Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester)
Session – (2026-27)

Name of the Teacher: Dr. Archana,

Department: Chemistry

Class: M.Sc I **Subject:** Inorganic Chemistry

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	28-07.2026	05.08.2026	VSEPR, Walsh diagrams (tri and tetra-molecules), d π-p π bonds,	Lecture
2	06.08.2026	13.08. 2026	Bent rule and energetics of hybridization, some simple reactions of covalently bonded molecules.	Lecture
3	14.08. 2026	18.08. 2026	Limitations of crystal field theory, molecular orbital theory for octahedral.	Lecture
4	19.08. 2026	27.08. 2026	molecular orbital theory for tetrahedral and square planar complexes, π bonding and molecular orbital theory.	Lecture
5	28.08. 2026	12.09. 2026	Stepwise and overall formation constant and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin,	Lecture
6	13.09. 2026	30.09. 2026	Determination of binary formation constants by pH spectrophotometry. Energy profile of a reaction, reactivity of metal complexes,	Lecture and group discussion
7	01.10. 2026	24.10. 2026	Inert and labile complexes, kinetic application of valance bond and crystal field theories, kinetics of	Lecture

			octahedral substitution. Acid hydrolysis, factors affecting acid hydrolysis, Base hydrolysis, conjugate base mechanism, direct and indirect evidences in favour of conjugate mechanism, reactions without metal-ligand bond cleavage	
8	25.10. 2026	Till exams	Substitution reactions in square planar complexes, the trans effect, mechanism of substitution reaction, Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, Cross reactions and Marcus Hush Theory, inner sphere type reactions	Lecture and Group discussion
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans				
26th August, 2026	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				
30th September, 2026	The teachers have completed the scheduled chapters and topics as shown in the lesson plan			
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28th October, 2026	The teachers have completed the scheduled chapters and topics as shown in the lesson plan			
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***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 – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester)
Session – (2026-27)

Name of the Teacher: Dr. Manjot Kaur and Dr. Swatika Sharma

Department: Chemistry

Class: M.Sc I **Subject:** Organic Chemistry CH-412

S.No	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	18-07-2026	04-08-2026	Unit III Aliphatic Nucleophilic substitution: S_N1 and S_N2, Neighbouring group participation.	Lecture method
2	05-08-2026	25-08-2026	Unit III Aliphatic Nucleophilic substitution: S_N1 and S_N2, Neighbouring group participation. Phase transfer catalysis, ambident nucleophiles, regioselectivity, esterification and ester hydrolysis. S_{N1} mechanism, SET mechanism, Factors affecting reactivity in SN reactions. Nucleophilic substitution at an allylic carbon, aliphatic trigonal carbon and at a vinylic carbon. Phase transfer catalysis, ambident nucleophiles, regioselectivity, esterification and ester hydrolysis.	Lecture Method & Group Discussion for paper solving by giving Assignment
3	26-08-2026	22.09.2026	Unit III Aliphatic Nucleophilic Aliphatic Electrophilic substitution: SE1, SE2 and SEi. Electrophilic substitution accompanied by double bond shifts, Factors affecting electrophilic substitution reactions. Unit IV Aromatic Electrophilic substitution: Arenium ion mechanism, orientation and reactivity, energy profile diagrams, Nitration, sulphonation, halogenations, Friedel-Crafts reaction and Friedel-Crafts acylation.	Lecture Method & Group Discussion for paper solving by giving Assignment

