Teacher's name : Reena Kumari
Name of Program: Skill Enhancement Course
Semester —III
Session: 2025- 26
Class: B.Sc.(LifeSciences/Physical science)
Course name/Course code: Batteries /25CHE403SE01

Month	Content
August	Basic Concepts Unit-I 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
September	Unit-Ⅱ Battery Design and Factors Affecting Battery Performance General introduction, designing to eliminate potential safety problems, battery safeguards when using discrete batteries, battery construction, design of rechargeable batteries, factors affecting battery performance
October	Primary Batteries Unit-III characteristics and applications of primary batteries, types and characteristics of primary batteries, comparison of the performance characteristics of primary battery systems, recharging primary batteries. A) Zinc-Carbon Batteries (Leclanche' and Zinc Chloride Cell Systems): General characteristics, cell chemistry, types of cells and batteries, construction, cell components. B) Magnesium and Aluminum Batteries: General characteristics, cell chemistry, construction of Mg/MnO2 batteries, performance characteristics of Mg/MnO2 batteries, sizes and types of Mg/MnO batteries,other types of magnesium primary batteries.
November	Secondary Batteries

	Unit-IV General characteristics and applications of secondary batteries, types and characteristics of secondary batteries, comparison of performance characteristics for secondary battery systems and introduction, chemistry, construction, performance characteristics, charging characteristics of following batteries: Lead batteries, Lithium ion batteries, Iron electrode batteries, Nickel-Cadmium, Nickel-Metal hydride, Nickel- Zinc batteries.

Teacher's name - Reena Kumari
Name of Program : Discipline specific Course
Semester - III
Session:2025- 26
Class - B.Sc.(Life Sciences/Physical Sciences)
Course Name & Course code- Fundamental Chemistry-Ⅲ (25CHEM403DS01)

Month	Content
August	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. 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, some important compounds as laboratory reagents: potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite.
September	Thermodynamics : Third law of thermodynamics: Nernst heat theorem, concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions,Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. A & G as criteria for spontaneity, thermodvnamic cquilibrium and thein advantage over entropy change. Variation of G and A with P, V and T. Partial molar quantities
October	Electrochemistry: Arrhenius theory of ionization,Ostwald's Dilution Law. Debye-Huckel-Onsager's equation for strong electrolytes (clementary treatment only), transport number, definition and determination by Hittorf's

	methods. Electrolytic conduction,factors affecting electrolytic conduction. Applications of conductivity measurements: determination of dissociation constant (Ka)and degree of dissociation, determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, buffer solution, buffer action, Henderson - Hasselbalch equation, buffer mechanism of buffer action. Reversible electrodes-Metal- metal ion gas electrode, metal - metal insoluble salt-anion electrode and
November	Alkyl and aryl halides Unit-IV Alkyl halide: Nomenclature and classes of alkyl halides, general methods of preparation, physical properties and chemical reactions, mechanisms (SNI, SN2, E1, E2 and Elcb) and stereochemistry of nucleophilie substitution reactions of alkyl halides with energy profile diagrams, elimination vs substitution reactions. Aryl halides: Methods of preparation,Reactions: Aromatic nucleophilie substitution and effect of substituents on reactivity. Benzyne Mechanism:KNH/NHs(or NaNH2/NHs), reactivity and relative strength of C-halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.

GOVERNMENT COLLEGE BAHADURGARH

LESSON PLAN FOR SESSION 2025-26

Subject Name with code and semester:- MDC CHEMISTRY,B.Sc. 1 Sem.

