

Govt. P.G. College For Women, ROHTAK

LESSON PLAN

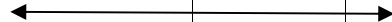
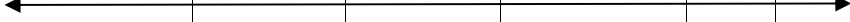
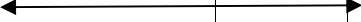
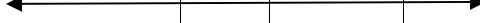
Odd Semester

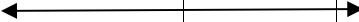
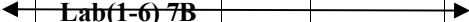
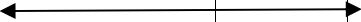
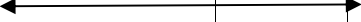
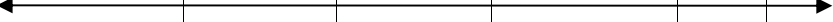
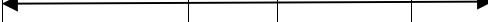
2026-2027

CHEMISTRY DEPARTMENT

Chemistry Time Table Odd Sem 2026-27

Name	9-10	10-11	11-12	12-1	1-2	2-3	3-4	Sign
Dr. Anita		M.Sc. (6)	Lab B.Sc. 3 rd (3-6) 5C ←→ Lab MSc.(1-2) 3C		B.Sc. 2 nd Skill M. Lab (5) 7B B.Sc. 2 nd Skill N.M. Sec B (6) 3B	2 nd Minor Lab(5) 5C	20	
	←→							
Dr. Sonika	On CCL							
Dr. Deepak	Lab 2 nd (5-6) 6B N.M. ←→ Bsc 3 rd N.M. Sec C (3-4) 5B		Lab 3 rd (1-4) 6B ↔ Lab 1 st Skill Non- Med. (5- 6) 7B		B.Sc 3 rd Minor Lab (3-4) 6B			
		B.sc 3 rd (M) Sec A (3- 4)5B						
Dr. Pooja Chahal	Lab 2 nd N.M. (5- 6) 5C ←→	M.Sc. (1-2) 2C ←→	Lab 3 rd (1-2) 6B ←→ Lab M.Sc. (3- 4) 3C					
				Yoga Phy Hons (5-6)				

Ms. Shammy Laj	Lab 2nd (3-6) 5C		Lab 3rdN.M.(3-6) 7B 		B.Sc 1st Thry Sec A(3-4)2C B.Sc 1st Thry Sec C (1-2)2C			
Dr. Nidhi	M.Sc. (1-2) 2C Lab 2nd (3-4) 3C		Lab 3rd (1-2) 5C  Yoga Hindi Hons.(3-4) Lab M.Sc. (5-6) 3C 					
Ms. Vandana Aggarwal	M.Sc. (3-4) 2C Lab 2nd (1-2) 3C 		Lab M.Sc. (5-6) 3C  Lab 3rdN.M.(3-4)7B  Yoga psycho +home sci(1-2)					
Mr. Anuj Sharma			B.Sc 3rd Hons Minor (3-4) Sec B 3B		B.Sc. 3 Minor Th Sec A 5B (1-2) B.Sc 3rd Minor Lab (3-6) 6B	B.Sc. 1st Lab(1-6) 6B 		
Dr. Sakshi	Lab 2nd (1-2)6B N.M. 	B.Sc 3rd (M) Sec	Lab 3rd (3-4) 5C 		B.Sc 1st Minor Lab (1-4) 6B B.Sc. 1st Minor Th	B.Sc 2nd Minor Lab(3-4) 5C		

		B (5-6) 5B		Lab 1 st Skill Med. (5-6) 7B	Sec A +B (5-6) 5B			
Ms. Komal			Lab 3 rd (1-2,5-6) 7B 		Bsc 3 rd Minor Lab (3-6) 6B	B.Sc. 2 nd N.M. Sec A Minor (1-2) 2C B.Sc 2 nd Minor N.M Lab(3-6) 5C		
Dr. Mohini			B.Sc 2 nd Sec C med (1-2) 2C B.Sc 2 nd Sec B med (5-6) 2C	Lab 1 st Skill Med. (5-6) 7B	B.Sc 1 st Minor Lab (1-2) 6B	B.Sc. 1 st Lab(1-6) 7B		
Ms. Pooja Chaudhary	Lab 2 nd (3-6) 7B 		B.Sc 2 nd Sec D N.M (3-4) 5B Lab 3 rd Hons. (1-2) 7B	B.Sc. 2 nd Hons. Minor Sec B (5-6) 5B	B.Sc. 2 nd Skill M. Lab (5-6) 7B B.Sc. 2 nd Hons. Lab (1-4) 5C			
Ms.Seema	M.Sc. (5-6) 2C Lab 2 nd (1-2) 5C 		Lab M.Sc. (3-4) 3C  Yoga (5-6) Eco Hons.	Skill 2 nd lab N.M.(5-6) 6B	B.Sc 3 rd Minor Lab (5-6) 6B			
Ms. Meena	 1 st Hons. Lab (5) 3C		Lab 3 rd Hons.(5-6) 7B B.Sc 1 st N.M. Sec D(1-2) 3B		B.Sc. 2 nd Skill N.M. Sec B (5) 3B B.Sc. 2 nd Skill M. Lab (6) 7B 2 ND Hons. Minor	B.Sc. 1 st Lab(1-4) 5C 2 nd Minor Lab(6) 5C		

					Lab(1-4) 5C			
Dr. Aarti			Lab 3 rd Hons.(5-6) 6B	B.Sc. 2 nd Skill M. Sec A (5-6) 2C	B.Sc 1 st Sec B(5-6)2C B.Sc 1 st Minor Lab (3-4) 6B	BSc. 1 st Lab(1-6) 6B		
Dr. Suman	Lab 2 nd (1-2) (3C)		Lab M.Sc.(1-2) 3C					
	1 st Hons. Lab (3-4,6) 3C	M.Sc. (3-5)			B.Sc. 2 nd Skill M. Lab (5-6)5C			
Ms. Preeti			Lab 3 rd Hons.(1-2) 6B B.Sc. 1 st Skill(M) Sec A(5-6) 3B	B.Sc. 1 st Skill N.M. Sec. B (5-6) 3B	B.Sc. 2 nd Skill M. Lab (5-6) 5C	B.Sc. 1 st Lab(1-6) 7B		
Dr. Nidhi	BSc III (1-6) Theory Sec A		BSc III (1-2)					
Ms. Monika	NO Workload							
Ms. Manu	NO Workload							
Dr. Vijaita	NO Workload							
Ms. Sangeeta	NO Workload							

Govt. P.G. College For Women, ROHTAK

Department of Chemistry

Lesson Plan

2026-27

1.

Name of Faculty - Dr Anita Singal

Class – M.Sc. Previous (Inorganic Chemistry)

Semester - 1st &

B.Sc. II Skill Chemistry

Semester -3rd

August 2026

Second Week **B.Sc. II Battery Design and Factors Affecting Battery Performance**

General introduction.

Third Week **B.Sc. II** Designing to eliminate potential safety problems, battery safeguards when using discrete batteries.

Fourth Week **B.Sc. II** Battery construction.

September 2026

First Week **M.Sc. Previous** Crystal field theory, spectrochemical series.

B.Sc. II Design of rechargeable batteries.

Second Week **M.Sc. Previous** Calculation of CFSE for low and high spin complexes of 3d-series elements

B.Sc. II Factors affecting battery performance.

Third Week **M.Sc. Previous** Applications of CFSE, limitations of crystal field theory.

B.Sc. II Assignment & Test

Fourth Week **M.Sc. Previous** Jahn-Teller effect.

B. Sc. II Secondary Batteries

General characteristics and applications of secondary batteries.

October 2026

First Week **M.Sc. Previous** Applications of Jahn-Teller effect.

B.Sc. II Types and characteristics of secondary batteries.

Second Week **M.Sc. Previous** Ligand field theory.

B.Sc. II Comparison of performance characteristics for secondary battery systems and introduction, chemistry, construction, performance characteristics.

Third Week **M.Sc. Previous** Molecular orbital theory.

B.Sc. II Charging characteristics of following batteries: Lead batteries, Lithium ion batteries, Iron electrode batteries.

Fourth Week **M.Sc. Previous** M.O. diagrams of octahedral complexes including both σ and π bonding.

B.Sc. II Charging characteristics of following batteries: Nickel-Cadmium, Nickel-Metal hydride, Nickel Zinc batteries.