4	22.09.2026	Till Exam	Unit IV Aromatic Electrophilic substitution: o/p- ratio. Ipso attack, orientation in other ring systems. Vilsmeier-Haack Reaction, Gatterman-Koch Reaction, Diazonium coupling. Aromatic Nucleophilic substitution: Unimolecular and Bimolecular mechanism. Aromatic Nucleophilic Substitution Reaction via Benzynes. Factors affecting reactivity. Von Richter Rearrangement, Smiles Rearrangement and Sommelet-Hauser Rearrangement.	Lecture method
5.	18-07-2026	04-08-2026	Unit I Nature of Bonding in Organic molecules: Fundamental concepts, Delocalized chemical bonding, conjugation, Cross conjugation, resonance, hyper- conjugation.	Lecture Method & Group Discussion for paper solving by giving Assignment
6	05-08-2026	25-08-2026	Unit I Nature of Bonding in Organic molecules: Bonding in fullerenes, Tautomerism, Aromaticity in benzenoid and non-benzenoid compd Alternant and non-alternant hydrocarbons, Huckel's rule. Energy level of π M.O., Annulenes, anti-aromaticity, aromaticity, Homo aromaticity, PMO approach. Bonds weaker than covalent, addition compound, crown ether complexes and cryptands, Inclusion compound, cyclo dextrins, Catenanes & rotaxanes.	Lecture Method & Group Discussion for paper solving by giving Assignment
7.	26-08-2026	22.09.2026	Effect of structure on reactivity-resonance and field effects, steric effect, quantitative treatment. The Hammett equation and linear free energy relationship, substituent and reaction constants. Taft equation.synthesis, chirality due to helical shape. Stereochemistry of compounds containing N, S, P	Lecture Method & Group Discussion for paper solving by giving Assignment
8.	22.09.2026	Till Exam	Unit II Stereochemistry: Geometrical Isomerism, Conformational Analysis, Conformation of Acyclic systems, cycloalkanes, sugars and decalins. Effect of conformation on reactivity. Steric strain due to undesirable crowding of resolution. Stereospecific and stereoselectiveRevision and Solution of previous years' question papers	Lecture Method & Group Discussion for paper solving by giving Assignment

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Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester)
Session – (2026-27)

Name of the Teacher: Dr. Shilpa Dogra

Department: Chemistry

Class: M.Sc. I **Subject** -Physical Chemistry

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	28-07.2026	18.08. 2026	Schrodinger wave equation to different systems, Approximation method, Variation Theorm, Perturbation Theory, Self-Consistent Field Theory.	Lecture method, Group discussion
2	19.08. 2026	12.09. 2026	Concept of distribution, thermodynamic probability & most probable distribution, ensemble averaging, postulates of ensemble averaging, canonical, grand canonical & micro canonical ensembles. Ordinary angular momentum, generalized angular momentum, eigenfunctions for angular momentum, eigen values of angular momentum, using ladder operators.	Lecture Method, Group discussion
3	13.09. 2026	24.10. 2026	Non ideal systems, excess functions for non-ideal solutions, Activity,	Lecture Method, Group discussion

			Activity coeff, Debye huckel theory for activity coeff. electrolyte solutions, determination of activity & activity coeff, ionic strength.	
4	25.10. 2026	Till Exam	Application of phase rule to 3-component system, second order phase transitions.Calculation of Thermodynamic properties in terms of partition functions. Heat capacity, behaviour of solids chemical equilibria and equilibrium constant in terms of partition function, F.D. statistics, distribution law and application to metals. Bose Einsteins statistics. Distribution law & application to Helium. Revision and Solution of previous years' question papers	Lecture Method, Group discussion
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Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester)
Session – (2026-27)

Name of the Teachers: Dr. Manjot Kaur
Department: Chemistry

Class: M.Sc I **Subject:Biology For Chemist**(CH-414)

Date (Monthly)			**Topics to be Covered**	**Academic Activity Undertaken***
From		**To**		
18-07-2026		04-08-2026	UNIT 1:Cell Structure and Functions: Structure of prokaryotic and eukaryotic cell, intracellular organelles and their functions, comparison of plant and animal cells. Overview of metabolic processes –catabolism and anabolism. ATP-the biological energy currency. Origin of life – unique properties of carbon, chemical evolution and rise of living systems. Introduction to biomolecules, building blocks of bio-macromolecules.	Lecture Method & Group Discussion about Introduction to relevant reference books And marking system in final paper
05-08-2026		25-08-2026	UNIT 1: Cell Structure and Functions: Carbohydrates: Conformation of monosaccharides, structure and functions of important derivatives of monosaccharides like glycosides, deoxy sugars, myoinositol, amino sugars. N-acetylmuramic acid, sialilic acid, disaccharides and polysaccharides. Structure and biological functions of glucosaminoglycans or muco-polysaccharides. Carbohydrates of glycoproteins and glycolipids. Role of sugars in biological recognition. Blood group substances. Ascorbic acid. Carbohydrate metabolism-kreb's cycle, glycolsis, glycognesis and glycogenolysis, gluconeogenenis, pentose phosphate pathway.	Lecture Method & Case Studies. For Practice of nomenclature
26-08-2026		22.09.2026	UNIT 2: Lipids Fatty acids, essential fatty acids, structure and function of triacylglycerols, glyerophosphplipids, cholesterol, bile acids, prostaglandins, lipoproteins-composition and function, role in atherosclerosis. Properties of lipid	Lecture Method & Group Discussion for paper solving