Teacher Name:-RAJEEV KUMAR

MONTH	
JULY 2025	Basic Concepts of Chemistry Introduction, Dalton atomic theory, concept of atom, element and molecule, matter and its classification, chemical reactions, empirical and molecular formula, atomic mass, molecular mass, mole concept, ways of expressing concentration of solutions (molarity, normality, molality, mole fraction, strength).
AUGUST 2025	Atomic Structure Thomson's model, Rutherford's model, Bohr's model, electron, proton, neutron and their characteristics, atomic number, atomic mass, isotopes, isobars and isotones, dual nature of matter and light, de Broglie's relationship, Heisenberg Uncertainty principle, concept of orbit and orbital, quantum numbers, shapes of s,
SEPTEMBER 2025	Atomic Structure Thomson's model, Rutherford's model, Bohr's model, electron, proton, neutron and their characteristics, atomic number, atomic mass, isotopes, isobars and isotones, dual nature of matter and light, de Broglie's relationship, Heisenberg Uncertainty principle, concept of orbit and orbital, quantum numbers, shapes of s,
OCTOBER 2025	States of Matter Introduction to the three states of matter and intermolecular interactions. Gaseous state: Boyle's law, Charles' law, Gay Lussac's law and Avogadro's Law with practical implications. Elementary idea of kinetic energy, molecular speeds, ideal gas equation and deviation from ideal behavior. Liquid state: Melting and boiling points, vapor pressure, viscosity and surface tension.
NOVEMBER 2025	Solid state: General characteristics of solid state, crystalline and amorphous solids, classification of crystalline solids. Chemistry in Everyday Life Drugs and their classification with suitable examples, food adulterants and preservatives, artificial sweetening agents, antioxidants, soaps and detergents and their cleansing action.

GOVERNMENT COLLEGE BAHADURGARH

LESSON PLAN FOR SESSION 2025-26

Subject Name with code and semester:- INORGANIC CHEMISTRY,B.Sc. 5th Sem.

Teacher Name:-RAJEEV KUMAR

MONTH AUGUST 2025	Metal-ligand Bonding in Transition Metal Complexes Limitations of valence bond theory, an elementary idea of cr ystal-f ield theory, crystal field split ting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-f ield parameters.
SEPTEMBER 2025	Thermodynamic and Kinetic Aspects of Metal Complexe A brief outline of thermodynamic stability of metal complexes and factors affec ting the s tab ility, substitution reac tions of square planar complexes of Pt(II).
OCTOBER 2025	Magnetic Properties of Transition Metal Complexe Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of s and eff values, orbital contribution to magnetic moments, application of magnetic moment data for 3dmetal complexes.
NOVEMBER 2025	Electron Spectra of Transition Metal Complexes Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram for d1 and d9 states, discussion of the electronic spectrum of [Ti(H2O)6]3+ complex ion

Paper Code: 24CHE401SE01

Lesson Plan (Odd Semester)

Session - 2024-2025

Class BSC 1ST SEM
Faculty PRADEEP AGARWAL
Subject - ROLE OF CHEMISTRY IN SOCIETY
Course Code: 24CHE401SE01

Time Period	Topics
July/August	
Week 1	Analysis of soil and management composition of soil concept of PH,complexometric titration
Week 2	Chelating agents estimation of calcium and magnesium in soil, estimation of purity of water ,water sampling method ,estimation of dissolved oxygen in in water.
Week 3	Cosmetics a general study of preparation of hair dye
Week 4	Soap ,shampoo
September	
Week 1	Suntan lotion face powder, lipstick.
Week 2	Talcum powder ,nail enamel
Week 3	General introducytion to pestisides
Week 4	Benefit and adverse effect changing concept of pesticide
October	
Week 1	Brief introduction to structural activity relationship.
Week 2	Manufacture and uses
Week 3	Organochlorine organophosphates
Week 4	Revision
November	
Week 1	
Week 2	revision
Week 3	REVISION and TESTS
Week 4	REVISION and TESTS

Class -B.SC (CHEMISTRY) 5TH Semester
Faculty -PRADEEP AGARWAL
Subject - ORGANIC CHEMISTRY