November 2026

First Week Diwali Vacations.

Second Week M.O. diagrams of square planar complexes including σ bonding.

Third Week M.O. diagrams of square planar complexes including π bonding.

Fourth Week Factors affecting ΔE .

December 2026

First Week Revision of syllabus

Second Week Questions for Practice

Third Week Group Discussion

Fourth Week Problem Solving

2. Name of Faculty : Dr. Deepak

Course/Class :B.Sc-III

Semester : Semester-V

Subject : ChemistryMajor(26CHEM405DS01)

Week/Month	Name of Topics
11-15 August 2026	UNIT-III Carbonyl Compounds and Carboxylic acid derivatives Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation
17-22 August 2026	Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer-Villiger oxidation,
24-29 August 2026	, α -substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, LiAlH_4 , NaBH_4 , MPV, PDC). Preparation and reactions of acid chlorides, anhydrides, esters and amides, comparative study of nucleophilic substitution at acyl group - Mechanism of acidic and alkaline hydrolysis of esters
31-5 September 2026	Claisen condensation, Dieckmann and Reformatsky reactions, Hoffmann-bromamide degradation and Curtius rearrangement

7-12 September 2026	UNIT-1 Organometallic Chemistry Definition, nature of metal carbon bond, classification of organometallic compounds by bond types viz. i) covalent ii) ionic iii) electron deficient iv) cluster compounds v) bond compounds including sandwich derivatives.
14 - 19 September 2026	Structure and bonding in metal-ethylenic, metal-acetylenic complexes, metal carbonyls and cyclopentadienyl derivative. Properties and bonding of alkyls of Li, Al, Hg and Sn, concept of hapticity of organic ligand, Zeise salt and ferrocene
21-26 September 2026	EAN rule applied to carbonyls. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. π – acceptor behavior of carbon monoxide.
28- 3 October 2026	Synergic effects (VB approach, MO diagram of CO can be referred for synergic effect to IR frequencies). Applications of organometallic compounds.
5-10 October 2026	UNIT-IV Carbohydrates Classification and nomenclature. Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides, erythro and threo diastereomers
12-17 October 2026	Conversion of glucose into mannose. Formation of glycosides, ethers and esters. Determination of ring size of glucose and fructose. Open chain and cyclic structure of D(+) glucose & D(-) fructose.
19-24 October 2026	Mechanism of mutarotation, structures of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.
26-31 October 2026	Synthetic Dyes Colour and constitution (electronic concept). Classification of dyes, chemistry and synthesis of methyl orange, Congo red, malachite green, crystal violet, phenolphthalein, fluorescein, alizarin and indigo.
1-11 November 2026	DIWALI-BREAK
12-14 November 2026	UNIT-II Quantum Mechanics-I Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids,
16-21 November 2026	Compton effect, wave function and its significance, postulates of quantum mechanics, quantum mechanical operator, commutation relations
23-28 November 2026	Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity, role of operators in quantum mechanics, Heisenberg uncertainty principle
30 -5 December	Revision

3. Name of the Faculty – Dr. Pooja Chahal

Subject – MSc. Physical Chemistry

SEPTEMBER 2026

Week 1: Elementary idea of quantum mechanics shrinker wave question for a particle in 1 dimensional box and its pictorial presentation

Week 2: Schrodinger wave equation in for a particle in a three dimensional box concept of degeneracy

Week 3: Schrodinger wave equation for a linear harmonic oscillator and its solution by polynomial method,

Week 4: zero point energy of a particle possessing harmonic motion

OCTOBER 2026

Week 1: Schrodinger wave equation for three dimensional rigid rotator energy of rigid rotator space quantization

Week 2: Schrodinger wave equation 4 hydrogen atom

Week 3: separation of variable in polar spherical coordinates and its solution

Week 4: Electrochemistry: Debye Huckle theory of Iron Island interaction and activity coefficient, applicability and limitation of Dubai Huckle limiting law

November 2026

Week 1: Diwali Break

Week 2: Defect of iron solvent interaction on activity coefficient physical significance of activity coefficient mean activity coefficient of an electrolyte

Week 3: Debye Huckle Onsager treatment for aquaous solution and its limitations, Debye Huckle Onsager treatment for non-aquaous solution

Week 4: Solvent effect on mobility of infinite dilution, equivalent conductivity vs concentration as a function of solvent, effect of Ion Association upon Conductivity

December 2026

Week 1: Ionic movement under influence of an electric field, mobility of ions ionic drift velocity and its relation with current density

Week 2: Einstein relations between absolute mobility and diffusion coefficient

Week 3: stocks Einstein relations nuns Einstein equation warden through

LESSON PLAN

4. NAME OF FACULTY – Mrs Shammy Laj DESIGNATION – Assistant Professor

CLASS – B.Sc. Semester III

SUBJECT – MAJOR CHEMISTRY

AUGUST

2ND WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Ionic bond, lattice energy, Born–Haber cycle and its applications; Fajan’s rules; hydration energy; bond moment, dipole moment and percentage ionic character.

3RD WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Resonance and resonance energy in inorganic and organic compounds. Molecular Orbital Approach: LCAO method; bonding and antibonding molecular orbitals; characteristics of s–s, s–p and p–p combinations of atomic orbitals.

4TH WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Non-bonding combination of orbitals; MO treatment of homonuclear diatomic molecules of the first and second periods, including s–p mixing; heteronuclear diatomic molecules such as O_2 , O_2^{2-} , N_2^- , CO, NO^+ and CN^- ; comparison of VB and MO approaches.

SEPTEMBER

1ST WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Oxides: structures of oxides of nitrogen and phosphorus. Oxyacids: structures and relative acid strengths of oxyacids of nitrogen and phosphorus.

2ND WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Structure of white, yellow and red phosphorus; oxyacids of sulphur—structures and acidic strength; H_2O_2 —structure, properties and uses.

3RD WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Basic properties of halogens; interhalogen compounds—types and properties; halogen acids and oxyacids of chlorine—structure and comparison of acidic strength.

Zinc–Carbon batteries (Leclanché and Zinc Chloride cell systems): general characteristics, cell chemistry, types of cells and batteries, construction and cell components.

4TH WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Brønsted–Lowry concept; conjugate acids and bases; relative strengths of acids and bases; effects of substituent and solvent; differentiating and levelling solvents.

OCTOBER

1ST WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Lewis acid–base concept; classification of Lewis acids and bases; Lux–Flood concept. Revision and class test of Unit–II.

2ND WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Maxwell's distribution of velocities and energies (derivation excluded); calculation of root mean square velocity, average velocity and most probable velocity.

3RD WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Collision diameter, collision number, collision frequency and mean free path; deviation of real gases from ideal behaviour.

4TH WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Van der Waals equation of state and its applications in the calculation of Boyle's temperature (compression factor); explanation of the behaviour of real gases using Van der Waals equation.

NOVEMBER

1ST WEEK

DIWALI BREAK

No classes – Diwali Break.

2ND WEEK

MAJOR CHEMISTRY Unit–III Critical Phenomenon

Critical temperature, critical pressure and critical volume and their determination; PV isotherms of real gases; continuity of states; isotherms of Van der Waals equation.

3RD WEEK

MAJOR CHEMISTRY Unit–III Critical Phenomenon

Relationship between critical constants and Van der Waals constants; compressibility factor; law of corresponding states. Revision and unit test.

4TH WEEK

MAJOR CHEMISTRY Unit–IV Basics of Organic Chemistry and Stereochemistry

Electronic displacements and their applications; reaction intermediates; concept of aromaticity; concept and types of isomerism; introduction to optical isomerism and optical activity.

5. CHEMISTRY DEPARTMENT GPGCW, ROHTAK LESSON PLAN

NAME OF FACULTY- Dr. NIDHI

CLASS- MSc Chemistry

Subject: Organic Chemistry-I / Wellbeing Course through Yoga

AUGUST

2ND WEEK

Yoga: Unit-I Introduction to Yoga: History and Philosophy of Yoga; basic principles of Yoga.

3RD WEEK

Yoga: Unit-I Introduction to Yoga: Ashtanga Yoga and Hatha Yoga; importance of Yoga in daily life.