		aggregates micelles, bilayers, liposomes and their possible biological functions. Bioligical membrans. Fluid mosaic model of membrane structure. Lipid metabolism - beta oxidation of fatty acid.	by giving Assignment
22.09.2026	Till Exam	Amino-acids, Peptides and Proteins: Chemical and enzymatic hydrolysis of proteins to peptides, amino acid sequencing. Secondary structure of proteins forces responsible for holding of secondary structures. Alpha helix, Beta sheets, secondary structure, triple helix structure of collagen. Tertiary structure of protein-folding Subject: BIOLOGY FOR CHEMISTS PAPER: (IV) CH-414 (b) 13 and domain structure. Quaternary structure. Amino acid metabolism- degradation and biosynthesis of amino acids, sequence determination chemical enzymatic mass spectral, racemization detection. Chemistry of oxytocin and tryptophan releasing hormone.	Lecture Method & group Discussion. Revision and question papers discussion
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Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Even Semester)
Session – (2026-27)

Name of the Teacher: Dr. Archana (Tentative)

Department: Chemistry

Class: M.Sc I Su**bject:** Inorganic Chemistry(CH-421)

S. No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	15 -01- 2027	30-01-2027	Electronic Spectra and Magnetic Properties of Transition Metal Complexes-I: Spectroscopic ground states, correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d1-d9 states), calculations of Dq, B and β parameters, charge transfer spectra, Isopoly and Heteropoly Acids and Salts	Lecture Method, PPT Group Discussion
2	01.02. 2027	27.02. 2027	Electronic Spectra and Magnetic Properties of Transition Metal Complexes-II: Spectroscopic method of assignment of absolute configuration in optically active metal chelates and their stereo chemical information, anomalous magnetic moments, magnetic exchange coupling and spin crossover.	Lecture Method, PPT Group Discussion
3	01.03. 2027	27.03. 2027	Metal Π–Complexes: Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structure elucidation, important reaction of metal carbonyls. Preparation, bonding structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes, tertiary phosphine as ligand.	Lecture Method and Group Discussion

4	29.03. 2027	Till exam	Metal Cluster: Higher boranes, carboranes, metallobranes and metallocarboranes, metal carbonyl and halide clusters, compounds with metal-metal multiple bonds. Remedial Classes	Lecture Method and Group Discussion
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24th Feb, 2027	The teachers have completed the scheduled chapters and topics as shown in the lesson plan			
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31th, March 2027	The teachers have completed the scheduled chapters and topics as shown in the lesson plan			
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28th April, 2027	The teachers have completed the scheduled chapters and topics as shown in the lesson plan			

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Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Even Semester)
Session – (2026-27)

Name of the Teachers: Dr. Swatika Sharma (Tentative)

Department: P.G. Department of Chemistry

Class: M.Sc I **Subject:** Organic Chemistry 1 (CH-422)

Teacher	**Date (Monthly)**		**Topics to be Covered**	**Academic Activity Undertaken***
	From	**To**		
1.	15 .01. 2027	30.01.2027	**Unit 1: Reaction Mechanism, Structure and Reactivity and Addition to Carbon-Carbon Multiple Bonds:** Types of mechanism, types of reactions, thermodynamics and kinetic requirement. Kinetic & thermodynamics control Hammond's postulate, Curtin-Hammett Principle, Potential energy diagrams, transition states and intermediates, method of determining mechanisms, isotope effects. Mechanistic and stereochemical aspects of addition reaction involving electrophiles, nucleophiles and free radicals, regio and chemoselectivity, orientation and reactivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic ring. Hydroboration. Michael reaction. Sharpless asymmetric epoxidation.	Lecture method & Group discussion about Introduction to good reference books
2.	01.02. 2027	27.02. 2027	**Unit 2: Addition To Carbon-Heteroatom Multiple Bonds** Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds acids, esters and nitriles. Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds acids, esters and nitriles. Addition of grignard reagents, organozinc and organolithium reagents to carbonyl and unsaturated carbonyl compounds. Wittig reaction. Mechanism of condensation reactions involving enolates-	Lecture Method & Group Discussion for Importance of reaction mechanism and basics of proper structure drawing

