

Govt. College Chhilo (Mahendergarh)
Lesson Plan- B.Sc. IInd Semester (Non Medical/ Medical)
Inorganic/ Organic/ Physical Chemistry-Session 2023-24

Date	Day	Topic
		Inorganic Chemistry
15-01-2024	Thursday	Section-A Hydrogen Bonding & Vander Waals Forces Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander Waals Forces
16-01-2024	Friday	Section-A Metallic Bond and Semiconductors Metallic Bond- Brief introduction to metallic bond; band theory of metallic bond . Semiconductors- Introduction, types and applications.
17-01-2024	Saturday	Sh. Guru Govind Singh Jayanti- Holiday
22-01-2024	Thursday	Section-B s-Block Elements-Comparative study of the elements including , diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems.
23-01-2024	Friday	Section-B Chemistry of Noble Gases Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon.
24-01-2024	Saturday	Section – C p-Block Elements-Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation).
29-01-2024	Thursday	Section-c Boron family (13th group):-Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding) Borazene – chemical properties and structure Trihalides of Boron – Trends in fewis acid character structure of aluminium (III) chloride.
30-01-2024	Friday	Section-D Carbon Family (14th group)-Catenation, $p\pi - d\pi$ bonding (an idea), carbides, fluorocarbons, silicates structural aspects), silicon – general methods of preparations, properties and uses.
31-01-2024	Saturday	Section-D Nitrogen Family (15th group) Oxides – structures of oxides of Nitrogen and phosphorus. Oxyacids – structure and relative acid strengths of oxyacids of Nitrogen and phosphorus. Structure of white, yellow and red phosphorus.
05-02-2024	Thursday	Section-D Oxygen Family (16th group) Oxyacids of sulphur – structures and acidic strength H_2O_2 –structure, properties and uses.
06-02-2024	Friday	Section-D Halogen Family (17th group) Basic properties of halogen, interhalogens types properties ,hydro and oxyacids of chlorine – structure and comparison of acid strength .Halogen Family (17th group) Basic properties of halogen, interhalogens types properties ,hydro and oxyacids of chlorine – structure and comparison of acid strength.

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		Organic Chemistry
07-02-2024	Saturday	Section-A Alkenes Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.
12-02-2024	Thursday	Section-A Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation, oxymercuration-reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO_4 .
13-02-2024	Friday	Section-B Arenes and Aromaticity Nomenclature of benzene derivatives- Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non - aromatic compounds.
14-02-2024	Saturday	Basant Panchami- Holiday
19-02-2024	Thursday	Section-B Aromatic electrophilic substitution general pattern of the mechanism, mechanism of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation.
20-02-2024	Friday	Section-C Dienes and Alkynes- Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene,. Chemical reactions 1,2 and 1,4 additions (Electrophilic & free radical mechanism),
21-02-2024	Saturday	Section-C Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions; hydroboration-oxidation of alkynes.
29-02-2024	Thursday	Section-D Alkyl and Aryl Halides Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides; $\text{S}_\text{N}2$ and $\text{S}_\text{N}1$ reactions with energy profile diagrams.
		Section-D Methods of formation and reactions of aryl halides, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.
		Physical Chemistry
01-03-2024	Friday	Section - A Kinetics-I Rate of reaction, rate equation, factors influencing the rate of a reaction -concentration, temperature, pressure, solvent, light, catalyst.
02-03-2024	Saturday	Section - A Order of a reaction, Integrated rate expression for zero order, first order, second and third order reaction.
07-03-2024	Thursday	Section - A Half life period of a reaction. Methods of determination of order of reaction.
08-03-2024	Friday	Mahashivratri- Holiday
09-03-2024	Saturday	Section - B Kinetics-II-Effect of temperature on the rate of reaction - Arrhenius equation. Theories of reaction rate.

