

GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2024- 2025

Name of Assistant/Associate Professor: Dr. Shivani

Class & Sem.: B.E. 6th Sem. Subject: Inorganic Chemistry

Months	Topics/Chapters to be Covered
Jan 2025	organometallic Chemistry: Definition, nomenclature and classification of organometallic compounds, preparation, properties and bonding of alkyls of Li, Al, Hg and Sn. a brief account of metal-alkylene complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.
Feb 2025	Acids and Bases, HSAB concepts- Arrhenius, Bronsted-lowry, the Lux - Flood, Solvent System and Lewis concepts of acids and bases, relative strength of acid and bases, concept of Hard and Soft acids and Bases. Symbiosis, electronegativity and hardness and softness.
March 2025	Essential and trace elements in biological processes, metalloproteins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca ²⁺ . Nitrogen fixation.
April 2025	Silicones and phosphazenes, their preparation, properties, structure and uses.

Signature of Asst/Asso. Professor

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Name of Assistant/Associate Professor: Dr. Shivati Takhas

Class & Sem.: B.Sc. 6th Sem Subject: Organic Chemistry.

Months	Topics/Chapters to be Covered
Jan 2025	Heterocyclic compounds-I: Introduction, Molecular orbital picture and aromatic characteristics of furan, 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. Heterocyclic compounds-II: Introduction to condensed five- and six-membered heterocycles. Preparation and reactions of indole, quinoline & isoquinoline with special reference to Fischer indole synthesis. Stereo synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of quinoline & isoquinoline.
Feb 2025	Organosulphur compounds: Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioesters, Sulphonic acids, sulphenamides and sulphamides. Synthesis reagents alkyl and aryl sulphenates.
March 2025	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. Synthetic polymer: Addition of chain-growth polymerization, free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymer. Condensation of step growth polymerization polyester, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes.
April 2025	Amino acids, peptides and 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, and group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptides and proteins: Primary and secondary structure.

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Name of Assistant/Associate Professor: Dr. Shivani

Class & Sem.: B.Sc. 6th Sem Subject: Physical Chemistry

Months	Topics/Chapters to be Covered
Jan 2025	Electronic Spectrum: Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of sigma and pi [*] and n molecular orbital (orb) their energy level and respective transitions.
Feb 2025	Interaction of radiation with matter, difference b/w thermal & photochemical processes. Laws of photochemistry, Groutus - Drapier law, Stark - Einstein law. Chain of photochemical equivalence, Jablonski diagram depicting various processes occurring in the excited state. Qualitative description of fluorescence, phosphorescence, non-radiative process (internal conversion, intersystem crossing). Quantum yield, photosensitized reactions - energy transfer process (simple examples)
March 2025	Solutions: Dilute solution and colligative properties: Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficients. Dilute solutions colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination, osmosis, law of osmotic pressure and its measurement, determination of molecular weight. Elevation of boiling point and depression of freezing point. Thermodynamic derivation of relation b/w molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of association & dissociation of solute.
April 2025	Phase equilibrium - 1 statement and meaning of the term. phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibrium of one component system. Example water and sulfur systems. Phase equilibrium of two component systems. Solid-liq. equilibria, simple eutectic example - Pb-Ag system, desilverisation of lead.

Signature of Asst/Asso. Professor