GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs BALWINDER KAUR**
Designation: **Assistant Professor**
Class: **B.Sc. 3rd Semester (PHYSICAL SCIENCES)**
Subject: **CHEMISTRY-III**
course code: **B23-CHE-301**

Months	**Topics to be covered**	**Learning outcomes of the student**	**Teaching learning Strategy**	Remarks if any
July	**s and p-Block Elements**: Salient features of hydrides, oxides, halides, hydroxides of sblock 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.	Students will learn about the structure of S and P-block elements, their properties and their use in daily life as well as industrial applications. 2. 34.	Group Learning and Teaching	
August	**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 of EMF measurement in solubility product and potentiometric titrations using glass electrode.	Students will understand about various laws and theories related to eletrochemistry-I and know about their thermodynamic properties.	Group Learning and Teaching	**Assignment -1 and Test**

Sept	**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 erythronomenclature, 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.	Students will understand about variation of conductance studies with concentration and explain with many phenomenon.	PPT presentation & and	**Assignment -2 Test**
Oct	**Benzene and its derivatives:** Nomenclature, Aromatic nucleus and side chain, Huckels' rule of aromaticity. Aromatic electrophilic substitution, mechanism of nitration, 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. Aryl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the eliminationaddition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides	The students will learn and understand the fundamental properties, structures and reactivity of organic compounds such alkene, alkyne arenes, alkyl and aryl halide etc	Group Learning and Teaching	
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs BALWINDER KAUR**
Designation: **Assistant Professor**
Class: **B.Sc. 3rd Semester (LIFE SCIENCES)**
Subject: **CHEMISTRY-III**
course code: **B23-CHE-301**

Months	**Topics to be covered**	**Learning outcomes of the student**	**Teaching learning Strategy**	Remarks if any
July	**s and p-Block Elements**: Salient features of hydrides, oxides, halides, hydroxides of sblock 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.	Students will learn about the structure of S and P-block elements, their properties and their use in daily life as well as industrial applications. 2. 34.	Group Learning and Teaching	
August	**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 of EMF measurement in solubility product and potentiometric titrations using glass electrode.	Students will understand about various laws and theories related to eletrochemistry-I and know about their thermodynamic properties.	Group Learning and Teaching	**Assignment -1 and Test**

Sept	**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 erythronomenclature, 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.	Students will understand about variation of conductance studies with concentration and explain with many phenomenon.	PPT presentation & and	**Assignment -2 Test**
Oct	**Benzene and its derivatives:** Nomenclature, Aromatic nucleus and side chain, Huckels' rule of aromaticity. Aromatic electrophilic substitution, mechanism of nitration, 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. Aryl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the eliminationaddition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides	The students will learn and understand the fundamental properties, structures and reactivity of organic compounds such alkene, alkyne arenes, alkyl and aryl halide etc	Group Learning and Teaching	
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs BALWINDER KAUR**
Designation: **Assistant Professor**
Class: **B.Sc. Ist Semester (MAJOR IN CHEMISTRY)**
Subject: **PHYSICAL CHEMISTRY-I**
course code: **B23-CHE-102**

Months	**Topics to be covered**	**Learning outcomes of the student**	**Teaching learning Strategy**	Remarks if any
July	**Chemical Kinetics:** Kinetics Rate of reaction, rate equation and its types, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst. Order and molecularity of a reaction, integrated rate expression for zero order,	The student will Get the knowledge of concepts of rates of chemical reactions and its application in determination of order of various reactions.	Group Learning and Teaching	
August	**Chemical Kinetics:** integrated rate expression for first order, second and third order reactions (for equal and unequal concentrations of reactants), methods of determination of order of reaction, Half-life period of a reaction. Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular collision. Transition state theory of bimolecular reactions. **Thermodynamics:** Definition of thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Thermodynamic equilibrium, Concept of heat and work. First law of thermodynamics: statement, concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship.	The student will Get the knowledge of various thermodynamic variables and properties.	Group Learning and Teaching	**Assignment -1 and Test**
Sept	**Thermodynamics:** Joule–Thomson coefficient for ideal gas and real gas and inversion temperature. Calculation of w, q, dU & dH for the expansion of	The student will learn about the concepts of physical and thermodynamic functions in different	PPT presentation & and	**Assignment -2 Test**

