Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-1 and ORGANIC CHEMISTRY-1A"

B.Sc. Chemistry (Honours)

Extra nuclear Structure of atom, Acid-Base reactions, Redox Reactions, Bonding and Physical Properties and General Treatment of Reaction Mechanism I

Paper: CEMA-CC-1-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Quantum Numbers and their Significance	https://www.youtube.com/watch?v=oOVLkiBnq6o	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Schrödinger's Wave Equation	https://www.youtube.com/watch?v=byjbEvjYL_8	Explains with board work	Listens	Understanding
Class 03	Significance of ψ and ψ^2	https://www.youtube.com/watch?v=byDNBfPaehg	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Radial and Angular Wave Functions for Hydrogen Atom	https://www.youtube.com/watch?v=pIfH4PAQ7wc	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Radial and Angular Distribution Curves	https://www.youtube.com/watch?v=UnmtLLB_Fc8	Explains with board work	Comprehends	Understanding
Class 06	Shapes of s, p, d, and f Orbitals	https://www.youtube.com/watch?v=nNkw_0c8vY0	Explains with board work	Listens	Understanding
Class 07	Pauli's Exclusion Principle and Hund's Rules	https://www.youtube.com/watch?v=bdfir8uT06Q	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Exchange Energy and Aufbau Principle	https://www.youtube.com/watch?v=rvA3K-ORxPg	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Ground State Term Symbols for Atomic Number Up to 30	https://www.youtube.com/watch?v=5ZN5pxoWzQg&list=PLYXnZUqtB3K_F_UXVHC5x-Zj-R4cSLlRI	Explains with board work	Listens and writes	Analyze
Class 10	Acid-Base Reactions: Arrhenius and Bronsted-Lowry Concepts	https://www.youtube.com/watch?v=OP6RKqSp1Xw	Explains with board work	Listens	Understanding
Class 11	Acid-Base Reactions: Lewis Concept and Superacids	https://www.youtube.com/watch?v=rmaLsdFQ2KQ	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Solvent System Concept, Thermodynamic Acidity Parameters	https://www.youtube.com/watch?v=cFTWNoAw18c	Explains with board work	Comprehends	Understanding
Class 13	Acid-Base Equilibria in Aqueous Solution, pH, Buffer Solutions	https://www.youtube.com/watch?v=jdmHjFp_35I	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Acid-Base Neutralization Curves, Indicators	https://www.youtube.com/watch?v=uO8DWyRJMHo	Explains with board work	Comprehends	Understanding
Class 15	Ion-Electron Method of Balancing Redox Reactions	https://www.youtube.com/watch?v=N6ivvu6xlog	Explains with board work	Listens	Understanding

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Paper: CEMA-CC-1-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 16	Elementary Idea on Standard Redox Potentials and Nernst Equation	https://www.youtube.com/watch?v=oAOq55MPJpM	Explains with board work	Comprehends	Understanding
Class 17	Influence of Complex Formation on Redox Potentials	https://www.youtube.com/watch?v=oAOq55MPJpM	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Redox Potentials: Formal Potential and Feasibility of Redox Titrations	https://www.youtube.com/watch?v=EQJf8Gb8pg4	Explains with board work	Comprehends	Understanding
Class 19	Redox Potential at Equivalence Point, Redox Indicators	https://www.youtube.com/watch?v=EQJf8Gb8pg4	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Latimer and Frost Diagrams and Their Applications	https://youtube.com/watch?v=_l6bJGQncRI	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Hybridization, Resonance, and Bonding	https://www.youtube.com/watch?v=J8GLj_armbA	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Shapes of Molecules and Formal Charges	https://www.youtube.com/watch?v=Q9-JjyAEqnU	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Molecular Orbital Theory: Bonding and Antibonding Interactions	https://www.youtube.com/watch?v=6tB6E6R_XpQ	Explains with board work	Comprehends	Understanding
Class 24	Concept of σ, σ*, π, π* Orbitals	https://www.youtube.com/watch?v=pG3f_vqvbO8	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	HOMO, LUMO, and SOMO Concepts	https://www.youtube.com/watch?v=9VpCOr3WNYI	Explains with board work	Listens	Understanding
Class 26	Energy Levels of π Orbitals in Acyclic and Cyclic Systems	https://www.youtube.com/watch?v=JKUDuHA0Ms4	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Hückel's Rules for Aromaticity and Frost Diagram	https://www.youtube.com/watch?v=xfNWTToC6gU	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Concept of Antiaromaticity, Homoaromaticity, and Non-aromaticity	https://www.youtube.com/watch?v=UvzL3YGPllU	Explains and narrates with suitable bord work	Listens	Understanding

