Lesson Plan

MCM DAV College for Women, Sector – 36 A, Chandigarh

Monthly Teaching Plans (Odd Semester)

Session: 2024-25

Name of the Teacher: Dr. Madhuri, Dr. Aanchal Batra, Dr. Archana

Department: Chemistry

Class: B.Sc (1st Semester) **Subject:** Chemistry

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	15-07-2024	31-08-2024	**INORGANIC CHEMISTRY** **Atomic Structure:** Idea of de-Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, the significance of ψ and ψ2, quantum numbers, radial and angular wave functions (excluding mathematical relations), probability distribution curves, shapes of *s*, *p*, and *d* orbitals. **ORGANIC CHEMISTRY** **Structure and Bonding:** Hybridisation, Bond lengths and bond Angles,	Lecture

			Bond Energy, Localised and Delocalized chemical bond, Van der Waal's interaction, Resonance and Resonance effect, Hyperconjugation, Inductive and Field effect, Electromeric effect, Hydrogen Bonding. **PHYSICAL CHEMISTRY** **Basic Concepts of Mathematics:** Logarithmic relations, differentiation and integration of functions like e^x, x^n, sin x, and log x. Terms of mean and median, precision and accuracy in chemical analysis. **Chemical Kinetics-I:** Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction-concentration,temperature, pressure, solvent, light, and catalyst. Concentration dependence of rates	
2.	01-09-2024	30-09-2024	**INORGANIC CHEMISTRY** **Atomic Structure:** Aufbau and Pauli exclusion principles, Hund's multiplicity rule, Electronic configurations of the elements and ions. **Periodic Properties:** Position of elements in the periodic table, effective	Lecture and discussion

			nuclear charge and its calculations, Atomic and ionic radii, ionisation energy **<u>ORGANIC CHEMISTRY</u>** **Reactive Intermediates:** Curved arrow notation, Drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking, Types of Reagents – Electrophiles and nucleophiles, Types of Organic Reactions. Reactive intermediates-Carbocations, Carbanions, Free Radicals, Carbenes, Arynes and Nitrenes (with examples). Assigning Formal charges on intermediates and other ionic species **<u>PHYSICAL CHEMISTRY</u>** **Chemical Kinetics-I** mathematical characteristics of simple chemical reactions – zero order, first order, second order, pseudo-order, half-life, and mean life. Determination of the order of reaction – differential method, method of integration, method of half-life period and isolation method,	

			Radioactive decay as a first-order phenomenon. **Chemical Kinetics-II:** Theories of Chemical Kinetics: Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy, Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis), Expression for the rate constant based on equilibrium constant and thermodynamic aspects.	
3.	01-10-2024	29-10-2024	**INORGANIC CHEMISTRY** **Periodic Properties:** electron affinity and electronegativity– definition, methods of determination or evaluation. **ORGANIC CHEMISTRY** **Geometrical isomerism:** Cause and conditions for geometrical isomerism, Nomenclature of geometrical isomers- cis and trans, E and Z system, Determination of configuration of geometrical isomers. **Conformational Isomerism:** Representation of conformations - Sawhorse	Lecture

			and Newman formulae, Conformational analysis of ethane, propane, n-butane, cyclohexane, Equatorial and Axial bonds. Conformations of Mono and di-substituted derivatives of cyclohexanes. **PHYSICAL CHEMISTRY** **Chemical Kinetics-II:** Catalysis and general characteristics of catalytic reactions, Homogeneous catalysis, acid-base catalysis and enzyme catalysis, including their mechanisms. Michaelis-Menten equation for enzyme catalysis and its mechanism.	
4.	04-11-2024	Till Exams	**INORGANIC CHEMISTRY** **Periodic Properties:** Trends in the periodic table and applications in predicting and explaining the chemical behaviour. **ORGANIC CHEMISTRY** Conformations of Mono and di-substituted derivatives of cyclohexanes. **PHYSICAL CHEMISTRY** **Chemical Kinetics-II:** Michaelis-Menten equation for enzyme	Lecture and group discussion

			catalysis and its mechanism.	

Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
31st August, 2024	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
23rd Sept, 2024	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
26th Oct, 2024	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
14th Nov, 2024	The teachers have completed the scheduled chapters and topics as shown in the lesson plan

***Any of these** – (i) Lecture Method; (ii) PPT; (iii) Online Sources; (iv) Group Discussion; (v) Case Studies etc. Other Methods adopted by the teacher – Please write the specific teaching method

Lesson Plan

MCM DAV College for Women, Sector – 36 A, Chandigarh

Monthly Teaching Plans (Even Semester)

Session: 2024-25

Name of the Teacher: Dr. Madhuri, Dr. Aanchal Batra, Dr. Archana

Department: Chemistry

Class: B.Sc (2nd Semester) **Subject:** Chemistry

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	10-01-2025	31-01-2025	**INORGANIC CHEMISTRY** **Chemical Bonding – I** Covalent Bond – Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization, and shapes of simple inorganic molecules and covalent ions: BeF_2, BF_3, CH_4, PF_5, SF_6, IF_7, $SnCl_2$, XeF_4. **ORGANIC CHEMISTRY** **Alkanesand Cycloalkanes** Structure, IUPAC Nomenclature, and Isomerism. Methods of Preparation (Sabatier and	Lecture

			Senderen's 36 reaction, from alkyl halide, Wurtz reaction, Corey-House synthesis, Kolbe's method, decarboxylation), Physical and Chemical Properties. **PHYSICAL CHEMISTRY** **Gaseous States** Gas laws, Ideal and real gases, postulates of kinetic theory of gases, deviation from ideal behavior, Van der Waals equation of state. Critical Phenomena: PV isotherms of real gases, the isotherms of Van der Waals equation, relationship between critical constants and Van der Waals constants, the law of corresponding states, reduced equation of state.	
2.	01-02-2025	28-02-2025	**INORGANIC CHEMISTRY** **Chemical Bonding I cont.** Valence shell electron pair repulsion (VSEPR) theory to H_3O^+, SF_4, ClF_3, ICl_4^-, and H_2O. MO theory, homonuclear (elements and ions of 1st and 2nd row) and heteronuclear (CN, CO^+, CO, CN^-) diatomic molecules. Percentage ionic character from dipole moment and electronegativity.	Lecture and discussion

			ORGANIC CHEMISTRY **Alkanes and Cycloalkanes cont.** Mechanism of Halogenation of Alkanes – Relative reactivities of halogens, alkanes, and different classes of hydrogen atoms; Orientation, Reactivity, and Selectivity. **PHYSICAL CHEMISTRY** **Gaseous States cont.** Molecular Velocities: Root mean square, average, and most probable velocities. Collision number, mean free path, and collision diameter. Liquefaction of gases (based on Joule-Thomson effect).	
3.	01-03-2025	28-03-2025	**INORGANIC CHEMISTRY** **Chemical Bonding – II** Ionic Solids – Concept of close packing, ionic structures (NaCl type, and Zinc blende), radius ratio rule and coordination number, limitation of radius ratio rule, lattice defects, semiconductors. Lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing	Lecture

			power and polarizability of ions, Fajan's rule. **<u>ORGANIC CHEMISTRY</u>** **Stereochemistry of Organic Compounds –** Optical Isomerism Concept of Isomerism. Types of isomerism. Tetrahedral concept of carbon, Polarimetry, specific rotation. Optical isomerism – Elements of Symmetry, Molecular Chirality, Enantiomerism, stereogenic center, optical activity, chiral and achiral molecules with two stereogenic centers, Diastereoisomers, Erythro and Threo isomers, Meso compounds. **<u>PHYSICAL CHEMISTRY</u>** **Thermodynamics I** Definition of Thermodynamic Terms: System, surroundings, etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.	
4.	01-04-2025	Till Exams	**<u>INORGANIC CHEMISTRY</u>** **Chemical Bonding II cont.:** Metallic bond: free electron, valence bond,	Lecture and group discussion

			and band theories. Weak Interactions – Hydrogen bonding, Van der Waals forces. **<u>ORGANIC CHEMISTRY</u>** **Stereochemistry of Organic Compounds cont.** Representation of Stereoisomers – Saw-horse, Newman, Flying edge, and Fischer Projection. Number of stereoisomers in chiral compounds, Racemisation, Internal and External compensation, Resolution of racemic mixture, Enantioselective synthesis, Walden inversion. Relative and absolute configuration, sequence rules, D & L, and R & S system of nomenclature (with examples). **<u>PHYSICAL CHEMISTRY</u>** **Thermodynamics I cont:** First Law of Thermodynamics: Statement, definition of internal energy and enthalpy, Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's Law – Joule-Thomson coefficient and inversion temperature. Calculations of w, q, dU & dH for the	

			expansion of ideal gases under isothermal and adiabatic conditions for a reversible process.	

Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
31st January, 2025	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
28th Feb, 2025	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
29th March, 2025	The teachers have completed the scheduled chapters and topics as shown in the lesson plan
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans	
19th April, 2025	The teachers have completed the scheduled chapters and topics as shown in the lesson plan

***Any of these** – (i) Lecture Method; (ii) PPT; (iii) Online Sources; (iv) Group Discussion; (v) Case Studies etc. Other Methods adopted by the teacher – Please write the specific teaching method