Lesson plans of Chemistry Department

Name of the Faculty : Mr. GURDEEP

Discipline : B.SC- II (Med. + Non Med.)

Semester : Semester-III

Subject : (Inorganic, Physical, Organic) Chemistry

Week/Mon	Name of Topics
th	
August	 s and p-Block Elements Salient features of hydrides, oxides, halides, hydroxides of s-block elements (methods of preparation excluded). Structure, preparation and properties of Diborane and Borazine. Catenation, carbides, fluorocarbons, silicates (structural aspects), structure of oxides of Nitrogen and Phosphorous, structure of white and red phosphorus. Structure of oxyacids of Nitrogen, phosphorous, sulphur and chlorine and comparison of acidic strength of oxyacids. low chemical reactivity of noble gases, chemistry of xenon, structure and bonding in fluorides, oxides and oxyfluorides of xenon.
September	Electrochemistry-I
	 Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution (Numericals) Concepts of pH and pKa, Buffer solution, Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action. Electrochemistry-II Reversible & irreversible cells, Calculation of thermodynamic quantities of cell reaction (▲G, ▲H & K). Types of reversible electrodes – metal- metal ion, gas electrode, metal – insoluble salt- anion and redox electrodes. Nernst equation, Standard

Hydrogen electrode, reference electrodes, Applications measurement in solubility product and potentiometric titrations using glass electrode. October **Alkynes** Nomenclature and its structure. Methods of formation: using Calcium carbide, dehydrohalogenation, Kolbe's electrolysis. Chemical reactions: Mechanism of electrophilic and nucleophilic addition reactions, formation of metal acetylides, addition of bromine and alkaline KMnO4, ozonolysis. Acidity of alkynes. **Stereochemistry of Organic Compounds** Concept of isomerism: Structural and Stereoisomerism. Symmetry elements, enantiomers, optical activity, properties of enantiomers, chiral and achiral molecules (up-to 2 asymmetric centres), diastereomers, threo- and erythro- nomenclature, meso-compounds, Relative and absolute configuration, sequence rules, R and S system of nomenclature. Cis- Trans isomerism, E & Z system of nomenclature, Conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds. Newman and Sawhorse projection formulae. **November Benzene and its derivatives:** Nomenclature, Aromatic nucleus and side chain, Huckels' rule of aromaticity. Aromatic electrophilic substitution, mechanism halogenation, sulphonation, and Friedel- Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation. Alkyl halides: Nomenclature, methods of formation: from alkenes and alcohol, nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams. Arvl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the elimination- addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides.

•	Assignment and Class tests

Name of the Faculty : Mr. GURDEEP Discipline : B.SC- I (MINOR.)

Semester : Semester-I

Subject : Chemistry

Week/Mon	Name of Topics
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August	I. Covalent Bond
	Contact Hours: 4 This unit covers the shapes of simple inorganic molecules and ions based on Valence Shell Electron Pair Repulsion (VSEPR) theory and hybridization. It includes suitable examples of various geometries such as linear, trigonal planar, square planar, and tetrahedral arrangements.
September	II. Chemical Kinetics
	Contact Hours: 4 This section deals with the concept of reaction rates, factors influencing the rate of reaction, order and molecularity of a reaction, and integrated rate expressions for zero and first-order reactions.
October	III. Alkanes (up to 5 carbon atoms)
	Contact Hours: 4 Topics include nomenclature, classification of carbon atoms in alkanes, isomerism in alkanes, and various methods of formation such as Wurtz reaction, Kolbe reaction, Corey-House reaction, and decarboxylation of carboxylic acids.
November	IV. Metallic Bond and Semiconductors
	Contact Hours: 3 This unit introduces the metallic bond and provides a qualitative idea of band theory of metallic bonding, distinguishing between conductors, semiconductors, and insulators. and

Assignments and Class tests

Name of the Faculty : Mr. GURDEEP Discipline : B.SC- II (SEC)

