Lesson Plan- Dr. Surender Kumar
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 2nd Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Chemistry Section-A	Section-A ***Covalent Bond*** Valence bond theory approach
January Second Week	Chemistry Section-A	Section-A Shapes of simple inorganic molecules and ions based on VSEPR theory
January Third Week	Chemistry Section-A	Section-A Hybridization with suitable examples of linear , Trigonal planar, square planar ,
January Fourth Week	Chemistry Section-A	Section-A Hybridization with suitable examples of tetrahedral, Trigonal bi pyramidal and octahedral arrangements.
February First Week	Chemistry Section-A	Section-A MO theory of Homo nuclear (N2 and O2) and hetero nuclear (CO and NO) diatomic. molecules,
February Second Week	Chemistry Section-A	Section-A bond strength and bond energy,
February Third Week	Chemistry Section-A	Section-A Percentage ionic character and dipole moment in covalent bond.
February Fourth Week	Chemistry Section-B	Section-B Concept of reaction rates, rate equation
March First Week	Chemistry Section-B	Section-B Factor influencing the rate of reaction
March Second Week	Chemistry Section-B	Section-B Order and Molecularity of a reaction
March Third Week	Chemistry Section-B	Section-B Integrated rate expression for Zero ,first (for equal conc .of reactants)
March Fourth Week	Chemistry Section-B	Section-B Integrated rate expression for second order reaction(for equal conc. of reactants)

April First Week	Chemistry Section-B	Section-B Half life period of a reaction
April Second Week	Chemistry Section-B	Section-B ……Revision……....
April Third Week	Chemistry Section-B	Mid-Term Test/ Assignment
April Fourth Week	Chemistry Section-B	Mid-Term Test/ Assignment

Lesson Plan- Dr. Surender Kumar
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 4th Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Inorganic Chemistry Section-C	Section-C Theory of Qualitative and Quantitative Inorganic Analysis-I Chemistry of analysis of various acidic radicals.
January Second Week	Inorganic Chemistry Section-C	Section-C Theory of Qualitative and Quantitative Inorganic Analysis-I Chemistry of identification of acid radicals in typical combinations.
January Third Week	Inorganic Chemistry Section-C	Section-C Theory of Qualitative and Quantitative Inorganic Analysis-I Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
January Fourth Week	Inorganic Chemistry Section-C	Section-C Theory of Qualitative and Quantitative Inorganic Analysis-I Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
February First Week	Inorganic Chemistry Section-D	Section-D Theory of Qualitative and Quantitative Inorganic Analysis-II Chemistry of analysis of various groups of basic radicals.
February Second Week	Inorganic Chemistry Section-D	Section-D Theory of Qualitative and Quantitative Inorganic Analysis-II Theory of precipitation, coprecipitation, Post- precipitation, purification of precipitates
February Third Week	Inorganic Chemistry Section-D	Section-D Theory of Qualitative and Quantitative Inorganic Analysis-II Theory of precipitation, coprecipitation, Post- precipitation, purification of precipitates
February Fourth Week	Inorganic Chemistry Section-D	Section-D Theory of Qualitative and Quantitative Inorganic Analysis-II Theory of precipitation, coprecipitation, Post- precipitation, purification of precipitates
March First Week	Physical Chemistry Section-A	Section-A Thermodynamics-III Second law of thermodynamics, need for the law, different statements of the law, Carnot's cycles and its efficiency, Carnot's theorm, Thermodynamics scale of temperature.
March Second Week	Physical Chemistry Section-A	Section-A Concept of entropy – entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

March Third Week	Physical Chemistry Section-B	Section-B Thermodynamics-IV Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data.
March Fourth Week	Physical Chemistry Section-B	Section-B Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.
April First Week	Physical Chemistry Section-C	Section-C Electrochemistry-III Electrolytic and Galvanic cells – reversible & Irreversible cells , conventional representation of electrochemical cells. EMF of cell and its measurement, Wes ton standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K).
April Second Week	Physical Chemistry Section-C	Section-C Types of reversible electrodes – metal metal ion gas electrode, metal – insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical se ries and its applications.
April Third Week	Physical Chemistry Section-D	Section-D Electrochemistry-IV Concentration cells with and without transference, liquid junction potential, application of EMF measurement i.e. valency of ions, solubility product activity 20 coefficient, potentiometric titration (acid- base and redox).
April Fourth Week	Physical Chemistry Section-D	Section-D Electrochemistry-IV Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods. B. Sc. IVth Semester Paper XV (Theory) Organic Chemistry.
		Mid-Term Test/ Assignment