4TH WEEK

Yoga: Unit-II Physical Wellbeing through Asanas: Basics of human physiology and anatomy; benefits of Asanas in physical health.

SEPTEMBER

1ST WEEK

Yoga: Unit-II Practice of Asanas: Vrikshasana, Utkatasana, Padahasthasana, Trikonasana and Veerasana.

2ND WEEK

Yoga: Unit-II Practice of Asanas: Baddha Padmasana, Utthita Padmasana, Pawanmuktasana, Mandukasana and Uttanmandukasana.

3RD WEEK

Yoga: Unit-II Practice of Asanas: Paschimottanasana, Matsyasana, Naukasana, Uttanpadasana and Sarvangasana.

M.Sc. Unit-I – Nature of Bonding in Organic Molecules: Delocalized chemical bonding; conjugation; cross-conjugation; resonance; hyperconjugation and tautomerism.

4TH WEEK

Yoga: Unit-II Practice of Asanas: Halasana, Bhujangasana, Shalabhasana, Dhanurasana, Makarasana and Shavasana.

M.Sc. Unit-I – Nature of Bonding in Organic Molecules: Aromaticity in benzenoid and non-benzenoid compounds; Hückel's rule; energy levels of π -molecular orbitals; annulenes.

OCTOBER

1ST WEEK

Yoga: Unit-III Physical Wellbeing through Pranayama and Bandhas: Introduction to Pranayama and its benefits; Puraka, Rechaka and Kumbhaka.

M.Sc. Unit-I – Nature of Bonding in Organic Molecules: Antiaromaticity; homoaromaticity; PMO approach; alternant and non-alternant hydrocarbons.

2ND WEEK

Yoga: Unit-III Pranayama: Anulom Vilom, Bhastrika and Bhramari; practical practice and benefits.

M.Sc. Unit-I – Nature of Bonding in Organic Molecules: Bonds weaker than covalent; addition compounds; crown ether complexes; cryptands; inclusion compounds; cyclodextrins.

3RD WEEK

Yoga: Unit-III: Kapalbhathi; introduction to Bandhas and their practical procedure.

M.Sc. Unit-I – Nature of Bonding in Organic Molecules: Catenanes and rotaxanes; completion and revision of Unit-I.

4TH WEEK

Yoga: Unit-IV Mental Wellbeing through Meditation and Mudras: Connection between mind, body and spirit; benefits of meditation on mental health.

M.Sc. Unit-IV – Elimination Reactions: E1, E2 and E1cB mechanisms; orientation of the double bond; effect of substrate structure, attacking base and leaving group on reactivity.

NOVEMBER

1ST WEEK

Holiday: Diwali Break

2ND WEEK

Yoga: Unit-IV Meditation and Mudras: Introduction to Mudras; benefits of Mudras for meditation; practical practice.

M.Sc. Unit-IV – Elimination & Addition Reactions: Mechanistic and orientation aspects of pyrolytic elimination; mechanistic and stereochemical aspects of addition reactions.

3RD WEEK

Yoga: Unit-IV Guided Meditation: Mindfulness and loving-kindness meditation; practical guided meditation sessions.

M.Sc. Unit-IV – Addition to Carbon-Carbon Multiple Bonds: Addition reactions involving electrophiles, nucleophiles and free radicals; orientation and reactivity; addition to cyclopropane ring.

4TH WEEK

Yoga: Unit-IV Revision and Practical Integration: Asanas, Pranayama, Bandhas and Meditation; connection of mind, body and spirit.

M.Sc. Unit-IV – Addition to Carbon-Carbon Multiple Bonds: Hydrogenation of double and triple bonds; hydrogenation of aromatic rings; hydroboration; Michael reaction; Sharpless asymmetric epoxidation; revision of Unit-IV.

6. CHEMISTRY DEPARTMENT GPGCW, ROHTAK

LESSON PLAN

Name of Faculty- Komal

Class- B.Sc. 2nd Year (Major and Minor)

Subject- Chemistry Minor (Paper–II) & Chemistry Major(Paper–III)

Paper–II: Chemistry of Metals & Non-Metals, Hydrocarbons and Solutions | **Course Code:** 25CHE403M01

Paper–III: Fundamental Chemistry–III | **Course Code:** 25CHEM403DS01

AUGUST

2nd WEEK

PAPER–II Unit–I: Metal and Non-Metals

Occurrence of elements in nature; physical and chemical properties of metals and non-metals; minerals and ores; introduction to metallurgical processes.

PAPER–III Unit–I: Chemistry of Transition Series Elements

General characteristics of transition metals; brief comparison of the first, second and third transition series; general trends and important properties.

3rd WEEK

PAPER–II Unit–I: Metal and Non-Metals

Metallurgical processes: beneficiation, roasting, calcination and reduction of metal oxides; refining of metals; metallurgy of Fe, Zn, Al and Cu.

PAPER–III Unit–I: Chemistry of Transition Series Elements

Stability of various oxidation states; magnetic and spectral properties; binary compounds and compounds illustrating relative stability of oxidation states.

4th WEEK

PAPER–II Unit–II: Solution

Types of solutions; expression of concentration of solutions of solids in liquids; solubility of gases in liquids; solid solutions; Raoult's law.

PAPER–III Unit–I: Chemistry of Transition Series Elements

Chemistry of Ti, V, Cr, Mn, Fe, Co, Mo and W in various oxidation states; important laboratory reagents: potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite.

SEPTEMBER

1st WEEK

PAPER–II Unit–II: Solution

Colligative properties: relative lowering of vapour pressure, elevation of boiling point, depression in freezing point and osmotic pressure; determination of molecular masses using colligative properties.

PAPER–III Unit–II: Thermodynamics–II

Third law of thermodynamics; Nernst heat theorem; concept of residual entropy; evaluation of absolute entropy from heat-capacity data.

2nd WEEK

PAPER–II Unit–II: Solution

Abnormal molecular mass and Van't Hoff factor; applications and numerical problems based on colligative properties.

PAPER–III Unit–II: Thermodynamics–II

Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities; G and A as criteria for spontaneity and thermodynamic equilibrium; their advantage over entropy change.

3rd WEEK

PAPER–II Unit–III: Hydrocarbons

Alkanes: general methods of preparation and reactions, including free-radical substitution.

PAPER–III Unit–II: Thermodynamics–II

Variation of G and A with pressure, volume and temperature; partial molar quantities.

4th WEEK

PAPER–II Unit–III: Hydrocarbons

Alkenes: general methods of preparation and reactions including cis-addition (alkaline KMnO_4), trans-addition (bromine), addition of HX (Markownikoff's and anti-Markownikoff's addition), hydration, ozonolysis, oxymercuration-demercuration and hydroboration oxidation.

PAPER–III Unit–III: Electrochemistry

Arrhenius theory of ionization; Ostwald's dilution law; Debye–Hückel–Onsager equation for strong electrolytes; transport number and its determination by Hittorf's methods.

OCTOBER

1st WEEK

PAPER–II Unit–III: Hydrocarbons

Alkynes: general methods of preparation and reactions; formation of metal acetylides and acidity of alkynes; addition of bromine and alkaline KMnO_4 ; ozonolysis and oxidation with hot alkaline KMnO_4 ; hydration to form carbonyl compounds.

PAPER–III Unit–III: Electrochemistry

Electrolytic conduction and factors affecting electrolytic conduction; applications of conductivity measurements; determination of dissociation constant (K_a), degree of dissociation and solubility product of sparingly soluble salts.

2nd WEEK

PAPER–II Unit–IV: Aromatic Hydrocarbons

Structure of benzene: Kekulé, hybrid and resonance structures; preparation of benzene; introduction to electrophilic substitution reactions.

PAPER–III Unit–III: Electrochemistry

Conductometric titrations; definition of pH and pK_a ; buffer solution and buffer action; Henderson–Hasselbalch equation; mechanism of buffer action.

3rd WEEK

PAPER–II Unit–IV: Aromatic Hydrocarbons

Electrophilic substitution reactions of benzene: nitration, halogenation, sulphonation and Friedel–Craft's alkylation and acylation; carbocation rearrangement and its significance.

