Government College Chhachhrauli

Summary of Lesson Plan

Name: Ms. Meenu Rani Academic Session: 2025-26.

Class: B.Sc. I Semester: I Subject & Code: **Chemistry Major**

Sr. No.	Unit	Topics/Chapters to be covered	Duration	Assignments and Tests
1.	I	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.	22.07.2025 – 05.08.2025	**Assignment**
2.	I	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.	06.08.2025 – 20.08.2025	Test
3.	II	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)	21.08.2025 – 04.09.2025	**Assignment**
4.	II	Critical Phenomenon Concept of Critical temperature, critical pressure, critical volume, relationship between critical constants and Van der Waal' s constants (Derivation excluded)	06.09.2025 – 20.09.2025	Test

5.	III	Structure and Bonding Localized and delocalized chemical bond, Van der Waals interactions. Concept of resonance and its applications, hyperconjugation, inductive effect, Electromeric effect and their comparison.	22.09.2025 – 06.10.2025	
6.	III	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).	08.10.2025 – 18.10.2025	
7.	IV	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 pattern method.	27.10.2025 – 10.11.2025	
8.	IV	Test and revision	11.11.2025- 24.11.2025	Test

Note:-

The teaching of topics to the students on the dates/days mentioned in the above lesson plan may not be exactly followed and may have little variations/fluctuations because of some unforeseen circumstances. For example: various Functions/Activities organized by the College *(Musical Meet, Blood Donation, Important Days Celebrations, Co-Curricular/Extra-curricular Activities etc.*), Response of Students in the Class, Request of Students for Repetition of some specific Topics, Unpredicted Leaves, Restricted Holidays etc.

Students can ask any query on my E-Mail ID also

- **E-Mail:** meenuchitrakaar@gmail.com

Government College Chhachhrauli

Summary of Lesson Plan

Name: Ms. Meenu Rani Academic Session: 2025-26.

Class: B.Sc. I Semester: I Subject & Code: **Chemistry Minor**

Sr. No.	Unit	Topics/Chapters to be covered	Duration	Assignments and Tests
1.	I	Covalent Bond Valence bond theory approach, shapes of simple inorganic molecules and ions based on valence shell electron pair repulsion (VSEPR) theory and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements.	22.07.2025 – 05.08.2025	**Assignment**
2.	I	Molecular orbital theory of homonuclear (N2, O2) and heteronuclear (CO and NO) diatomic molecules, dipole moment and percentage ionic character in covalent bond.	06.08.2025 – 20.08.2025	Test
3.	II	Chemical Kinetics Concept of reaction rates, rate equation, factors influencing the rate of reaction, Order and molecularity of a reaction, integrated rate expression for zero, first, second order reactions (for equal conc. of reactants), Half-life period of a reaction.	21.08.2025 – 04.09.2025	**Assignment**
4.	II	Alkanes (upto 5 carbon atoms) Alkanes, nomenclature, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation: Wurtz reaction, Kolbe reaction,	06.09.2025 – 20.09.2025	Test
5.	III	Corey-House reaction and decarboxylation of carboxylic acids, physical properties. Mechanism of free radical halogenation of alkanes: reactivity and selectivity.	22.09.2025 – 06.10.2025	

6.	III	Metallic Bond and semiconductors Metallic bond – Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators). Semiconductors – Introduction, types, and applications	08.10.2025 – 18.10.2025	
7.	IV	Test and Revision	27.10.2025 – 10.11.2025	Test
8.	IV	Revision	11.11.2025- 24.11.2025	

Government College Chhachhrauli

Summary of Lesson Plan

Name: Ms. Meenu Rani Academic Session: 2025-26.

Class: B.Sc. II Semester: III Subject & Code: **Chemistry Major & Minor**

Sr. No.	Unit	Topics/Chapters to be covered	Duration	Assignments and Tests
1.	I	s and p-Block Elements Salient features of hydrides, oxides, halides, hydroxides of sblock 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.	22.07.2025 – 05.08.2025	**Assignment**
2.	I	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. Electrochemistry-I Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration.	06.08.2025 – 20.08.2025	Test
3.	II	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 using glass electrode	21.08.2025 – 04.09.2025	**Assignment**

4.	II	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.	06.09.2025 – 20.09.2025	Test
5.	III	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 erythronomenclature, meso-compounds, 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.	22.09.2025 – 06.10.2025	
6.	III	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.	08.10.2025 – 18.10.2025	
7.	IV	Alkyl halides: Nomenclature, methods of formation: from alkenes and alcohol, nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams. Aryl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the eliminationaddition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides.	27.10.2025 – 10.11.2025	Test
8.	IV	Test and Revision	11.11.2025- 24.11.2025	

Government College Chhachhrauli

Summary of Lesson Plan

Name: Ms. Meenu Rani Academic Session: 2025-26.

Class: B.Sc. III Semester: V Subject & Code: **Chemistry Major**

Sr. No.	Unit	Topics/Chapters to be covered	Duration	Assignments and Tests
1.	I	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.	22.07.2025 – 05.08.2025	**Assignment**
2.	I	Magnetic properties of transition metal complexes: Types of magnetic materials, magnetic susceptibility, method of determination, spin only formula, basic idea of L-S coupling. 11 II 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)	06.08.2025 – 20.08.2025	Test
3.	II	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.	21.08.2025 – 04.09.2025	**Assignment**
4.	II	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, 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,	06.09.2025 – 20.09.2025	Test

		Application Schrodinger wave equation in determination of wave function and energy of a particle in one dimensional box		
5.	III	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,	22.09.2025 – 06.10.2025	
6.	III	spectral intensity distribution using Maxwell-Boltzmann distribution, Determination of bond length and 11 3 concept of isotopic effect Organic Synthesis via Enolates Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.	08.10.2025 – 18.10.2025	
7.	IV	Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. 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.	27.10.2025 – 10.11.2025	Test
8.	IV	Test and revision	11.11.2025- 24.11.2025	

Government College Chhachhrauli

Summary of Lesson Plan

Name: Ms. Meenu Rani Academic Session: 2025-26.

Class: B.Sc. III Semester: V Subject & Code: **VOC Chemistry**

Sr. No.	Unit	Topics/Chapters to be covered	Duration	Assignments and Tests
1.	I	Methods and time of fertilizer applications, tips to get best efficiency of applied fertilizers,.	22.07.2025 – 05.08.2025	**Assignment**
2.	I	integrated nutrient management, fertilizers and their relation to plant nutrients, factors affecting optimum fertilizer dose	06.08.2025 – 20.08.2025	Test test
3.	II	Classification and types of fertilizers, Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide,	21.08.2025 – 04.09.2025	**Assignment**
4.	II	Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride. Introduction, Raw materials, Action of fertilizers.	06.09.2025 – 20.09.2025	
5.	III	Phosphate fertilizers: Normal Super Phosphate, Triple Super Phosphate, Ammonium Phosphate. Potassic fertilizers: Types and optimum doses.	22.09.2025 – 06.10.2025	
6.	III	Pesticides: Classification, synthesis, structure–activity relationship (SAR), mode of action, uses and adverse effects of representative pesticides in the following classes:	08.10.2025 – 18.10.2025	
7.	IV	Organochlorines: DDT, Gammaxene Organophosphates: Malathion, Parathion Carbamates: Carbofuran, Carbaryl Quinones: Chloranil Anilides: Alachlor, Butachlor	27.10.2025 – 10.11.2025	Test

8.	IV	Test and revision	11.11.2025- 24.11.2025	