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14-03-2024	Thursday	Section – B Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.
15-03-2024	Friday	Section-C Electrochemistry-I-Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization, Ostwald's Dilution.
16-03-2024	Saturday	Section-C Law. Debye- Huckel – Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included)
21-03-2024	Thursday	Section-D Electrochemistry-II Kohlrausch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution.
22-03-2024	Friday	Section-D Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids determination of solubility product of sparingly soluble salts, conductometric titrations.
23-03-2024 To 31-03-2024	Saturday	Holi festival Holidays
04-04-2024	Thursday	Section-D Definition of pH and pKa, Buffer solution, Buffer action, Henderson –Hassel equation, Buffer mechanism of buffer action.
05-04-2024	Friday	Conceptual and Exam related Important Questions
06-04-2024	Saturday	Conceptual and Exam related Important Questions
11-04-2024	Thursday	Eid- Holiday
12-04-2024	Friday	Conceptual and Exam related Important Questions
13-04-2024	Saturday	Baishakhi- Holiday
18-04-2024	Thursday	
19-04-2024	Friday	
20-04-2024	Saturday	
25-04-2024	Thursday	
26-04-2024	Friday	Term End Semester Exam Starts

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Govt. College Chhilo (Mahendergarh)

Lesson Plan- B.Sc. 4th Semester (Non Medical/ Medical)

Inorganic/ Organic/ Physical Chemistry-Session 2023-24

Date	Day	Topic
		Inorganic Chemistry
15-01-2024	Thursday	Section-A Chemistry of f – block elements Lanthanides- Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation
16-01-2024	Friday	Section-A Occurrence and isolation of lanthanide and its compounds.
17-01-2024	Saturday	Sh. Guru Govind Singh Jayanti- Holiday
22-01-2024	Thursday	Section-B Chemistry of f – block elements Actinides General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from Uranium
23-01-2024	Friday	Section-B Comparison of properties of Lanthanides and Actinides and with transition elements.
24-01-2024	Saturday	Section-C Theory of Qualitative and Quantitative Inorganic Analysis-I. Chemistry of analysis of various acidic radicals,
29-01-2024	Thursday	Section-c Chemistry of identification of acid radicals in typical combinations, Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.
30-01-2024	Friday	Section-D Theory of Qualitative and Quantitative Inorganic Analysis-II Chemistry of analysis of various groups of basic radicals,
31-01-2024	Saturday	Section-D Theory of precipitation, co-precipitation, Post- precipitation, purification of precipitates.
		Physical Chemistry
05-02-2024	Thursday	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 theorem, Thermodynamics scale of temperature.
06-02-2024	Friday	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,
07-02-2024	Saturday	Section-A entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.
12-02-2024	Thursday	Section-B Thermodynamics-IV Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy,

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13-02-2024	Friday	Section-B 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 thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.
14-02-2024	Saturday	Basant Panchami- Holiday
19-02-2024	Thursday	Section-B A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.
20-02-2024	Friday	Section-C Electrochemistry-III- Electrolytic and Galvanic cells – reversible & Irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement.
21-02-2024	Saturday	Section-C Wes ton standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K).
29-02-2024	Thursday	Section-C Types of reversible electrodes – metal metal ion gas electrode, metal –insoluble salt- anion and redox electrodes.
		Section-C Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.
01-03-2024	Friday	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 coefficient, potentiometric titration (acid- base and redox).
02-03-2024	Saturday	Section-D Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.
		Organic Chemistry
07-03-2024	Thursday	Section – A Infrared (IR) absorption spectroscopy. Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands
08-03-2024	Friday	Mahashivratri- Holiday
09-03-2024	Saturday	Section – A Measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and Interpretation of IR spectra of simple organic compounds.
14-03-2024	Thursday	Section – A Applications of IR spectroscopy in structure elucidation of simple organic compounds.
15-03-2024	Friday	Section-B Amines- Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines.
16-03-2024	Saturday	Section-B Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds).