Semester : Semester-III

Subject : Chemistry

Week/Mon	Name of Topics
th	
August	I. Common Foods and Adulteration This unit covers the definition and types of adulteration in common foods. It includes topics such as poisonous substances, metallic contamination, pesticide residues, biological and chemical adulterants, and incidental and intentional food additives. It also emphasizes the general impact of food adulteration on human health.
September	II. Adulteration of Common Foods and Methods of Detection This unit deals with the sources of adulterants, methods of detection, and adulterants in common food items such as milk, oil, grains, sugar, spices, processed food, fruits, vegetables, and sweetening agents. The candidate must learn at least three methods of detection for each food item.
October	III. Present Laws and Procedures on Adulteration This section highlights the Food Safety and Standards Act 2006 (FSSA) and the role of the Food Safety and Standards Authority of India (FSSAI). It includes rules and procedures of local authorities for controlling and preventing food adulteration.
November	IV. This unit elaborates the role of voluntary agencies such as Agmark, ISI, and others. It also covers quality control laboratories of private testing agencies, consumer cooperatives, and government sectors. Topics

include consumer education, consumer rights and responsibilities, the Consumer Protection Act (COPRA) 2019, offenses and penalties, and procedures for filing complaints and compensation to victims. and

Assignments and Class tests

Name of the Faculty : Mr. RAVI KUMAR

Discipline : B.SC- I (Physical Science)

Semester : Semester-I

Subject : CHEMISTRY

Week/Month	Name of Topics
August	L. Atomic Structure
	Dual behaviour of matter and radiation, de Broglie's relation, Heisenberg's uncertainty principle, concept of atomic orbitals, significance of quantum numbers, radial and angular wave functions, normal and orthogonal wave functions, significance of and 4, shapes of s, p, d, f orbitals, Rules for filling electrons in various orbitals, effective nuclear charge, Slater's rules.
Sept.	Periodic table and atomic properties
	Classification of periodic table, definition of atomic and ionic radii, ionisation energy, electron affinity and electronegativity, trend in periodic table (in s and p-block elements), Pauling, Mulliken, Allred Rachow and Mulliken Jaffe's electronegativity scale, Sanderson's electron density ratio.
	II. Gaseous State
	Kinetic theory of gases, Maxwell's distribution of velocities and

	energies (derivation excluded) Calculation of root mean square
	velocity, average velocity, and most probable velocity.
0-4	Collision diameter collision number collision for average and
Oct.	Collision diameter, collision number. collision frequency and mean free path (Derivations excluded), Deviation of Real gases
	from ideal behaviour, Derivation of Van der Waal's Equation of
	State, its application in the calculation of Boyle's temperature
	(compression factor)
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	Critical Phenomenon
	Concept of Critical temperature, critical pressure, critical volume.
	relationship between critical (Derivation excluded). constants and
	Van der Waal's constants
	Stanisting and Danding
	Structure and Bonding
	Localized and delocalized chemical bond, Van der Waals
	interactions. Concept of resonance and its applications,
	hyperconjugation, inductive effect, Electromeric effect and their
	comparison.
Nov.	
	Machaniam of Organia Pasations
	Mechanism of Organic Reactions
	Curved arrow notation, homolytic and heterolytic bond fission.
	Types of reagents: electrophiles and nucleophiles. Types of
	organic reactions: Substitution, Addition, Condensation,
	Elimination, Rearrangement, Isomerization and Pericyclic
	reactions. Reactive intermediates: Carbocations, carbanions, free
	radicals, carbenes (structure & stability).