	ideal gases under isothermal and adiabatic conditions for reversible process. **Physical Properties and Molecular Structure-I:** Optical activity, polarization – (Clausius – Mossotti equationderivation excluded). Orientation of dipoles in an electric field, dipole moment, induced dipole moment.	reversible reactions and get the knowledge of molecular structure.		
Oct	**Physical Properties and Molecular Structure-II:** Measurement of dipole moment-temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetism.	The student will learn and understand about the various properties of molecules related to its magnetic behaviour	Group Learning and Teaching	
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs BALWINDER KAUR**
Designation: **Assistant Professor**
Class: **B.A Ist Semester (MDC-I-CHEMISTRY)**
Subject: **INTRODUCTORY CHEMISTRY-I**
course code: **B23-CHE-104**

Months	**Topics to be covered**	**Learning outcomes of the student**	**Teaching learning Strategy**	Remarks if any
July	**Atomic Structure and Bonding**: Introduction, Elementary introduction of atomic structure and chemical bonding, Representation of elements/ atoms, Lewis structure, electronic configurations (1-30)	The students will be able to get knowledge about structure and bonding.	Group Learning and Teaching	
August	**Carbon and Its Compounds**: Introduction, Tetravalency of Carbon, allotropes of carbon and their properties, hydrocarbons (1-5), nomenclature (linear compounds), Applications of hydrocarbons.	The students will be able to learn about hydrocarbons and their applications in day to day life.	Group Learning and Teaching	**Assignment -1 and Test**
Sept	**Polymers**: Introduction, elementary idea of synthetic and natural polymers, Homo polymers and copolymers, uses and properties (Natural rubber, Vulcanized rubber, Polyethene, PVC, Styrene, Teflon, PAN, Nylon-66)	The students will aware about different polymers.	PPT presentation & and	**Assignment -2 Test**
Oct	**Food Preservatives**: Elementary idea of natural and synthetic food preservatives, rancidity, uses and properties, different food preservation processes (pickle, Jam), artificial sweeteners, uses and properties	The students will be able to get knowledge about preservative	Group Learning and Teaching	
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs. Rani Jindal**
Designation: **Assistant Professor Class:** **B.Sc 3rd sem**

Subject: **Chemistry(MDC chemistry) Theory course code** B23-CHE-303

Months	Topics to be covered	Learning outcomes of the student	Teaching learning Strategy	Remarks if any
July	Pollution and their types:	1 To get more knowledge on the impacts of pollution on environment	Group Learning and Teaching	
August	Plastic and polyethene pollution, pollution sources, Recycling of plastic, greenhouse effect, ozone depletion II Energy: Energy sources, renewable and non-renewable sources, cells and batteries, fuel cell, solar cell, polymer cell :	2.To learn about different energy resources	Group Learning and Teaching	**Assignment -1 and Test**
Sept	III Water Sources of drinking water and uses, water conservation, Permissible TDS, Techniques of purification of water, R.O. water purification process (Osmosis and Reverse Osmosis), wastewater management IV Pesticides and Herbicides: General introduction and definition, biological control and chemical control: natural and synthetic pesticides,	3To learn about the purification process of water quality 4 To Know more about Pesticides and their bad impacts on health	PPT presentation & and	**Assignment -2 Test**
Oct	benefits and adverse effects of DDT, BHC, malathion.		Group Learning and Teaching	**Revision and Tests**
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Mrs. Rani Jindal**
Designation: **Assistant Professor Class:** **B.Sc 5th sem**