PAPER–III Unit–III: Electrochemistry

Reversible electrodes: metal–metal ion gas electrodes, metal–metal insoluble salt–anion electrodes and redox electrodes.

4th WEEK

PAPER–II Unit–IV: Aromatic Hydrocarbons

Side-chain oxidation of alkyl benzene; emphasis on carbocation rearrangement and the reaction mechanisms of electrophilic substitution.

PAPER–III Unit–IV: Alkyl and Aryl Halides

Alkyl halides: nomenclature and classes; general methods of preparation; physical properties and chemical reactions; SN_1 , SN_2 , E_1 , E_2 and $\text{E}_{1\text{cb}}$ mechanisms; stereochemistry of nucleophilic substitution reactions; energy profile diagrams and elimination versus substitution.

NOVEMBER

1st WEEK – DIWALI BREAK

Diwali Break

2nd WEEK

PAPER–III Unit–IV: Alkyl and Aryl Halides — Continued

Aryl halides: methods of preparation; aromatic nucleophilic substitution and effect of substituents on reactivity; benzyne mechanism using KNH_2/NH_3 or $\text{NaNH}_2/\text{NH}_3$; reactivity and relative strength of C–halogen bonds in alkyl, allyl, benzyl, vinyl and aryl halides.

PAPER–II & PAPER–III: Final Revision

Final revision of all prescribed units, clarification of student queries and focused practice of important concepts, numerical problems, reactions, mechanisms and comparative questions.

3rd WEEK

PAPER–II & PAPER–III: Assessment and Course Completion

Final unit-wise assessment/test, discussion of answers, assignment review and completion of the prescribed syllabus.

Komal

Assistant Professor

Department of Chemistry

CHEMISTRY DEPARTMENT GPGCW, ROHTAK

LESSON PLAN

7. NAME OF FACULTY- Ms. Vandana Aggarwal

CLASS- M.Sc. Chemistry

Subject: Organic Chemistry-I/ Wellbeing Course through Yoga

AUGUST

2ND WEEK

Yoga: Unit-I Introduction to Yoga: History and Philosophy of Yoga; basic principles of Yoga.

3RD WEEK

Yoga: Unit-I Introduction to Yoga: Ashtanga Yoga and Hatha Yoga; importance of Yoga in daily life.

4TH WEEK

Yoga: Unit-II Physical Wellbeing through Asanas: Basics of human physiology and anatomy; benefits of Asanas in physical health.

SEPTEMBER

1ST WEEK

Yoga: Unit-II Practice of Asanas: Vrikshasana, Utkatasana, Padahastasana, Trikonasana and Veerasana.

2ND WEEK

Yoga: Unit-II Practice of Asanas: Baddha Padmasana, Utthita Padmasana, Pawanmuktasana, Mandukasana and Uttanmandukasana.

3RD WEEK

Yoga: Unit-II Practice of Asanas: Paschimottanasana, Matsyasana, Naukasana, Uttanpadasana and Sarvangasana.

MSc: Unit-II – Stereochemistry

Chirality; elements of symmetry; molecules with more than one chiral center; diastereomerism; methods of resolution; optical purity.

Prochirality; enantiotopic and diastereotopic atoms, groups and faces; asymmetric synthesis; Cram's rule and its modifications; Prelog's rule.

Conformational analysis of decalins.

Optical activity in the absence of chiral carbon: biphenyls, allenes and spiranes; chirality due to helical shape.

Geometrical isomerism in alkenes and oximes; methods of determining the configuration.

4TH WEEK

Yoga: Unit-II Practice of Asanas: Halasana, Bhujangasana, Shalabhasana, Dhanurasana, Makarasana and Shavasana.

MSc: Unit-II – Stereochemistry (Continuation)

Revision and problem-solving based on chirality, stereoisomerism, resolution, optical purity, asymmetric synthesis, Cram's rule, Prelog's rule, conformational analysis and geometrical isomerism.

OCTOBER

1ST WEEK

Yoga: Unit-III Physical Wellbeing through Pranayama and Bandhas: Introduction to Pranayama and its benefits; Puraka, Rechaka and Kumbhaka.

MSc: Unit-III – Reaction Mechanism: Structure and Reactivity

Types of mechanisms; thermodynamic and kinetic requirements; kinetic and thermodynamic control.

Hammond's postulate; Curtin-Hammett principle; potential energy diagrams; transition states and intermediates.

2ND WEEK

Yoga: Unit-III Pranayama: Anulom Vilom, Bhastrika and Bhramari; practical practice and benefits.

MSc: Unit-III – Reaction Mechanism (Continuation)

Methods of determining mechanisms; isotope effects.

Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes and nitrenes.

3RD WEEK

Yoga: Unit-III: Kapalbhati; introduction to Bandhas and their practical procedure.

MSc: Unit-III – Structure–Reactivity Relationships

Effect of structure on reactivity.

Hammett equation and linear free energy relationship; substituent and reaction constants.

4TH WEEK

Yoga: Unit-IV Mental Wellbeing through Meditation and Mudras: Connection between mind, body and spirit; benefits of meditation on mental health.

MSc: Unit-III – Structure–Reactivity Relationships (Continuation)

Taft equation; revision and problem-solving based on reaction mechanisms, energy profiles, reactive intermediates and structure–reactivity relationships.

NOVEMBER

1ST WEEK

Holiday: Diwali Break

MSc: Unit-III – Revision

Revision of reaction mechanisms, kinetic/thermodynamic control, Hammond postulate, Curtin-Hammett principle and potential energy diagrams.

2ND WEEK

Yoga: Unit-IV Meditation and Mudras: Introduction to Mudras; benefits of Mudras for meditation; practical practice.

MSc: Unit-III – Revision

Revision of carbocations, carbanions, free radicals, carbenes and nitrenes; comparative stability and reactivity.

3RD WEEK

Yoga: Unit-IV Guided Meditation: Mindfulness and loving-kindness meditation; practical guided meditation sessions.

MSc: Unit-III – Revision

Revision of Hammett and Taft equations, LFER, substituent constants and reaction constants.

4TH WEEK

Yoga: Unit-IV Revision and Practical Integration: Asanas, Pranayama, Bandhas and Meditation; connection of mind, body and spirit.

MSc: Unit-III – Unit Test / Comprehensive Revision

Comprehensive revision and question discussion covering Unit-II Stereochemistry and Unit-III Reaction Mechanism.

CHEMISTRY DEPARTMENT GPGCW, ROHTAK

LESSON PLAN

8. NAME OF FACULTY- SAKSHI

CLASS- B.Sc. 3rd Year / B.Sc. 1st Year

SUBJECT- 1.B.Sc. 3rd Year MAJOR CHEMISTRY, 2.B.Sc. 1st Year MINOR CHEMISTRY

AUGUST

2ND WEEK

MAJOR CHEMISTRY Unit-I Organometallic Chemistry

Definition and nature of metal carbon bond, classification of organometallic compounds by bond types viz. covalent, ionic and electron deficient compounds.

MINOR CHEMISTRY Unit-I Atomic Structure

Atomic models, Rutherford's model and its limitations, Bohr's model and its applications, dual nature of matter and light, de Broglie's relationship.

3RD WEEK

MAJOR CHEMISTRY Unit-I Organometallic Chemistry

Cluster compounds, π -bond compounds including sandwich derivatives. Structure and bonding in metal-alkene, metal-acetylene complexes, metal carbonyls and cyclopentadienyl derivatives.

MINOR CHEMISTRY Unit-I Atomic Structure

Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals.

4TH WEEK

MAJOR CHEMISTRY Unit-I Organometallic Chemistry

Properties and bonding of alkyls of Li, Al, Hg and Sn; concept of hapticity of organic ligand; Zeise salt and ferrocene; EAN rule applied to examples. Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals; π -acceptor behavior of carbon monoxide; synergic effects.

MINOR CHEMISTRY Unit-I Atomic Structure

Rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

SEPTEMBER

1ST WEEK

MAJOR CHEMISTRY Unit-II Quantum Mechanics-I

Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance.

MINOR CHEMISTRY Unit-II Periodic Table and Atomic Properties

Brief history of the development of periodic table, modern periodic law and the present form of periodic table.