Name of the Faculty : Mr. RAVI KUMAR
Discipline : B.SC- I (Life Science)

Semester : Semester-I

Subject : CHEMISTRY

Week/Month	Name of Topics
August	L. Atomic Structure
	Dual behaviour of matter and radiation, de Broglie's relation, Heisenberg's uncertainty principle, concept of atomic orbitals, significance of quantum numbers, radial and angular wave functions, normal and orthogonal wave functions, significance of and 4, shapes of s, p, d, f orbitals, Rules for filling electrons in various orbitals, effective nuclear charge, Slater's rules. Periodic table and atomic properties Classification of periodic table, definition of atomic and ionic radii, ionisation energy, electron affinity and electronegativity, trend in periodic table (in s and p-block elements), Pauling, Mulliken, Allred Rachow and Mulliken Jaffe's electronegativity scale, Sanderson's electron density ratio.
Sept.	II. Gaseous State Kinetic theory of gases, Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity, and most probable velocity.
	Collision diameter, collision number. collision frequency and mean free path (Derivations excluded), Deviation of Real gases from ideal behaviour, Derivation of Van der Waal's Equation of

	State, its application in the calculation of Boyle's temperature (compression factor) Critical Phenomenon Concept of Critical temperature, critical pressure, critical volume. relationship between critical (Derivation excluded). constants and Van der Waal's constants
Oct.	
	Structure and Bonding
	Localized and delocalized chemical bond, Van der Waals interactions. Concept of resonance and its applications, hyperconjugation, inductive effect, Electromeric effect and their comparison.
	Mechanism of Organic Reactions
	Curved arrow notation, homolytic and heterolytic bond fission. Types of reagents: electrophiles and nucleophiles. Types of organic reactions: Substitution, Addition, Condensation, Elimination, Rearrangement, Isomerization and Pericyclic reactions. Reactive intermediates: Carbocations, carbanions, free radicals, carbenes (structure & stability).
Nov.	Liquid State
	Structure of liquids, Properties of liquids - surface tension, refractive index, viscosity, vapour pressure and optical rotation.
	Solid State
	Classification of solids, Law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry and symmetry elements, seven crystal systems and fourteen Bravais lattices; X- ray diffraction, Bragg's law, a simple

account of Laue method, rotating crystal method and powder pattern method

Name of the Faculty : Mr. RAVI KUMAR

Discipline : B.SC- III (Physical Science + Life Science)

Semester : Semester-V

Subject : CHEMISTRY

Week/Month	Name of Topics
August	Coordination Compounds: Werner's theory of coordination compounds, EAN, chelates, nomenclature of coordination compounds, isomerism in coordination compounds.
Sept.	Metal Ligand Bonding in Transition Metal Complexes: Valence bond theory, applications and their Limitation, Elementary idea of CFT (Only structural aspects), Crystal field splitting in octahedral, tetrahedral and square planer complexes.
Oct.	Magnetic properties of transition metal complexes: Types of magnetic materials, magnetic susceptibility, method of determination, spin only formula, basic idea of L-S coupling Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine.

Nov.	Methods of synthesis and chemical reactions with particular
	emphasis on the mechanism of electrophilic substitution.
	Mechanism of nucleophilic substitution reactions in pyridine
	derivatives. Comparison of basicity of pyridine, piperidine and
	pyrrole.

Name of the Faculty : Mr. Surender Kumar
Discipline : B.SC- I (Physical Science)

Semester : Semester-I

Subject : CHEMISTRY

Week/Month	Name of Topics			
August	Liquid State			
	Structure of liquids, Properties of liquids - surface tension, refractive index, viscosity, vapour pressure and optical rotation.			
Sept.	Solid State			
	Classification of solids, Law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry and symmetry elements,			
Oct.	seven crystal systems and fourteen Bravais lattices; X- ray diffraction, Bragg's law, a simple account of Laue method, rotating crystal method and powder pattern method			
Nov.	Gas State :			

	Derivation of Van der Waal's Equation of State, its application in				
	the calculation of Boyle's temperature (compression factor)				

Name of the Faculty : Mr. Surender Kumar

Discipline : B.SC- III (Physical Science + Life Science)