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21-03-2024	Thursday	Section-B Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.
22-03-2024	Friday	Section-C 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 hydrazines, coupling reaction and its synthetic application.
23-03-2024 To 31-03-2024	Saturday	Holi festival Holidays
04-04-2024	Thursday	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.
05-04-2024	Friday	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, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate.,
06-04-2024	Saturday	Section-D Physical properties and Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations.
11-04-2024	Thursday	Eid- Holiday
12-04-2024	Friday	Section-D Condensation with ammonia and its derivatives: Wittig reaction. Mannich reaction. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH ₄ and NaBH ₄ reductions.
13-04-2024	Saturday	Baishakhi- Holiday
18-04-2024	Thursday	Conceptual and Exam related Important Questions
19-04-2024	Friday	Conceptual and Exam related Important Questions
20-04-2024	Saturday	Conceptual and Exam related Important Questions
25-04-2024	Thursday	
26-04-2024	Friday	Term End Semester Exam Starts

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Govt. College Chhilo (Mahendergarh)
Lesson Plan- B.Sc. 6th Semester (Non Medical/ Medical)
Inorganic/ Organic/ Physical Chemistry-Session 2023-24

Date	Day	Topic
		Inorganic Chemistry
15-01-2024	Thursday	Section-A Organometallic Chemistry Definition, nomenclature and classification of organometallic compounds.
16-01-2024	Friday	Section-A Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal-ethylenic complexes,
17-01-2024	Saturday	Sh. Guru Govind Singh Jayanti- Holiday
22-01-2024	Thursday	Section-A Mononuclear carbonyls and the nature of bonding in metal carbonyls.
23-01-2024	Friday	Section-B Acids and Bases, HSAB Concept, Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases
24-01-2024	Saturday	Section-B relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness
29-01-2024	Thursday	Section-C Bioinorganic Chemistry-Essential and trace elements in biological processes,
30-01-2024	Friday	Section-C Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+} . Nitrogen fixation.
31-01-2024	Saturday	Section-D Silicones and Phosphazenes- Silicones and phosphazenes and their preparation, properties, structure and uses
05-02-2024	Thursday	Section-D Silicones and Phosphazenes- properties, structure and uses of Silicones and phosphazenes
		Physical Chemistry
06-02-2024	Friday	Section-A Spectroscopy-III - Electronic Spectrum- Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle.
07-02-2024	Saturday	Section-A Qualitative description of sigma and pi and n molecular orbital (MO) their energy level and respective transitions.
12-02-2024	Thursday	Section-B Photochemistry-Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Draper law, Stark- Einstein law (law of photochemical equivalence)
13-02-2024	Friday	Section-B Jablonski diagram depicting various processes occurring in the excited state,
14-02-2024	Saturday	Basant Panchami- Holiday

S. Kumar

19-02-2024	Thursday	Section-B qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples)
20-02-2024	Friday	Section-C Solutions: Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient.
21-02-2024	Saturday	Section-C Dilute solution, 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 from osmotic pressure.
29-02-2024	Thursday	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.
		Section-C Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.
01-03-2024	Friday	Section-D Phase Equilibrium-Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule,
02-03-2024	Saturday	Section-D Phase equilibria of one component system –Example – water and Sulphur systems.
07-03-2024	Thursday	Section-D Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.
08-03-2024	Friday	Mahashivratri- Holiday
		Organic Chemistry
09-03-2024	Saturday	Section – A Heterocyclic Compounds-I- Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine.
14-03-2024	Thursday	Section – A Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.
15-03-2024	Friday	Section-A Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole
16-03-2024	Saturday	Section-B Heterocyclic Compounds-II- Introduction to condensed five and six- membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher Indole synthesis
21-03-2024	Thursday	Section-B Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline
22-03-2024	Friday	Section-B Organosulphur Compounds-Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.

S. Kumar

23-03-2024 To 31-03-2024	Saturday	Holi festival Holidays
04-04-2024	Thursday	Section-C 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.
05-04-2024	Friday	Section-C Synthetic Polymers-Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.
06-04-2024	Saturday	Section-C Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers.
11-04-2024	Thursday	Eid- Holiday
12-04-2024	Friday	Section-D 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.
13-04-2024	Saturday	Baishakhi- Holiday
18-04-2024	Thursday	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.
19-04-2024	Friday	Section-D Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.
20-04-2024	Saturday	Conceptual and Exam related Important Questions
25-04-2024	Thursday	Conceptual and Exam related Important Questions
26-04-2024	Friday	Term End Semester Exam Preparation

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