2ND WEEK

MAJOR CHEMISTRY Unit-II Quantum Mechanics-I

Postulates of quantum mechanics, quantum mechanical operator, commutation relations, Hamiltonian operator, Hermitian operator.

MINOR CHEMISTRY Unit–II Periodic Table and Atomic Properties

Periodic trends in properties of elements - atomic radii, ionic radii and inert gas radii.

3RD WEEK**MAJOR CHEMISTRY Unit–II Quantum Mechanics-I**

Average value of square of Hermitian operator as a positive quantity, role of operators in quantum mechanics, Heisenberg uncertainty principle.

MINOR CHEMISTRY Unit–II Periodic Table and Atomic Properties

Ionization enthalpy, electron gain enthalpy, electronegativity, valency.

4TH WEEK**MAJOR CHEMISTRY Unit–II Quantum Mechanics-I**

Revision of Unit–II, numerical/conceptual practice based on wave function, operators, commutation relations and Heisenberg uncertainty principle. Test and assignment.

MINOR CHEMISTRY Unit–II Periodic Table and Atomic Properties

Nomenclature of elements with atomic number greater than 100. Revision, test and assignment.

OCTOBER**1ST WEEK****MAJOR CHEMISTRY Unit–III Carbonyl Compounds and Carboxylic Acid Derivatives**

Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Claisen-Schmidt and Perkin reactions.

MINOR CHEMISTRY Unit–III Mole Concept

Atomic mass, mole concept and molar mass, Avogadro's number and its significance.

2ND WEEK**MAJOR CHEMISTRY Unit–III Carbonyl Compounds and Carboxylic Acid Derivatives**

Cannizzaro and Wittig reactions, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer-Villiger oxidation.

MINOR CHEMISTRY Unit–III Mole Concept

Percentage composition, empirical and molecular formula, chemical reactions.

3RD WEEK**MAJOR CHEMISTRY Unit–III Carbonyl Compounds and Carboxylic Acid Derivatives**

α -substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, LiAlH_4 , NaBH_4 , MPV, PDC). Preparation and reactions of acid chlorides, anhydrides and esters.

MINOR CHEMISTRY Unit–III Mole Concept

Ways of expressing concentration of solutions - molarity, normality, molality, mole percentage and strength.

4TH WEEK**MAJOR CHEMISTRY Unit–III Carbonyl Compounds and Carboxylic Acid Derivatives**

Amides and their preparation; study of nucleophilic substitution at acyl group; mechanism of acidic and alkaline hydrolysis of esters; Claisen condensation, Dieckmann and Reformatsky reactions, Hoffmann-bromamide degradation and Curtius rearrangement. Test and assignment.

MINOR CHEMISTRY Unit–III Mole Concept

Stoichiometric calculations involving reactants and products. Numerical practice, revision, test and assignment.

NOVEMBER**1ST WEEK – DIWALI BREAK****2ND WEEK****MAJOR CHEMISTRY Unit–IV Carbohydrates**

Classification and nomenclature, monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides, erythro and threo diastereomers, conversion of glucose into mannose.

MINOR CHEMISTRY Unit–IV Fundamentals of Organic Chemistry

Electronic displacements: Inductive effect, electromeric effect, resonance and hyperconjugation. Cleavage of bonds: homolysis and heterolysis.

3RD WEEK

MAJOR CHEMISTRY Unit–IV Carbohydrates / Synthetic Dyes

Formation of glycosides, ethers and esters; determination of ring size of glucose and fructose; open chain and cyclic structure of D(+)-glucose and D(-)-fructose. Mechanism of mutarotation; structures of ribose and deoxyribose; introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination. Synthetic Dyes: colour and constitution (electronic concept), classification of dyes, chemistry and synthesis of methyl orange, congo red, malachite green, crystal violet, phenolphthalein, fluorescein, alizarin and indigo.

MINOR CHEMISTRY Unit–IV Fundamentals of Organic Chemistry

Reaction intermediates: carbocations, carbanions, free radicals and carbenes. Electrophiles and nucleophiles. Aromaticity: benzenoids and Huckel's rule. Revision of Unit–IV, assignment and unit test.

SAKSHI
Assistant Professor
Department of Chemistry

CHEMISTRY DEPARTMENT GPGCW, ROHTAK

LESSON PLAN

9. NAME OF FACULTY- MOHINI

CLASS- B.Sc. 2nd Year, 3rd Semester

SUBJECT- CHEMISTRY

AUGUST

2ND WEEK

CHEMISTRY Unit–I Chemistry of Transition Series Elements

General characteristics of transition metals; brief discussion of differences between the first, second and third transition series; stability of various oxidation states; magnetic and spectral properties.

3RD WEEK

CHEMISTRY Unit–I Chemistry of Transition Series Elements

Binary compounds and complexes illustrating relative stability of their oxidation states; chemistry of Ti, V, Cr, Mn, Fe, Co, Mo and W in various oxidation states.

4TH WEEK

CHEMISTRY Unit–I Chemistry of Transition Series Elements

Important compounds as laboratory reagents: potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite. Revision and problem-solving.

SEPTEMBER

1ST WEEK

CHEMISTRY Unit–II Thermodynamics-II

Third law of thermodynamics; Nernst heat theorem; concept of residual entropy; evaluation of absolute entropy from heat capacity data.

2ND WEEK

CHEMISTRY Unit–II Thermodynamics-II

Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities; criteria for spontaneity and thermodynamic equilibrium.

3RD WEEK

CHEMISTRY Unit–II Thermodynamics-II

Variation of G and A with P, V and T; partial molar quantities; applications and numerical problems.

4TH WEEK

CHEMISTRY Unit–II Thermodynamics-II

Revision of Unit–II; numerical/problem-solving practice; class test and assignment.

OCTOBER

1ST WEEK

CHEMISTRY Unit–III Electrochemistry

Arrhenius theory of ionization; Ostwald's dilution law; Debye-Hückel–Onsager equation for strong electrolytes; elementary treatment of transport number.

2ND WEEK

CHEMISTRY Unit–III Electrochemistry

Definition and determination of transport number by Hittorf's methods; electrolytic conduction; factors affecting electrolytic conduction.

3RD WEEK

CHEMISTRY Unit–III Electrochemistry

Applications of conductivity measurements: determination of dissociation constant (K_a) and degree of dissociation; determination of solubility product of sparingly soluble salts; conductometric titrations.

4TH WEEK

CHEMISTRY Unit–III Electrochemistry

Determination of pH and pK_a ; buffer action; Henderson–Hasselbalch equation; buffer mechanism of buffer action. Reversible electrodes – metal-metal ion gas electrode, metal-metal salt anion electrode and redox electrode.

NOVEMBER

1ST WEEK – DIWALI BREAK

2ND WEEK

CHEMISTRY Unit–IV Alkyl and Aryl Halides

Alkyl halide: nomenclature and classes of alkyl halides, general methods of preparation, physical properties and chemical reactions. Mechanisms (SN_1 , SN_2 , E1, E2 and E1cb) and stereochemistry of nucleophilic substitution reactions of alkyl halides with energy profile diagrams.

3RD WEEK

CHEMISTRY Unit–IV Alkyl and Aryl Halides

Elimination vs substitution reactions. Aryl halides: methods of preparation; aromatic nucleophilic substitution and effect of substituents on reactivity. Benzyne mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$); reactivity and relative strength of C–halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides. Revision, assignment and unit test

CHEMISTRY DEPARTMENT GPGCW, ROHTAK

LESSON PLAN

10. Name of Faculty- Anuj Sharma

Class- B.Sc. 3rd Year (Physical Science and Physics Honours)

Subject- Minor Chemistry (Paper–V)

Paper–V: Transition Metals, Batteries, Alcohols & Phenols | Course Code: 26CHE406MV01

AUGUST

2nd WEEK

Unit–I: d-Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals.

3rd WEEK

Unit–I: d-Block Elements

General trends in transition-metal properties, including metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic and magnetic properties.

4th WEEK

Unit–I: d-Block Elements

Interstitial compounds, alloy formation, preparation and chemical properties of $K_2Cr_2O_7$ and $KMnO_4$.