			Aldol, Knoevenagel, Claisen, Mannich, Benzoin, Perkin and Stobbe reactions. Hydrolysis of esters and amides, ammonolysis of esters.	
3.	01.03. 2027	27.03. 2027	**Unit 3: Free Radical Reactions and Elimination Reaction** Type of free radical reactions, free radical substitution mechanism at an aromatic substrate, neighbouring group assistance. Reactivity for aliphatic and aromatic substrates at a bridgehead. Reactivity in the attacking radicals. The effect of solvents on reactivity. Allylic halogenation (NBS), oxidation of aldehydes to carboxylic acids, auto-oxidation. Coupling of alkynes and arylation of aromatic compounds by diazonium salts. Sandmeyer reaction. Free Radical Rearrangement. Hunsdiecker reaction. The E2, E1 and E1cB mechanisms and their spectrum, Orientation of the double bond. Reactivity effects of substrate structure, attacking base, the leaving group and the medium. Mechanism and orientation in pyrolytic elimination.	Lecture method & Group discussion about Introduction to good reference books
4.	29.03. 2027	Till exam	**Unit 4: Pericyclic Reactions** Molecular orbital symmetry, frontier orbitals of ethylene, 1,3-butadiene, 1, 3, 5-hexatriene and allyl system. Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions conrotatory and disrotatory motions 4n, 4n +2 and allyl system. Cycloadditions-antarafacial suprafacial additions, 4n and 4n+2 systems Ene reaction. 2+2 additiion of ketenes, 1, 3-dipolar cycloadditions and cheleotropic reactions.Sigmatropic rearrangements-Suprafacial and antarafacial shifts of H. Sigmatropic shifts involving carbon moieties, [3, 3]-and [5, 5]- sigmatropic rearrangements. Claisen, Cope and aza-Cope rearrangement. Fluxional tautomerism. Ene reaction. 2+2 additiion of ketenes, 1, 3-dipolar cycloadditions and cheleotropic reactions	Lecture method & Group discussion about Introduction to good reference books
Departmental Meeting to Coordinate and Review the Monthly completion of Syllabus as per lesson plans				
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Lesson Plan

Mehr Chand Mahajan D.A.V. College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Even Semester)
Session –2026-2027

Name of the Teacher: NT (Tentative)

Department: Chemistry

Class: M. Sc. I Chemistry **Subject:** Physical Chemistry (CH-423)

S. No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	15.01.2027	15.02.2027	**Unit-1: Chemical Dynamics:** Methods of determining rate laws, ionic reactions, kinetic salt effects, steady state kinetics, kinetic & thermodynamic control of reactions, treatments of unimolecular reactions, Dynamic chain (pyrolysis of acetaldehyde composition of ethane), Photochemical (H_2-Cl_2) reactions & oscillatory reactions (Belousov-Zhabotinsky reaction), homogeneous catalysis. **Unit-2: Non-equilibrium** Thermodynamics: Thermodynamic criteria for non-equilibrium states, entropy production and entropy flow, entropy balance equations for different irreversible processes (eg. heat flow, chemical reaction etc.), Transformation of generalized fluxes and forces, non-equilibrium stationary states, phenomenological equators,	Lecture, PPT
2.	16.02.2027	03.03.2027	**Unit-1: Chemical Dynamics:** kinetics of enzyme reactions, general features of fast reactions, Study of fast reactions by flow method, relaxation method, flash photolysis, and NMR method dynamics of molecular motion, probing the transition state, dynamics of barrier less chemical	Lecture, Online sources

