absolute entropy from heat capacity data. Gibbs function and Helmholtz Function as thermodynamic quantities. Criteria for thermodynamic equilibrium and spontaneity. Variation of G with P, V and T, Partial molar properties, concept of chemical potential (numerical included)	
3.	01-09-2025 to 15-09-2025	Phase Equilibria: Statement and the meaning of terms-phase component and degree of freedom, Thermodynamic derivation of Gibbs phase rule, Phase equilibria of one component system-water system, phase equilibria of two component systems solid-liquid equilibria, simple Eutectic Pb-Ag system. Quantum Mechanics-I: Black body radiation, plank's radiation law, Explanation of spectral distribution of black body radiation on the basis of classical mechanics and quantum mechanics,	1 <sup>st</sup> ASSIGNMENT & TEST  Group Discussion

4.	16-09-2025- 30-09-2025	Heat capacity of solids, Need of quantum mechanics, postulates of quantum mechanics, quantum mechanical operator, Commutation relations, Hamiltonian operator, Role of operators to derive Schrodinger wave equation, Application Schrodinger wave equation in determination of wave function and energy of a particle in one dimensional box	
5.	01-10-2025 to 18-10-2025	Spectroscopy-I: Electromagnetic radiations, reasons of electromagnetic spectrum, basic features of spectroscopy, introduction to molecular spectroscopy and its difference from atomic spectroscopy, signal to noise ratio, resolving power of spectrophotometer, BornOppenheimer approximation, Concept of degree of freedom. Rotational Spectrum: Energy levels of rigid rotator of diatomic molecules, selection rules, spectral intensity distribution using Maxwell-Boltzmann distribution, Determination of bond length and concept of isotopic effect	2 <sup>ND</sup> ASSIGNMEN T & TEST
6.	19-10-2025- 26-10-2025	Diwali Vacation	
7.	27-10-2025 to 15-11-2025	Organic Synthesis via Enolates Acidity of $\alpha$ -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine..	REVISION
8.	16-11-2025 to 22-11-2025	Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole	REVISION

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**LESSON-PLAN (Session 2025-26)****Name of Assistant Professor: Mrs .SEEMA****Subject: Chemistry (Minor)****Class: B.Sc.(N.M.) 1<sup>st</sup> Semester**

Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	Covalent Bond: Shapes of simple inorganic molecules and ions based On valence shell electron pair repulsion (VSEPR) theory Hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral.	
2.	16-08-2025-31-08-2025	Hybridization with suitable examples trigonalbipyramidal and octahedral arrangements. Chemical Kinetics: Concept of reaction rates, factors influencing the rate of reaction,	Assignment 1
3.	01-09-2025 to 15-09-2025	Order and molecularity of a reaction, Integrated rate expression for zero and first order reactions	Group Discussion
4.	16-09-2025-30-09-2025	Alkanes (upto 5 carbon atoms): Alkanes, nomenclature, classification of carbon atoms in alkanes.	Class Seminar
5.	01-10-2025 to 18-10-2025	Isomerism in alkanes ,Methods of formation: Wurtz reaction, Kolbe reaction	Assignment 2
6.	19-10-2025-26-10-2025	Diwali Vacation	
7.	27-10 -2025 to 15-11-2025	Corey-House reaction and decarboxylation of carboxylic acids.Metallic Bond and semiconductors.	REVISION
8.	16-11-2025 to 22-11-2025	Metallic bond :Qualitative idea of Band theory of metallic bond (conductors, semiconductors, insulators).	REVISION

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**LESSON-PLAN (Session 2025-26) Odd Semester****Name of Professor: Mrs .SEEMA****Subject: Introductory Chemistry-I****Class: BCA , BA & B.COM 1st Semester**

Sr. No.	Days	Topics to be covered	Remarks if any
1.	22-07-2025 to 15-08-2025	Atomic Structure and Bonding Introduction, Elementary introduction of atomic structure and chemical bonding.	
2.	16-08-2025-31-08-2025	Representation of elements/ atoms, Lewis structure, electronic configurations (1-30). Carbon and Its Compounds Introduction.	
3.	01-09-2025 to 15-09-2025	Tetravalency of Carbon, allotropes of carbon and their properties, hydrocarbons (1-5), nomenclature (linear compounds).	1 <sup>st</sup> ASSIGNMENT & TEST  Group Discussion
4.	16-09-2025-30-09-2025	Applications of hydrocarbons. Polymers Introduction, elementary idea of synthetic and natural polymers. Homo polymers and copolymers.	
5.	01-10-2025 to 18-10-2025	Uses and properties (Natural rubber, Vulcanized rubber, Polyethylene, PVC, Styrene, Teflon, PAN, Nylon-66)	2 <sup>ND</sup> ASSIGNMENT & TEST
6.	19-10-2025-26-10-2025	Diwali Vacation	
7.	27-10-2025 to 15-11-2025	Food Preservatives Elementary idea of natural and synthetic food preservatives, rancidity, uses and properties,	REVISION
8.	16-11-2025 to 22-11-2025	Different food preservation processes (pickle, Jam), artificial sweeteners, uses and properties.	REVISION

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