Semester : Semester-V

Subject : CHEMISTRY

Week/Month	Name of Topics		
August	Organic Synthesis via Enolates Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate Quantum Mechanics-I: Black body radiation, plank's radiation law, Explanation of spectral distribution of black body radiation on the basis of classical mechanics and quantum mechanics, Heat capacity of solids, Need of quantum mechanics, postulates of quantum mechanics, quantum mechanical operator		
Sept.	Commutation relations, Hamiltonian operator, Role of operators		

	to derive Schrodinger wave equation, Application Schrodinger wave equation in determination of wave function and energy of a particle in one dimensional box Spectroscopy-I: Electromagnetic radiations, reasons of electromagnetic spectrum, basic features of spectroscopy, introduction to molecular spectroscopy and its difference from atomic spectroscopy, signal to noise ratio, resolving power of spectrophotometer, Born-Oppenheimer approximation, Concept of degree of freedom
Oct.	Rotational Spectrum: Energy levels of rigid rotator of diatomic molecules, selection rules, spectral intensity distribution using Maxwell-Boltzmann distribution, Determination of bond length and concept of isotopic effect Phase Equilibria: Statement and the meaning of terms-phase component and degree of freedom, Thermodynamic derivation of Gibbs phase rule, Phase equilibria of one component systemwater system, phase equilibria of two component systems solid-liquid equilibria, simple Eutectic Pb-Ag system
Nov.	Thermodynamics-II: Third Law of Thermodynamics, Nernst Heat Theorem, Statement of concept of residual entropy, evaluation absolute entropy from heat capacity data. Gibbs function and Helmholtz Function as thermodynamic quantities. Criteria for thermodynamic equilibrium and spontaneity. Variation of G with P, V and T, Partial molar properties, concept of chemical potential (numerical included)

Name of the Faculty : Mr. Surender Kumar

Discipline : B.SC- I (SEC)

Semester : Semester-1

Subject : CHEMISTRY

Week/Month	Name of Topics			
August	Biological Molecules in Food Preparations : Water physical properties, water in food preparation and preservation Starch - structure, functional properties-gelatinization, pasting, syneresis, retrogradation, dextrinization			
Sept.	Starch - structure, functional properties-gelatinization, pasting, syneresis, retrogradation, dextrinization			
Oct.	Food Additives Additives: a) Buffer systems, and salts, chelating agents b) Antioxidants c) Antimicrobials d) Fat replacers, sweeteners e) Masticatory substances f) Fat extenders g) Clarifying agents, bleaching agents h) Flour improvers, anticaking agents i) Gases and propellants.			
Nov.	Color - Natural and synthetic food colors, their chemical structure, shades imparted, stability, permitted list of colors, usage levels and food application. Food colorants: sunset yellow, orange-B, citrus red No2, yellow No5, green No3.			

Months	Topicstobecovered
	Months

${\bf P.I.G.~GOVT.~COLLEGE~FOR~WOMEN, JIND~LESSON}$

1	August	Plastic and polyethylene pollution, pollution sources, recyclingofplastic,greenhouseeffect,ozonedepletion. Unit test.
2	September	Energysources,renewableandnon-renewable.Sources, Cell, polymer cell. Unittest.
3	October	Sourcesofdrinkingwateranduses,waterconservation, permissible TDS, techniques of purification of water, R.O.waterpurification,wastewatermanagements. Assignment.
4	November	Pesticides, herbicides, general introduction and definition, biological control and chemical control, naturalandsyntheticpesticides, benefits and adverse effects of DDT, BHC. Revision of syllabus.

 $[\]hbox{*Vacation as per university calendar}$

• 2assignmentsand01unittestwillbetakenasperschedule.