SEPTEMBER

1st WEEK

Unit–II: Primary and Secondary Batteries

Characteristics of an ideal battery, principle, working, applications and comparison of Pb-acid and Li-metal batteries.

2nd WEEK

Unit–II: Primary and Secondary Batteries

Li-ion batteries, Li-polymer batteries, solid-state electrolyte batteries and fuel cells; principles, working, applications and comparison.

3rd WEEK

Unit–III: Alcohols

Structure and classification of alcohols as 1°, 2° and 3°; methods of preparation of primary, secondary and tertiary alcohols using Grignard reagent, ester hydrolysis and reduction of aldehydes, ketones, carboxylic acids and esters.

4th WEEK

Unit–III: Alcohols

Chemical reactions of alcohols: acidic character, reaction with sodium, reaction with HX (Lucas test), and esterification.

OCTOBER

1st WEEK

Unit–III: Alcohols

Oxidation using PCC, alkaline KMnO_4 , acidic $\text{K}_2\text{Cr}_2\text{O}_7$ and concentrated HNO_3 ; Oppenauer oxidation.

2nd WEEK

Unit–IV: Phenols

Acidity of phenols and factors affecting acidity; methods of preparation from cumene, diazonium salts and benzene sulphonic acid.

3rd WEEK

Unit–IV: Phenols

Directive influence of the $-\text{OH}$ group and electrophilic substitution reactions; vinyl, nitration, halogenation and sulphonation.

4th WEEK

Unit–IV: Phenols

Reimer–Tiemann reaction, Gattermann–Koch reaction, Houben–Hoesch condensation and Schotten–Baumann reaction.

NOVEMBER

1st WEEK – DIWALI BREAK

Diwali Break

2nd WEEK

PAPER–V: Final Revision

Final revision of all prescribed units, clarification of student queries and focused practice of important concepts, mechanisms, reactions, electrochemical equations and comparative questions.

3rd WEEK

PAPER–V: Assessment and Course Completion

Final unit-wise assessment / test, discussion of answers, assignment review and completion of the prescribed syllabus.

Anuj Sharma
Assistant Professor
Department of Chemistry

Government College for Women, Rohtak

Department of Chemistry

Lesson Plan, Odd Semester (Session 2026-27)

POOJA RANI

B.Sc.-II (Phy. Hons) Minor Theory and B.Sc.-II (Non-Medical) Major Theory

(Physical Chemistry)

B.Sc.-II (Phy. Hons) <u>Minor Theory</u>	B.Sc.-II (Non-Med.) <u>Major Theory</u>	Remarks
August, 2026		
<i>Chemical Bonding and Molecular Structure</i>	<i>Chemistry of Transition series elements</i>	<i>Unit-I</i>
Valence electrons, ionic bond, covalent bond, bond parameters, Lewis' structure, polar character of covalent bond, Valence bond theory and its limitations.	General characteristic of transition metals, brief discussion of differences between the first, second and third transition series, stability of various oxidation states, magnetic and spectral properties.	2 nd week
Resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization involving s, p and d orbitals and shapes of some simple molecules.	Binary compounds and complexes illustrating relative stability of their oxidation states. Chemistry of Ti, V, Cr, Mn, Fe, Co, Mo and W in various oxidation states.	3 rd week
Molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), hydrogen bond and its types with examples, Van der Waals forces. And assignment topic given.	Some important compounds as laboratory reagents: potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite. And assignment topic given.	4 th week
September, 2026		
<i>Thermodynamics</i>	<i>Thermodynamics-II</i>	<i>Unit-II</i>
Concept of system, types of system, surroundings, extensive and intensive properties, state functions and variables.	Third law of thermodynamics: Nernst heat theorem, concept of residual entropy.	1 st week
Laws of thermodynamics – internal energy and enthalpy, heat capacity and specific heat, entropy.	Evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities.	2 nd week

Gibbs free energy & Helmholtz function, measurement of ΔU and ΔH , Hess's law of constant heat summation.	A & G as criteria for spontaneity, thermodynamic equilibrium and their advantage over entropy change.	3 rd week
Enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization. Revision and test.	Variation of G and A with P, V and T, partial molar quantities. Revision and test.	4 th week
October, 2026		
<i>Chemical and ionic equilibrium</i>	<i>Electrochemistry</i>	<i>Unit-III</i>
Dynamic nature of equilibrium, law of mass action, equilibrium constant.	Arrhenius theory of ionization, Ostwald's Dilution Law, Debye – Huckel – Onsager's equation for strong electrolytes (elementary treatment only), transport number, definition and determination by Hittorf's methods.	1 st week
Factors affecting equilibrium – Le Chatelier's principle & its applications, theories of acid and base, ionization of acids and bases.	Electrolytic conduction, factors affecting electrolytic conduction. Application of conductivity measurements: determination of dissociation constant (K_a) and degree of dissociation.	2 nd week
Strong and weak electrolytes, degree of ionization, acidic and basic strength, concept of pH	Determination of solubility product of sparingly soluble salts, conductometric titrations, definition of pH and pK_a , buffer solution, buffer action, Henderson – Hasselbalch equation, buffer mechanism of buffer action.	3 rd week
Hydrolysis of salts (elementary idea), buffer solution, solubility product, common ion effect.	Reversible electrodes – Metal – metal ion gas electrode, metal – metal insoluble salt – anion electrode and redox electrode.	4 th week
November, 2026		
<i>Alkyl halides</i>	<i>Alkyl and aryl halides</i>	<i>Unit-IV</i>
Diwali Vacation		1 st week
Structure of haloalkanes and their classification as 1°, 2° & 3°, general method of preparation.	Alkyl halide: Nomenclature and classes of alkyl halides, general methods of preparation, physical properties and chemical reactions.	2 nd week

Chemical reactions: nucleophilic substitution reactions with mechanism and their types (SN1, SN2 and SNi, E1, E2 & E1cB).	Mechanism (SN1, SN2, E1, E2 and E1cB) and stereochemistry of nucleophilic substitution reactions of alkyl halides with energy profile diagrams, elimination vs substitution reactions, Aryl halides: Methods of preparation.	3 rd week
Nucleophilic substitution reactions with specific examples from: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation and Williamson's ether synthesis.	Reactions: Aromatic nucleophilic substitution and effect of substituents on reactivity, Benzyne Mechanism: KNH_2/NH_3 (or $\text{NaNH}_2/\text{NH}_3$), reactivity and relative strength of C-halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.	4 th week
December, 2026		
Test and assignment submission	Test and assignment submission	1 st week

GOVT. P.G. COLLEGE FOR WOMEN, ROHTAK
CHEMISTRY DEPARTMENT
LESSON PLAN

12 **NAME OF FACULTY- SEEMA** **CLASS- M.Sc. I (Sem I)**
SUBJECT- Physical Chemistry-I (Thermodynamics & Chemical Dynamics)

SEPTEMBER 1ST WEEK

Physical Chemistry- Unit-II: Thermodynamics
Introduction to laws of thermodynamics, Law of mass action and its thermodynamic derivation.

SEPTEMBER 2nd WEEK

Physical Chemistry- Clausius-Clapeyron equation and its applications, numerical problems on phase transitions.

SEPTEMBER 3rd WEEK

Physical Chemistry- Phase diagram for two completely miscible components system. Phase rule for condensed systems.

SEPTEMBER 4th WEEK

Physical Chemistry- Eutectic systems, calculation of eutectic point, systems forming solid compounds A_xB_y with congruent and incongruent melting points.

OCTOBER 1st WEEK

Physical Chemistry- Phase diagram and thermodynamic treatment of solid solutions.
Class test and doubt clearing session on Unit-II.

OCTOBER 2nd WEEK

Physical Chemistry- Unit-III: Chemical Dynamics
Rate law for consecutive & parallel reactions (first order), ionic reactions: single and double sphere models.

OCTOBER 3rd WEEK

Physical Chemistry- Influence of solvent and ionic strength, chain reactions: hydrogen-bromine reaction & hydrogen-chlorine reaction, ortho-para hydrogen conversion.

OCTOBER 4th WEEK

Physical Chemistry- Chain length, apparent activation energy of chain reactions. Photochemical reactions (hydrogen-bromine & hydrogen-chlorine reactions).