Subject: Chemistry of Fertilizers and Pesticides **Theory course code** B23-CHE-303

Months	Topics to be covered	Learning outcomes of the student	Teaching learning Strategy	Remarks if any
July	Methods and time of fertilizer applications	the learner will be able to: 1. Know about fertilizers and nutrients;	Group Learning and Teaching	
August	, tips to get best efficiency of Applied fertilizers, Integrated nutrient management, fertilizers and its relations to plant nutrients, Factors effecting optimum fertilizer dose.	Understand types of nitrate fertilizers;	Group Learning and Teaching	**Assignment -1 and Test**
Sept	Classification and types of fertilizers, Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate , Ammonium Chloride: Introduction, Raw materials, Action of as a fertilizersPhosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate. Potassic fertilizers (Types and optimum doses)	Understand types of phosphate fertilizers	PPT presentation & and	**Assignment -2 Test**
Oct	pesticides: Classification, synthesis, structure activity relationship (SAR), mode of action, uses and adverse effects of representative pesticides in the following classes: Organochlorines (DDT, Gammaxene); Organophosphates (Malathion, Parathion); Carbamates (Carbofuran and Carbaryl); Quinones	Get the knowledge about pesticides.	Group Learning and Teaching	

	(Chloranil), Anilides (Alachlor and Butachlor).			
Nov	**Revision and Tests**			

GOVT. P.G. COLLEGE FOR WOMEN, SECTOR-14, PANCHKULA

LESSON-PLAN (Session 2025-2026) ODD SEMESTER

Name of Professor: **Dr. Rani Jindal**
Designation: **Assistant Professor**
Subject: **ChemistryB23-CHE 501**
Class: **B.Sc 5th sem (Phy Sci & Life science)**

Months	**Topics to be covered**	**Learning outcomes of the student**	**Teaching learning Strategy**	Remarks if any
July	Cooridination compounds Werner's theory of cooridination compounds , EAN chelates , nomenclature of cooridination compounds	To understand about the basis of Cooridination compounds	Group Learning and Teaching	
August	Metal- Ligand Bonding in Transition Metal complexes: valence bond theory application and limitations An elementary idea of crystal field theory, crystal field splitting in octahedral complexes Tetrahedral and square planer complexes **Magnetic properties of Transition metal complexes:** Types of magnetic materials, magnetic susceptibility, method of determining magnetic susceptibility, spin only formula, basic ide of LS coupling L-S coupling, Thermodynamics II third law of thermodynamics , Nernst heat theorm Residual entropy, Evaluation absolute entropy, Evaluation absolute entropyfrom heat capacity data. Gibbs function and Helmholtz function as thermodynamics quantities.Creteria for thermodynamics equilibrium and spontaneity. Variation of G with P,V and T, Partial molar quantities Concept of chemical potential	To understand about thermodynamicsand equilibrium in predicting various physical properties of system	Group Learning and Teaching	**Assignment - 1 Test**

Sept	**Phase Equillibrium** Statement and meaning of the terms – phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one componentsystem –Example – water system.Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system,. **Quantum Mechanics-I** Black-body radiation, Plank's radiation law, postulates of quantum mechanics, quantum mechanical operators, commutation relations, Hamiltonian operator, Hermitian operator. Average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics, Determination of wave function & energy of a particle in one dimensional box. **Rotational Spectrum** Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length and isotopic effect	Get knowledge about the quantum mechanical perperties and analysis of diatomic molecules	PPT presentation & and learning through problem solving	**Assignment - 2** **Test**
Oct	**Organic Synthesis *via* Enolates:** Acidity of hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. **Heterocyclic Compounds:** Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with pa rticular emphasi s on the mechani sm of electrophilic substitution.	To understand about synthesis and mechanism of some organic reactions and heterocyclic compounds	Group Learning and Teaching	**Revision and Tests**
Nov	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole			

	Revision and Tests			
Nov				