Time Period	Topics
July/August	
Week 1	Principals of NMR,PMR SPECTRUM, Number of signals peak area,
Week 2	Equivalent and non equivalent protons,position of signals andChemical shift, Shielding and desheilding of protons
Week 3	Proton coupling, Spllit6ing of signal ,Coupling constant,MAGNETIC Equivalence of protons, Discussion of PMRsignalof molecules; Ethyl bromide,propyl bromide,isopropyl bromide
Week 4	1,1 Dibromo ETHANE , 1,1,2 Tribromoethane,ethyl acetate,toluene,benzaldehyde and acetone .simple problems on PMR
SEPT. WEEK 1	formation.conversion of glucose into fructose
Week 2	Chain lenghtning and shortning.Erythreo and threo diasteriomers
Week 3	Conversion of glucose into mannose.formation of glycoside deter ring size
Week 4	Mechanism of mutarotation.,structure of ribose and deoxyribose
October	
Week 1	An introduction to disachharides .maltose, sucrose and lactose
Week 2	.polysachharides starch and cellulose
Week 3	Organometallic compounds;Grignard reagent formation and reacti
Week 4	Organozinc compound ;formation
November	
Week 1	Organolithium compound formation
Week 2	REVISION and TESTS
Week 3	REVISION and TESTS
Week 4	REVISION and TESTS

	Department of Chemistry
Lesson Plan **Mrs Anjali Sharma**	**Class : B.Sc 1st Sem. DSC (P.S and L.S)** **Paper : Fundamental Chemistry** **Paper code: 24CHEM401DS01**
July 2025	**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. Resonance and resonance energy: study of some inorganic and organic compounds. Molecular Orbital Approach: LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combination of atomic orbitals.**
August. 2025	**of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (including idea of s-p mixing) and heteronuclear diatomic molecules such as O2-, O22-, N2-, CO, NO+, CN-. Comparison of VB and MO approaches.** **p-Block Elements** **Oxides – structures of oxides of N, P. Oxyacids – structure and relative acid strengths of oxyacids of nitrogen and phosphorus. Structure of white, yellow and red phosphorus. Oxyacids of sulphur – structures and acidic strength, H2O2– structure, properties and uses. Basic properties of halogen, interhalogen compounds-types and properties, halogen-acids and oxyacids of chlorine – structure and comparison of acidic strength.** **Teast - 1**
Sept. 2025	**Acids and Bases: Brönsted– Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and**

	solvent, differentiating and levelling solvents. Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept. Test -2 Gaseous States - Maxweldistribution 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, deviation of real gases from ideal behaviour, derivation of Van der Waals Equation of state and its applications in the calculation of Boyle' s temperature (compression factor), explanation of behavior of real gases using Van der Waals equation. Critical Phenomenon: Critical temperature.
Oct.2025	Critical Phenomenon: Critical temperature, critical pressure, critical volume and their determination. PV isotherms of real gases, continuity of states, isotherms of Van der Waals equation, relationship between critical constants and Van der Waals constants, compressibility factor. Law of corresponding states. Basics of Organic Chemistry and Stereochemistry- Electronic displacements and its applications, reaction intermediates and concept of aromaticity. Test-3
Nov.2025	Concept of isomerism, types of isomerism, optical isomerism, optical activity, elements of symmetry, molecular chirality, enantiomers, stereogenic centre, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization, relative and and absolute configuration , sequence rule,R and S nomenclature.