NOVEMBER 1st WEEK

Diwali Vacations.

NOVEMBER 2nd WEEK

Physical Chemistry- Rice-Herzfeld mechanism of organic molecules decomposition (ethane, acetaldehyde).

Physical Chemistry- Enzyme kinetics, Michaelis-Menten treatment, Lineweaver-Burk plot and Eadie-Hofstee methods.

NOVEMBER 3rd WEEK

Physical Chemistry- Competitive and non-competitive inhibition.

NOVEMBER 4th WEEK

Physical Chemistry- Revision of Unit-II & Unit-III syllabus, group discussion.

DECEMBER 1st WEEK

Physical Chemistry- Test and assignment, problem-solving session.

DECEMBER 2nd WEEK

Physical Chemistry- Final revision and previous year questions discussion.

CHEMISTRY DEPARTMENT, GPGCW, ROHTAK

LESSON PLAN

13 **NAME OF FACULTY – Mrs Meena** **DESIGNATION – EXTENSION LECTURER**

CLASS – B.Sc. Semester 1st, 3rd

SUBJECT – 1. MAJOR CHEMISTRY, 2. SEC BATTERIES

AUGUST

2ND WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Ionic bond, lattice energy, Born–Haber cycle and its applications; Fajan’s rules; hydration energy; bond moment, dipole moment and percentage ionic character.

SEC BATTERIES Unit–I Basic Concepts

Components of cells and batteries; classification of cells and batteries; operation of a cell;

3RD WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Resonance and resonance energy in inorganic and organic compounds. Molecular Orbital Approach: LCAO method; bonding and antibonding molecular orbitals; characteristics of s–s, s–p and p–p combinations of atomic orbitals.

SEC BATTERIES Unit–I Basic Concepts

theoretical cell voltage; capacity, energy, specific energy and energy density of practical batteries.

4TH WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Non-bonding combination of orbitals; MO treatment of homonuclear diatomic molecules of the first and second periods, including s–p mixing; heteronuclear diatomic molecules such as O_2 , O_2^{2-} , N_2^- , CO, NO^+ and CN^- ; comparison of VB and MO approaches.

SEC BATTERIES Unit–I Basic concepts

Cell voltage and factors affecting battery performance; practical significance of capacity, energy,

SEPTEMBER

1ST WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Oxides: structures of oxides of nitrogen and phosphorus. Oxyacids: structures and relative acid strengths of oxyacids of nitrogen and phosphorus.

SEC BATTERIES Unit–I Basic Concepts

specific energy and energy density; comparison of practical battery systems.

2ND WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Structure of white, yellow and red phosphorus; oxyacids of sulphur—structures and acidic strength; H_2O_2 —structure, properties and uses.

SEC BATTERIES Unit–III Primary Batteries

General characteristics and applications of primary batteries; types and characteristics of primary batteries; comparison of performance characteristics of primary battery systems; recharging primary batteries.

3RD WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Basic properties of halogens; interhalogen compounds—types and properties; halogen acids and oxyacids of chlorine—structure and comparison of acidic strength.

SEC BATTERIES Unit–III Primary Batteries

Zinc–Carbon batteries (Leclanché and Zinc Chloride cell systems):

4TH WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Brønsted–Lowry concept; conjugate acids and bases; relative strengths of acids and bases; effects of substituent and solvent; differentiating and levelling solvents.

SEC BATTERIES Unit–III Primary Batteries

general characteristics, cell chemistry

OCTOBER

1ST WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Lewis acid–base concept; classification of Lewis acids and bases; Lux–Flood concept. Revision and class test of Unit–II.

SEC BATTERIES Unit–III Primary Batteries

types of cells and batteries, construction and cell components.

2ND WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Maxwell's distribution of velocities and energies (derivation excluded); calculation of root mean square velocity, average velocity and most probable velocity.

SEC BATTERIES Unit–III Primary Batteries

Magnesium and Aluminium batteries: general characteristics,

3RD WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Collision diameter, collision number, collision frequency and mean free path; deviation of real gases from ideal behaviour.

SEC BATTERIES Unit–III Primary Batteries

cell chemistry and construction of Mg/MnO₂ batteries; performance characteristics;

4TH WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Van der Waals equation of state and its applications in the calculation of Boyle's temperature (compression factor); explanation of the behaviour of real gases using Van der Waals equation.

SEC BATTERIES Unit–III Primary Batteries

sizes and types of Mg/MnO₂ batteries; other magnesium primary batteries.

NOVEMBER

1ST WEEK

DIWALI BREAK

No classes – Diwali Break.

2ND WEEK

MAJOR CHEMISTRY Unit–III Critical Phenomenon

Critical temperature, critical pressure and critical volume and their determination; PV isotherms of real gases; continuity of states; isotherms of Van der Waals equation.

SEC BATTERIES Revision

Revision of Units I,III

3RD WEEK

MAJOR CHEMISTRY Unit–III Critical Phenomenon

Relationship between critical constants and Van der Waals constants; compressibility factor; law of corresponding states. Revision and unit test.

SEC BATTERIES Revision and Assessment

Final revision of primary and secondary batteries; numerical/problem-solving practice; assignment and unit test.

4TH WEEK

MAJOR CHEMISTRY Unit–IV Basics of Organic Chemistry and Stereochemistry

Electronic displacements and their applications; reaction intermediates; concept of aromaticity; concept and types of isomerism; introduction to optical isomerism and optical activity.

SEC BATTERIES Consolidation

Discussion of important battery applications, performance comparison, charging characteristics and safety precautions; doubt-clearing and preparation for assessment

Mrs Meena

Extension Lecturer

Department of Chemistry

Note: The lesson plan has been prepared from the Major Chemistry and SEC Batteries syllabi supplied above.

CHEMISTRY DEPARTMENT, GPGCW, ROHTAK

LESSON PLAN

14. NAME OF FACULTY – DR. AARTI DESIGNATION – EXTENSION LECTURER

CLASS – B.Sc. Semester III

SUBJECT – 1. MAJOR CHEMISTRY, 2. SEC BATTERIES

AUGUST

2ND WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Ionic bond, lattice energy, Born–Haber cycle and its applications; Fajan’s rules; hydration energy; bond moment, dipole moment and percentage ionic character.

SEC BATTERIES Unit–I Basic Concepts

Components of cells and batteries; classification of cells and batteries; operation of a cell; theoretical cell voltage; capacity, energy, specific energy and energy density of practical batteries.

3RD WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Resonance and resonance energy in inorganic and organic compounds. Molecular Orbital Approach: LCAO method; bonding and antibonding molecular orbitals; characteristics of s–s, s–p and p–p combinations of atomic orbitals.

SEC BATTERIES Unit–I Basic Concepts

Cell voltage and factors affecting battery performance; practical significance of capacity, energy, specific energy and energy density; comparison of practical battery systems.

4TH WEEK

MAJOR CHEMISTRY Unit–I Chemical Bonding and Molecular Structure

Non-bonding combination of orbitals; MO treatment of homonuclear diatomic molecules of the first and second periods, including s–p mixing; heteronuclear diatomic molecules such as O_2 , O_2^{2-} , N_2^- , CO, NO^+ and CN^- ; comparison of VB and MO approaches.

SEC BATTERIES Unit–II Battery Design and Factors Affecting Battery Performance

General introduction to battery design; designing to eliminate potential safety problems; battery safeguards when using discrete batteries; battery construction and design of rechargeable batteries.

SEPTEMBER

1ST WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Oxides: structures of oxides of nitrogen and phosphorus. Oxyacids: structures and relative acid strengths of oxyacids of nitrogen and phosphorus.

SEC BATTERIES Unit–II Battery Design and Factors Affecting Battery Performance

Factors affecting battery performance; constructional features; safety considerations; design considerations for rechargeable batteries.

2ND WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Structure of white, yellow and red phosphorus; oxyacids of sulphur—structures and acidic strength; H_2O_2 —structure, properties and uses.

SEC BATTERIES Unit–III Primary Batteries

General characteristics and applications of primary batteries; types and characteristics of primary batteries; comparison of performance characteristics of primary battery systems; recharging primary batteries.