			reactions in solution, Dynamics of unimolecular reaction (Lindemann-Hinshelwood and Rice-Ramsperger-Kassel-Marcus Theories of unimolecular reactions) **Unit-2: Non-equilibrium** Thermodynamics: microscopic reversibility and Onsager's reciprocity relations, electro kinetic phenomenon, Macromolecules: Electrically conducting, fire resistant, liquid crystal polymers, Kinetics of polymerization, Mechanism of polymerization, molecular mass determination (osmometry, viscometry, diffusion & light scattering methods), sedimentation.	
3.	04.03.2027	24.03. 2027	**Unit 3: Surface Chemistry** Adsorption, surface tension, capillary action, Laplace equation, Kelvin equation, Gibb's adsorption isotherm, BET equation. electro kinetic phenomenon, catalytic activity on surfaces. Micelles: **Unit 4: Electrochemistry** Electrochemistry of solutions, Debye Huckel Treatment and its extension, ion-solvent interaction, Debye Huckel-Jerum model, Thermodynamics of electrified interface equations, derivation of electro capillarity, Lipmann equations, Methods of determining structures of electrified interface, Guoy-Chapmann, Stern Over potentials. Diffusion, electrical conduction, irreversible thermodynamics for biological system,	Lecture, group discussion and seminar

4.	25-03-2027	Till exam	**Unit 4: Electrochemistry** coupled reactions. Exchange current density, Butler Volmer equation, Tafel plots, Quantum aspects of charge transfer at electrode solutions, quantization of charge transfer, Semiconductor interfaces-theory of double layer of interfaces, effects of light at semiconductor solution interface. Electrocatalysis: Influence of various parameters, H-electrode, polarography, Ilkovic equation, half wave potential and its significance, electrocardiography, corrosion **Unit 3: Surface Chemistry** Surfactants, classification, micellisation, critical micellisation concentration (CMC), factors affecting CMC, counter ions binding to micelles, thermodynamics of micellization-phase separation, mass action models, solubilization, microemulsions, reverse micelles.	Lecture, group discussion and seminar

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Lesson Plan

MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Even Semester)
Session – (2026-27)

Name of the Teacher/s: Dr. Shilpa Dogra (Tentative)

Department: Chemistry

Class: M.Sc. I **Subject:** Group Theory and spectroscopy

S.No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1.	15.01.2027	15.02.2027	**Unit 1:** Symmetry elements & symmetry operation, definitions of group, subgroup, relation between orders of a finite group & its sub groups. Point group symmetry. Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.	Lecture method, PPT, Videos from NPTEL
2.	16.02.2027	03.03.2027	**Unit 2:** Representations of groups by matrices (representation for the Cn, Cnv, Cnh, Dnh etc. group) character of a representation. The great orthogonality theorem and its importance character tables and their use-in spectroscopy. **Unit 3:** Infrared Spectroscopy: - Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero-point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational	Lecture method, PPT, Videos from NPTEL

			spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group frequencies, overtones, hot bands, Raman Vibrational: - Classical & quantum theories of Raman effect pure rotational, vibrational and vibrational. Rotational Raman spectroscopy. Coherent anti stokes Raman spectroscopy	
3.	04.03.2027	24.03. 2027	**Unit 4:** Nuclear Magnetic Resonance Spectroscopy: - Nuclear spin, nuclear resonance, shielding of magnetic nuclei, chemical shifts deshielding, spin-spin interactions, (ABX, AMX, ABC, A2 B2) spin decoupling. Electron Spin resonance spectroscopy: - Basic values factors affecting 'g' value. Measurements, techniques, applications. Nuclear Quadrupole Resonance spectroscopy: - Quadrupole Nuclear moments, electic field gradient complex constants applications	Lecture Method, Online Sources
4.	25-03-2027	Till exam	Energy levels, molecular orbital, Frank Condon's Principles, electronic spectra of polyatomic molecules emission spectra; radiative & non radiative decay. Spectra of transition metal complexes; change transfer spectra. **Unit 4:** Basic Principles Photoelectric Effect, Ionization Process: Koopman's theorem, photoelectron spectra of	Lecture Method, Videos from NPTEL

			simple molecule. Auger electron spectroscopy. Bragg's condition, Miller indices. Debye-Scherrer method for structure analysis. Principal and applications of neutron diffraction and electron diffraction	
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