Lesson Plan- Dr. Surender Kumar
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 6th Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Inorganic Chemistry Section-C	Section-C Bioinorganic Chemistry Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin.
January Second Week	Inorganic Chemistry Section-C	Section-C Bioinorganic Chemistry Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin.
January Third Week	Inorganic Chemistry Section-C	Section-C Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.
January Fourth Week	Inorganic Chemistry Section-D	Section-D Silicones and Phosphazenes Silicones and phosphazenes, their preparation, properties,structure and uses
February First Week	Inorganic Chemistry Section-D	Section-D Silicones and Phosphazenes Silicones and phosphazenes, their preparation, properties, structure and uses
February Second Week	Physical Chemistry Section-A	Section-A Spectroscopy-III Electronic Spectrum Concept of potential energy curves for bonding and antibonding molecular orbitals,
February Third Week	Physical Chemistry Section-A	Section-A Spectroscopy-III Qualitative description of selection rules and Franck- Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.
February Fourth Week	Physical Chemistry Section-A	Section-A Spectroscopy-III Qualitative description of selection rules and Franck- Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.
March First Week	Physical Chemistry Section-B	Section-B Section-B Photochemistry Interaction of radiation with matter, difference between thermal and photochemical processes.
March Second Week	Physical Chemistry Section-B	Section-B Section-B Photochemistry Section-B Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state,

March Third Week	Physical Chemistry Section-B	Section-B Section-B Photochemistry Qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).
March Fourth Week	Physical Chemistry Section-C	Section-C Section-C Solutions: Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient.
April First Week	Physical Chemistry Section-C	Section-C Section-C Solutions: Dilute solution, Colligative properties, Raolut's law, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure.
April Second Week	Physical Chemistry Section-C	Section-C Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.
April Third Week	Physical Chemistry Section-D	Section-D Phase Equilibrium 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 and Sulpher systems.
April Fourth Week	Physical Chemistry Section-D	Section-D Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilerisation of lead.
		Mid-Term Test/ Assignment

Lesson Plan- Dr. Rajdeep Yadav
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 2nd Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Chemistry Section-C	Section-C Alkenes -Nomenclature of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides.
January Second Week	Chemistry Section-C	Section-C Alkene-The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.
January Third Week	Chemistry Section-C	Section-C Alkene-Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions.
January Fourth Week	Chemistry Section-C	Section-C Alkenes -Markownikoff's rule, hydroboration–oxidation, oxymercurationreduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4,
February First Week	Chemistry Section-C	Section-C Alkenes -Hydroboration–Oxidation, Oxy-mercuration reduction,
February Second Week	Chemistry Section-C	Section-C Alkenes -Hydroxylation and oxidation with KMnO4,
February Third Week	Chemistry Section-C	Section-C Alkenes -Hydroxylation and oxidation with KMnO4,
February Fourth Week	Chemistry Section-D	Section-D Hydrogen Bonding & Vander Waals Forces Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances.
March First Week	Chemistry Section-D	Section-D Hydrogen Bonding & Vander Waals Forces Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances.
March Second Week	Chemistry Section-D	Section-D Hydrogen Bonding & Vander Waals Forces Hydrogen Bonding – Application Brief discussion of various types of Vander Waals Forces.
March Third Week	Chemistry Section-D	Section-D Metallic Bond and Semiconductors Metallic Bond- Brief introduction to metallic bond.
March Fourth Week	Chemistry Section-D	Section-D Metallic Bond and Semiconductors Metallic Bond- Band theory of metallic bond Semiconductors- Introduction, types and applications.
April First Week	Chemistry Section-D	Section-D Metallic Bond and Semiconductors Metallic Bond- Band theory of metallic bond Semiconductors- Introduction, types and applications.