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND LESSON-PLAN(Session2025-26)oddSEMESTER

Name of Teacher: Suman Lata

Designation:ExtensionLecturer Subject:

Chemistry

Class:BSc2ndLifescience

Subject/Paper:	Months	Topicstobecovered
Sr. No.		
1.	August	Sandpblockselements:- Structures,preparationandpropertiesofdiborane borazine, catenation of carbides. Comparationoflowchemicalreactivity. Electrochemistry 1st. Electrolyticconduction,specificconductionand variations with concentration.
2	September	ApplicationofKohlraush'sLaw.Conceptofph,pkw, Buffer solution. Electrochemistry2nd:- Reversible and Irreversible cell, calculation of thermodynamics quanties. Types of reversible electrode. Nernst equation, Application of EMF measurementinsolubilityproductandpotentiometric titration. Unittest.
3	October	Alkyne:- Nomenclature,it'sstructureandmethodsofformation. Mechanism of electrophilic and nucleophilic reactions. Stereochemistry of organic compounds:- Concept of isomerism Relative and absolute configuration.Conformationanalysisofethane,butane, cyclohexane. Assignment.
4	November	Benzeneandit'sderivatives:- Huckel's rule of aromaticity, mechanism of halogenation,sulphonationandnitration,friedalcraft reactions. SN1 and SN2 mechanism, Sand meyer mechanism, addition elimination mechanism. Revisionofsyllabus.

• 2assignmentsand01unittestwillbetakenasperschedule.

 $[\]hbox{*Vacation} as per university calendar$

Subject/Paper: Sr. No.	Months	Topicstobecovered
1	August	Cosmeticdefinition, history, classification and Ingredients. Unittest.
2	September	Nomenclatureandgeneralstudiesincluding Preparation of cosmetic. Unittest.
3	October	Usesofcosmeticincludinghairstylelike Hair dyes. Assignment.
4	November	Usesofshampoo,conditioners,suntanlotionand hairspray. Revisionofsyllabus.

• 2assignmentsand01unittestwillbetakenasperschedule.

Lesson Plan

Name of ExtensionLecturer: Priya

Class: B.Sc. 5th SemVOC (B23-VOC-123)

Chemistry Lesson Plan: August 2025 to November 2025

Week 1: Unit II: Preparation and uses of Face powder

Week 2: Preparation and uses of Lipsticks,

^{*}Vacationasperuniversitycalendar

- Week 3: Preparation and uses of Talcum powder
- Week 4: Preparation and uses of Nail enamel
- Week 5: Revision and Test for Unit II
- Week 6: Preparation and uses of cold creams
- Week 7: Preparation and uses of vanishing and shaving creams
- Week 8: Antiperspirants and Artificial flavours.
- Week 9: Revision and Test for Unit III
- Week 10: Unit IV: Essential oils and their importance in cosmetic industries
- Week 12: Eugenol, Geranioland their importance in cosmetic industries
- Week 13: Sandal wood oiland their importance in cosmetic industries
- Week 14: Eucalyptus, Rose oil, 2-Phenylethyl alcoholand their importance in cosmetic industries
- Week 15: Jasmone, Civetone, Musconeand their importance in cosmetic industries
- Week 16: Testfor Unit IV
- Week 17: Revision
- Week 18: Revision

Lesson Plan

Name of Extension Lecturer: Priya

Class: B.Sc. 1stSem (medical) SEC

Chemistry Lesson Plan: August 2025 to November 2025

Week 1: Enzymes: a) Biocatalysts, enzyme specificity

Week 2: Use of exogenous enzymes in foods – amylases, lipases, proteases.

Week 3: Endogenous enzymes – phenol oxidases, peroxidases, oxidoreductases, lipoxygenases

Week 4: Factors affecting enzyme activity

Week 5: Revision and Test of Unit II

Week 6: Food Additives: Additives: a) Buffer systems and salts, chelating agents b) Antioxidants

Week 7: c) Antimicrobials d) Fat replacers, sweeteners e) Masticatory substances

Week 8: f) Firming texturizers g) Clarifying agents, bleaching agents

Week 9: h) Flour improvers, anti-caking agents, i) Gases and propellants Test for Unit II

Week 10: Color – Natural and synthetic food colors

Week 12: Color – their chemical structure, shades imparted, stability

Week 13: Permitted list of colors, usage levels and food application.

