Lesson Plan

Name : **Ms Pooja (Chemistry)**

Subject: **Chemistry**

Class and Section: **B.Sc.-3rd (6th Sem.)**

Paper 1 & 2

Jan 2025	Acid & Base Organometalic compound	Acids and Bases Arrhenius, Bronsted-lowry, Lux-flood, solvent system and Lewis concept of acids and bases, relative strength of acids and bases, levelling solvents, hard and soft acids and bases(HSAB), Applications of HSAB principle. Organometallic chemistry Definition, classification and nomenclature of organometallic compounds, preparation, properties and bonding of alkyls of Li, Al, Hg and Sn, concept of hapticity of organic ligand, Structure and bonding in metal-ethylenic complexes, Structure of Ferrocene, classification in metal carbonyls, preparation, properties and bonding in mononuclear carbonyls.
Jan 2025	Bioinorganic Chemistry	Bio inorganic chemistry Metal ions present in biological system, classification on the basis of action (essential, non essential, trace, toxic), Metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of Na+ , K+ , Ca+2, Mg+2 , Fe+2 ions, Cooperative effect, Bohr effect. Silicones and Phosphazenes Nomenclature, classification, prepration and uses of silicones, elastomers, polysiloxane copolymers, poly phosphazenes and bonding in triphosphazene.
Feb 2025	Statistical mechanics & Photochemistry	Introduction to statistical mechanics Need for statistical thermodynamics, thermodynamic probability, Maxwell Boltzmann distribution statistics, Born oppenheimer approximation, partition function and its physical significance. Factorization of partition function. Photochemistry Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, StarkEinstein law (law of photochemical equivalence), Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).
Feb 2025	Colligative properties	Solutions, Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law. Colligative properties: (i) relative lowering of vapour pressure (ii) Elevation in boiling point (iii) depression in freezing point (iv) osmotic pressure. Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.. Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

Paper 2 & 3

March 2025	Phase Equilibrium	Phase Equillibrium Statement and meaning of the terms – phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water system. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic

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		Example Pb-Ag system, desilverisation of lead.
March 2025	Organic Synthesis & Heterocyclic compound	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. Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. 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. Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.
Apr 2025	Amino acids, Peptide & proteins	Amino Acids, Peptides& Proteins Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of α-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid– phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.
Apr 2025	Synthetic Polymers	Synthetic Poly mers Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.

Class and Section: **B.Sc.-1st (2nd Sem.)**

Name of the Course : **Chemistry** Course Code B23-CHE-201 Credits Theory(3) Practical(1) Total(4) Contact Hours T3 + P2 = 5 **Max. Marks:100** **Internal Assessment Marks:30** **End Term Exam Marks: 70** **Time:3hrs**	**Internal Assessment: Theory (20 Marks)** Class Participation: **05 Marks** Seminar/presentation/assignment/quiz/class test etc.: **05 Marks** Mid-Term Exam: **10 Marks** **End Term Examination (T) : 50 Marks** **Internal Assessment: Practicum (10 Marks)** Seminar/Demonstration/Viva-voce/Lab records etc.: **10 Marks** **End Term Examination (P) 20 Marks**

Feb 2025	**Covalent Bond & Ionic Solids**	Valence bond theory approach, shapes of simple inorganic molecules and ions based on valuece shell electron pair repulsion (VSEPR) theory and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements. Molecular orbital theory of homonuclear (N, O_2) and heteronuclear (CO and NO) diatomic molecules, diplole moment and percentage ionic character in covalent bond.

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		Ionic Solids Ionic structures (NaCl, CsCl, ZnS (Zinc blende), CaF,) size effects, radius ratio rule and its limitations, Concept of Lattice energy, Born-Haber cycle, Solvation energy and its relationship with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan's rule.
Mar 2025	**Chemical Kinetics & Distribution Law**	Concept of reaction rates, rate equation, factors influencing the rate of reaction, Order and molecularity of a reaction, integrated rate expression for zero, first, Half-life period of a reaction, Arrhenius equation. Nernst distribution law-its thermodynamic derivation, Nernst distribution law after association and dissociation of solute in one of the phases, of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride.
Apr 2025	**Alkanes and Cycloalkanes Nomenclature, classification of carbon atoms & Alkenes**	alkanes, of formation: Wartz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids, physical properties. Mechanism of free radical halogenation of alkanes: and selectivity. in alkanes reactivity Nomenclature of Cycloalkanes, Baeyer's strain theory and its limitations, tions, theory theor of strainless rings. Alkenes Nomenclature of alkenes and its structure. Metods of formation: dehydration of alcohols, dehydrohalogenation of alkyl halide, Hofmann elimination and their mechanism. The Saytzeff rule and relative stabilities of alkenes. Chemical reactions: electrophilic and free radical additions, addition of halogens, halogen acids, hydroboration-oxidation, oxymercuration-reduction, ozonolysis
May 2025	**Hydrogen Bonding and Van der Waals forces & Metallic Bond and semiconductors**	Hydrogen Bonding and Van der Waals forces Hydrogen Bonding Definiton, types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Van der Waals forces. Metallic Bond and semiconductors Metallic bond Qualitative idea of valence bond and Band theories of metallic bond (conductors, semiconductors, insulators). Semiconductors Introduction, types and applications.

Class and Section: **B.A.-1st (2nd Sem.)**

Name of the Course Introductory Chemistry-II **Course Code** B23-CHE-204 **Credits** Theory(2) Practical(1) Total(3) **Contact Hours** T2 + P1 = 4	**Internal Assessment: Theory (15 Marks)** Class Participation: **04 Marks** Seminar/presentation/assignment/quiz/class test etc.: **04 Marks** Mid-Term Exam: 07 **Marks**

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Subject: Chemistry

Max. Marks:75 **Internal Assessment Marks:20** **End Term Exam Marks: 55** **Time:3hrs**		**End Term Examination (T) : 35 Marks** **Internal Assessment: Practicum (05 Marks)** Seminar/Demonstration/Viva-voce/Lab records etc.: **05 Marks** **End Term Examination (P) 20 Marks**
Feb 2025	**Renowned Indian Scientists**	Renowned Indian Scientists Brief Biography of Renowned Indian Scientists (Hargobind Khurana, Dr. P.C. Ray, Sir C.V. Raman, Dr. A.P.J. Abdul Kalam, C.N.R. Rao, Dr. Vikram Sara Bhai, Dr. Homi Jahangir Bhabha, Dr. J.C. Bose, Dr. S.N. Bose)
Mar 2025	**Metal and Non-Metals**	Metal and Non-Metals Periodic table, classification of elements, physical and chemical aspects of metals and non-metals, Ore and Minerals of Iron, Copper, Aluminium, alloys
Apr 2025	**Matters**	Physical Properties of Matter Classification of matter, properties, uses, ideal gas equation, real gas equation, some important compounds (baking soda, washing soda, plaster of Paris, gypsum, glass)
May 2025	**Soil & fertilizers**	Soil and fertilizers Green revolution, soil: types of soil and their components for fertility, grow condition, pH, irrigation, biofertilizers, chemical fertilizers and their uses, acid rain.