April Second Week	Chemistry Section-D	Section-D Metallic Bond and Semiconductors Metallic Bond- Band theory of metallic bond Semiconductors- Introduction, types and applications.
April Third Week	Chemistry Section-D	Mid-Term Test/ Assignment
April Fourth Week	Chemistry Section-D	Mid-Term Test/ Assignment

Lesson Plan- Dr. Rajdeep Yadav
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 4th Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Inorganic Chemistry Section-C	**Section-A Chemistry of f – block elements Lanthanides** Electronic structure, oxidation states and ionic radii and.
January Second Week	Inorganic Chemistry Section-C	lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.
January Third Week	Inorganic Chemistry Section-C	**Section-B Chemistry of f – block elements Actinides** General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U
January Fourth Week	Inorganic Chemistry Section-C	, Comparison of properties of Lanthanides and Actinides and with transition elements.
February First Week	Inorganic Chemistry Section-D	**Organic Chemistry** **Section-A** **Infrared (IR) absorption spectroscopy** Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum,
February Second Week	Inorganic Chemistry Section-D	Fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.Applications of IR spectroscopy in structure elucidation of simple organic compounds.
February Third Week	Inorganic Chemistry Section-D	**Diazonium Salts** Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO_2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.
February Fourth Week	Inorganic Chemistry Section-D	**Section-B** **Amines** Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines.Structural features affecting basicity of amines.
March First Week	Physical Chemistry Section-A	Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds.

March Second Week	Physical Chemistry Section-A	Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.
March Third Week	Physical Chemistry Section-B	**Section-C** **Nitro Compounds** Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.
March Fourth Week	Physical Chemistry Section-B	**Section-D** **Aldehydes and Ketones** Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides.
April First Week	Physical Chemistry Section-C	Advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.
April Second Week	Physical Chemistry Section-C	Physical properties. Comparison of reactivities of aldehydes and ketones.
April Third Week	Physical Chemistry Section-D	Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction.
April Fourth Week	Physical Chemistry Section-D	Mannich reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions.
April Fourth Week		…….Revision……..

Lesson Plan- Dr. Rajdeep Yadav
Govt. College Nangal Chaudhary
Subject- Chemistry B.Sc. 6th Semester
Session-2024-25

Week-Month-Year	Subject	Unit-Lesson-Content
January First Week	Inorganic Chemistry Section-A	**Section-A** **Organometallic Chemistry** Definition, nomenclature and classification of organometallic compounds.
January Second Week	Inorganic Chemistry Section-A	Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal-ethylenic complexes,
January Third Week	Inorganic Chemistry Section-A	mononuclear carbonyls and the nature of bonding in metal carbonyls.
January Fourth Week	Inorganic Chemistry Section-B	**Section-B** **Acids and Bases, HSAB Concept** Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases,
February First Week	Inorganic Chemistry Section-B	Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness
February Second Week	Physical Chemistry Section-A	**Organic chemistry** **SECTION – A** **Heterocyclic Compounds-I** 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.
February Third Week	Physical Chemistry Section-A	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole
February Fourth Week	Physical Chemistry Section-B	**SECTION – B** **1. Heterocyclic Compounds-II** Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to
March First Week	Physical Chemistry Section-B	Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline

March Second Week	Physical Chemistry Section-B	**2. Organosulphur Compounds** Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers,
March Third Week	Physical Chemistry Section-B	sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.
March Fourth Week	Physical Chemistry Section-C	**SECTION – C** **1. 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.
April First Week	Physical Chemistry Section-C	**2. Synthetic Polymers** Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers
April Second Week	Physical Chemistry Section-C	. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy re sins and polyurethanes. Natural and synthetic rubbers.
April Third Week	Physical Chemistry Section-D	**Section – D** **Amino Acids, Peptides& Proteins** Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of -amino acids. Structure and nomenclature of Peptides and proteins.
April Fourth Week	Physical Chemistry Section-D	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.
April Fourth Week		…….Revision……..
April Fourth Week		…….Revision……..