Week 14: Food colorants: sunset yellow, orange-B

Week 15: Food colorants: citrus red No2, yellow No5, green No3.

Week 16: Revision and Test

Week 17: Revision

Week 18: Revision

Lesson Plan

Name of Extension Lecturer: Priya

Class: MDC (Introductory Chemistry-I)

Chemistry Lesson Plan: From August 2025 to November 2025

Week 1: Introduction, Elementary introduction of atomic structure and chemical bonding

Week 2: Representation of elements/ atoms, Lewis's structure,

Week 3: Electronic configurations (1-30)

Week 4: Carbon and Its Compounds: Introduction, Tetravalency of Carbon, allotropes of carbon

Week 5:Allotropes of carbon and their properties,
Week 6: Hydrocarbons (1-5), nomenclature (linear compounds),
Week 7: Applications of hydrocarbons.
Week 8: Polymer: Introduction, elementary idea of synthetic and natural polymers,
Week 9: Homo polymers and copolymers, uses and properties
Week 10: Natural rubber, Vulcanized rubber, Polyethene, PVC
Week 11: Styrene, Teflon, PAN, Nylon-66
Week 12: Elementary idea of natural and synthetic food preservatives
Week 13: Rancidity, uses and properties
Week 14: Different food preservation processes (pickle, Jam),
Week 15:Artificial sweeteners, uses and properties
Week 16:Revision
Week 17:Revision
Week 18:Revision

Lesson Plan

Name of Extension Lecturer: Priya

Class: BA 3rd Sem VAC(Environment and Society)

Chemistry Lesson Plan: From August 2025 to November 2025

Week 1: Social and cultural construction of environment': environmental thought from historical and contemporary perspective in light of the concepts of Gross Net Happiness and Aldo Leopold's Land Ethic

Week 2: Social and cultural construction of environment': environmental thought from historical and contemporary perspective in light of the concepts of Aldo Leopold's Land Ethic

Week 3: Issues in Environmentalism: Significant global environmental issues such as acid rain. Climatechange, and resource depletion;

Week 4: historical developments in cultural, social and economic issuesrelated to land, forest, and water management in a global context

Week 5:interface between environmentand society.

Test of Unit I

Week 6:Development-Environment Conflict: Developmental issues and related impacts such asecological degradation; environmental pollution

Week 7: development-induced displacement.resettlement, and rehabilitation: problems, concerns, and compensative mechanisms: discussion on Project Affected People (PAPS)..

Week 8: Polymer: Introduction, elementary idea of synthetic and natural polymers,

Week 9: Urbanization and environment: Production and consumption-oriented approaches toenvironmental issues in Indian as well as global context

Week 10: ; impact of industry and technology onenvironment; urban sprawl, traffic congestion and social-economic problems;

Week 11: Conflict betweeneconomic and environmental interests

Unit III Environment and Social Inequalities: Inequalities of race, class, gender, region, and nation-state in access to healthy and safe environments

Week 12: history and politics surrounding environmental, ecological and social justice; environmental ethics, issues and possible solutions.

Week 13: Regulatory Framework: Brief account of Forest Conservation Act 1980 1988; Forest Dwellers Act 2008;

Week 14: Land Acquisition Act 1894, 2007, 2011, 2012; Land Acquisition Rehabilitation and Resettlement Act 2013

Week 15:State, corporate, civil society, community, and individual level initiatives to ensure sustainable development: case studies of environmental movements (Appiko Movement, Chipko Movement, Narmada Bachao Andolan)

Week 16:Corporate responsibility movement; appropriate technology movement. citizen groups: role played by NGOs; environmental education and awareness.

Week 17:Revision

Week 18:Revision