3RD WEEK

MAJOR CHEMISTRY Unit–II p-Block Elements

Basic properties of halogens; interhalogen compounds—types and properties; halogen acids and oxyacids of chlorine—structure and comparison of acidic strength.

SEC BATTERIES Unit–III Primary Batteries

Zinc–Carbon batteries (Leclanché and Zinc Chloride cell systems): general characteristics, cell chemistry, types of cells and batteries, construction and cell components.

4TH WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Brønsted–Lowry concept; conjugate acids and bases; relative strengths of acids and bases; effects of substituent and solvent; differentiating and levelling solvents.

SEC BATTERIES Unit–III Primary Batteries

Magnesium and Aluminium batteries: general characteristics, cell chemistry and construction of Mg/ MnO_2 batteries; performance characteristics; sizes and types of Mg/ MnO_2 batteries; other magnesium primary batteries.

OCTOBER

1ST WEEK

MAJOR CHEMISTRY Unit–II Acids and Bases

Lewis acid–base concept; classification of Lewis acids and bases; Lux–Flood concept. Revision and class test of Unit–II.

SEC BATTERIES Unit–IV Secondary Batteries

General characteristics and applications of secondary batteries; types and characteristics; comparison of performance characteristics of secondary battery systems.

2ND WEEK

MAJOR CHEMISTRY Unit–III Gaseous States

Maxwell's distribution of velocities and energies (derivation excluded); calculation of root mean square velocity, average velocity and most probable velocity.

SEC BATTERIES Unit–IV Secondary Batteries

Lead batteries: chemistry, construction, performance characteristics and charging characteristics. Introduction to rechargeable battery systems.

3RD WEEK**MAJOR CHEMISTRY Unit–III Gaseous States**

Collision diameter, collision number, collision frequency and mean free path; deviation of real gases from ideal behaviour.

SEC BATTERIES Unit–IV Secondary Batteries

Lithium-ion batteries and iron electrode batteries: chemistry, construction, performance characteristics and charging characteristics.

4TH WEEK**MAJOR CHEMISTRY Unit–III Gaseous States**

Van der Waals equation of state and its applications in the calculation of Boyle's temperature (compression factor); explanation of the behaviour of real gases using Van der Waals equation.

SEC BATTERIES Unit–IV Secondary Batteries

Nickel–Cadmium, Nickel–Metal Hydride and Nickel–Zinc batteries: chemistry, construction, performance characteristics and charging characteristics.

NOVEMBER**1ST WEEK****DIWALI BREAK**

No classes – Diwali Break.

2ND WEEK**MAJOR CHEMISTRY Unit–III Critical Phenomenon**

Critical temperature, critical pressure and critical volume and their determination; PV isotherms of real gases; continuity of states; isotherms of Van der Waals equation.

SEC BATTERIES Revision

Revision of Units I–IV; important concepts, comparative study of primary and secondary batteries; battery performance and safety-related questions.

3RD WEEK**MAJOR CHEMISTRY Unit–III Critical Phenomenon**

Relationship between critical constants and Van der Waals constants; compressibility factor; law of corresponding states. Revision and unit test.

SEC BATTERIES Revision and Assessment

Final revision of primary and secondary batteries; numerical/problem-solving practice; assignment and unit test.

4TH WEEK**MAJOR CHEMISTRY Unit–IV Basics of Organic Chemistry and Stereochemistry**

Electronic displacements and their applications; reaction intermediates; concept of aromaticity; concept and types of isomerism; introduction to optical isomerism and optical activity.

SEC BATTERIES Consolidation

Discussion of important battery applications, performance comparison, charging characteristics and safety precautions; doubt-clearing and preparation for assessment.

DR. AARTI
Extension Lecturer
Department of Chemistry

Govt. P.G. College For Women, ROHTAK

Department of Chemistry

Lesson Plan

2026-27

15. Name of Faculty - Dr Suman (MIS-2954)

Class – M.Sc. Previous (Inorganic Chemistry)

Semester - 1st

September 2026

Unit–II Reaction Mechanism of Octahedral Transition Metal Complexes-I

First Week Inert and labile complexes, mechanisms for ligand replacement reactions, formation of complexes from aqua ions, ligand displacement reactions in octahedral complexes – acid hydrolysis, base hydrolysis, Anation reaction, H₂O ligand exchange reactions.

Second Week Factors affecting ligand substitution in octahedral complexes (leaving-group effects, effects of spectator ligands, steric effects), optical rotation, cotton effect.

Third Week Racemization of tris-chelate complexes, electrophilic attack on ligands. Thermodynamic aspects: Factors affecting stability of metal complexes, Irving–Williams series.

Fourth Week **Assignment** of Unit II & **Test** of Unit II

Unit–III Reaction Mechanism of Square-Planar Transition Metal Complexes-II

Mechanism of ligand displacement reactions in square planar complexes and related numerical, oxidative addition & reductive elimination reactions, trans effect and theories of trans effect, applications of trans effect.

October 2026

First Week Electron Transfer Processes: Types and mechanism-outer sphere electron transfer and inner sphere electron transfer reactions, electron exchange reactions.

Second Week Factors affecting rate of electron transfer reactions and role of non-bridging ligand on rate of electron transfer.

Revision & Problem solving.

Test of Unit III

Third Week Unit–IV Isopoly and Heteropoly Acids and Salts of Mo & W

Isopoly acids and isopoly-ions, preparation and structure of paramolybdate and octamolybdate.

Fourth Week Heteropoly acids(only classification into six groups). 26 Keggin's structure of 1:11 & 1:12–heteropoly acids and structure of 1:6 heteropoly acids and heteropoly blue.

November 2026

First Week Diwali Vacations

Second Week Crystal Structures: Structures of some binary and ternary crystalline solid such as fluorite, anti-fluorite, rutile, anti-rutile, cristobalite.

Third Week Layered lattices – CdI₂, BiI₃, ReO₃, Mn₂O₃, NiAs, corundum, perovskite, Ilmenite, calcite, normal spinel & inverse spinel minerals.

Fourth Week Well equation and tolerance factor.

December 2026

First Week Revision of syllabus

Second Week Questions for Practice

Third Week Group Discussion

Fourth Week Problem Solving

GPGCW ROHTAK

Lesson Plan (2026-27) Odd Semester

16. Name of the Extension Lecturer/Teacher : PREETI

Class and Section : B.Sc. 1st Year (Life Science & Physical Science), 1st sem

Subject : SKILL CHEMISTRY (Role of Chemistry in Society | Code: 24CHE401SE01)

Month / Week	Topics
August 2026 Week 2	Unit-I: Analysis of Soil and Water Composition of soil, concept of pH and pH measurement of soil.
Week 3	Complexometric titrations, chelation, chelating agents, use of indicators.
Week 4	Estimation of calcium and magnesium ions in soil. Definition of pure water.
September 2026 Week 1	Sources responsible for contaminating water, water sampling methods, water purification methods.
Week 2	Determination of dissolved oxygen (DO) of a water sample. Revision of Unit-I.
Week 3	Unit-II: Chemistry in Cosmetics General study, preparation, and uses of Hair dye and Soap.
Week 4	General study, preparation, and uses of Shampoo and Suntan lotions.

October 2026 Week 1	General study, formulation, and uses of Face powder and Lipsticks.
Week 2	General study, preparation, and uses of Talcum powder and Nail enamel.
Week 3	Unit-III: Pesticides General introduction to pesticides (natural and synthetic), benefits and adverse effects.
Week 4	DIWALI VACATION / BREAK
November 2026 Week 1	Changing concepts of pesticides, brief introduction of structure-activity relationship (SAR).
Week 2	Synthesis, technical manufacture, and uses of Organochlorines (gammexene) & Organophosphates (malathion).
Week 3	Unit-IV: Experimental Techniques Basic principle of pH metric, potentiometric, and conductometric titrations.
Week 4	Applications of conductivity measurements: degree of dissociation, K_a of acids and bases.
December 2026 Week 1	Buffer solution, buffer action, Henderson-Hasselbalch equation, buffer mechanism of buffer action.
Week 2	Overall Syllabus Revision, Doubts Clearing Session, Tests & Assignments.