	Department of Chemistry
Lesson Plan **Mrs. Anjali Sharma**	**Class : B.A 3rd Sem . (Minor Chemistry)** **Paper : Chemistry of Metals & Nonmetals, Hydrocarbons, Solutions.** **Paper code: 25CHE403MI01**
August 2025	**) Metal and Non-Metals:** **Occurrence of elements in nature, physical and chemical properties of metals and non-metals, minerals and ores, metallurgical processes (benefaction, roasting, calcination and reduction of metal oxides processes), refining of metals, metallurgy of Fe, Zn, Al and Cu.** **Teatst -1**
September 2025	**Hydrocarbons Alkanes:** **General methods of preparation and Reactions: free radical substitution. Alkenes: General methods of preparation and Reactions: cis-addition (alk. KMnO4) and trans-addition (bromine), addition of HX (Markownikoff' s and anti-Markownikoff' s addition), hydration, ozonolysis, oxymecuration-demercuration, hydroboration oxidation. Alkynes: General methods of preparation and Reactions: formation of metal acetylides and acidity of alkynes, addition of bromine and alkaline KMnO4, ozonolysis and oxidation with hot alk. KMnO4, hydration to form carbonyl compoun** **Test -2**
October 2025	**Solution :** **Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression in freezing point, osmotic pressure,**

	determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor. Test -3 U
November 2025	Aromatic Hydrocarbons : Structure of benzene (Kekule, hybrid and resonance), preparation of benzene. Reactions: electrophilic substitution reactions in benzene citing examples of nitration, halogenation, sulphonation and Friedel-Craft's alkylation and acylation with special emphasis on carbocationic rearrangement, side chain oxidation of alkyl benzene.

	Department of Chemistry
Lesson Plan Mrs Bhawna	Class : BCA / B.A MDC 3 rd semester Paper : Core Chemistry Paper code: 25CHEX03MD01
August.2025 Chemical Bonding	Chemical Bonding Types of chemical bonding- ionic bond, covalent bond, coordinate bond, hydrogen bonding, Van der Waals interactions, Valence bond theory, concept of hybridization and shapes of simple molecules, VSEPR theory, Molecular orbital theory.
Sept.2025 Basic Principles of Organic Chemistry	Basic Principles of Organic Chemistry Types of organic reactions, electrophiles and nucleophiles, homolytic and heterolytic fission of a covalent bond, inductive effect, electromeric effect and resonance effect. Unit test (1)
Oct.2025 Corrosion Biomolecules	Corrosion Introduction and causes of corrosion, types of corrosion, dry and wet corrosion, factors affecting corrosion, methods to prevent corrosion Biomolecules Carbohydrates- Classification of carbohydrates, structure and importance of monosaccharides, importance of disaccharides and polysaccharides.
Nov.2025 Biomolecules	Proteins- Amino acids, peptide linkage, primary, secondary, tertiary and quaternary structure of proteins, importance of proteins, denaturation of proteins. Nucleic Acids- Structure and function of DNA and RNA. Unit test (2)

	Department of Chemistry
Lesson Plan Mrs BHAWNA	Class : BCA Paper : Molecular Structure, Thermodynamics, Equilibrium & Alkyl Halides Paper code: 25CHE403MI01
August.2025 Chemical Bonding and Molecular Structure	Valence electrons, ionic bond, covalent bond, bond parameters, Lewis' structure, polar character of covalent bond, valence bond theory and its limitations, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), hydrogen bond and its types with examples, Van der Waal forces.
Sept. 2025 Thermodynamic	Thermodynamics Concept of system, types of system, surroundings, extensive and intensive properties, state functions and variables. Laws of thermodynamics – internal energy and enthalpy, heat capacity and specific heat, entropy, Gibbs free energy & Helmholtz function, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization. Unit test (1) , Assignment (2)
Oct.2025 Chemical and ionic equilibriu	Chemical and ionic equilibrium Dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle & its applications, Theories of acid and base, ionization of acids and bases, strong and weak electrolytes, degree of ionization, acidic and basic strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, solubility product, common ion effect. Unit test (2) , Revision
Nov.2025 Alkyl halides	Unit–IV Alkyl halides Structure of haloalkanes and their classification as 1º, 2º & 3º, general methods of preparation, chemical reactions: nucleophilic substitution reactions with mechanism and their types (SN1, SN2 and SNi, E1, E2 & E1cB), nucleophilic substitution reactions with specific examples from: hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation and Williamson's ether synthesis. Assignment (2)