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(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 29	Influence of Hybridization on Physical Properties: Bond Dissociation Energy	https://www.youtube.com/watch?v=ch9HorGagHE	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Bond Distances, Bond Angles, and Strain in Organic Molecules	https://www.youtube.com/watch?v=mbIMjotjvbQ	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Melting Point/Boiling Point, Solubility, and Polarity of Molecules	https://www.youtube.com/watch?v=08kGgrqaZXA	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 32	Stability of Hydrocarbons: Heat of Hydrogenation and Heat of Combustion Data	https://www.youtube.com/watch?v=JiKD3mDzL28	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Mechanistic Classification: Ionic, Radical, and Pericyclic Reactions	https://www.youtube.com/watch?v=T72nanpjQ80&list=PLDjIJRH6sIC7GJs6zqldCs-tvPJ29vym4	Explains with board work	Listens	Understanding
Class 34	Types of Reactions: Addition, Elimination, and Substitution	https://www.youtube.com/watch?v=Gu9rbmWFK2s	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Homolytic and Heterolytic Bond Fission	https://www.youtube.com/watch?v=2X6R-5RQlCU	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Bond Formation: Homogenic and Heterogenic Bond Formation	https://www.youtube.com/watch?v=gZkJY4NvaOs	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 37	Curly Arrow Notation in Mechanisms	https://www.youtube.com/watch?v=UVpizSVIBX0	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 38	Electrophiles and Nucleophiles: Definitions and Examples	https://www.youtube.com/watch?v=LC3ZcGkgjok	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 39	Types of Reagents in Organic Mechanisms	https://www.youtube.com/watch?v=LC3ZcGkgjok	Explains with examples	Listens and writes	Understanding and apply

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Paper: CEMA-CC-1-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 40	Recap of Reaction Mechanisms and Important Concepts	https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PHYSICAL CHEMISTRY-1, ORGANIC CHEMISTRY-IB"

B.Sc. Chemistry (Honours)

Kinetic Theory and Gaseous state, Transport processes, Chemical kinetics, Stereochemistry I, General Treatment of Reaction Mechanism II

Paper: CEMA-CC-1-2

(Credits: 04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Kinetic Theory of Gases: Concept of Pressure and Temperature: Collision of gas molecules and collision diameter.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Listens	Understanding
Class 02	Practice Class: Problems on pressure, temperature, and collisions in gases.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Collision Number and Mean Free Path: Frequency of binary collisions (similar and different molecules), wall collisions, and rate of effusion.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Practice Class: Problems on collision number, mean free path, and rate of effusion.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Maxwell's Distribution of Speed and Energy: Nature of distribution of velocities in one, two, and three dimensions.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Practice Class: Problems on Maxwell's distribution of speeds and energy calculations.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Kinetic Energy Distribution: Average, root mean square, and most probable values in one, two, and three dimensions.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Practice Class: Problems on kinetic energy distribution and associated calculations.	https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Principle of Equipartition of Energy: Application to classical limit of molar heat capacity of gases.	Castellan, G. W. Physical Chemistry, Narosa	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

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Kinetic Theory and Gaseous state, Transport processes, Chemical kinetics, Stereochemistry I, General Treatment of Reaction Mechanism II

Paper: CEMA-CC-1-2

(Credits: 04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Practice Class: Problems on equipartition of energy and heat capacity calculations.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Real Gas and Virial Equation: Deviation from ideal behavior, compressibility factor, Boyle temperature.	Castellan, G. W. Physical Chemistry, Narosa	Explains with examples	Listens and writes	Understanding and apply
Class 12	Practice Class: Problems on real gases, compressibility factor, and Boyle temperature.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Andrew's and Amagat's Plots: van der Waals equation and its features.	Castellan, G. W. Physical Chemistry, Narosa	Explains	Listens and writes	Understanding and apply
Class 14	Practice Class: Problems on Andrew's and Amagat's plots and real gas behavior.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Virial Equation of State: van der Waals equation in virial form and significance of second virial coefficient.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Practice Class: Problems on the virial equation and second virial coefficient.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Intermolecular Forces: Debye, Keesom, London interactions; Lennard-Jones potential.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 18	Practice Class: Problems on intermolecular forces and Lennard-Jones potential.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Diffusion: Fick's Law: Flux, force, phenomenological coefficients, and their inter-relationships.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and Narrates with suitable board work	Listens and writes	Understanding and apply

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Paper: CEMA-CC-1-2

(Credits: 04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 20	Practice Class: Problems on diffusion, Fick's law, and transport properties.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Viscosity: General Features of Fluid Flow: Newton's equation, viscosity coefficient, Poiseuille's equation.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Practice Class: Problems on viscosity and fluid flow equations.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Determination of Viscosity Coefficient: Using the falling sphere method and Ostwald's viscometer.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Practice Class: Problems on viscosity determination methods.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Temperature Variation of Viscosity: Comparison with gases and the relation between viscosity and mean free path.	Laidler, K. J. Chemical Kinetics, Pearson	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 26	Practice Class: Problems on viscosity temperature dependence and mean free path.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Rate Law, Order, and Molecularity: Introduction, rate constants, order, and different rate laws for first, second, and nth order reactions.	Laidler, K. J. Chemical Kinetics, Pearson	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 28	Practice Class: Problems on rate laws, order, and rate constants.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

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Paper: CEMA-CC-1-2

(Credits: 04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 29	Pseudo First-Order Reactions: Example using acid-catalyzed hydrolysis of methyl acetate.	Laidler, K. J. Chemical Kinetics, Pearson	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	Practice Class: Problems on pseudo first-order reactions and determination of order.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Rate-Determining Step and Steady-State Approximation: Explanation with examples.	Laidler, K. J. Chemical Kinetics, Pearson	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Practice Class: Problems on rate-determining steps and steady-state approximation.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Opposing, Consecutive, and Parallel Reactions: Explanation of kinetic and thermodynamic control of products.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 34	Practice Class: Problems on opposing, consecutive, and parallel reactions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Temperature Dependence of Rate Constant: Arrhenius equation and energy of activation.	Laidler, K. J. Chemical Kinetics, Pearson	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Practice Class: Problems on temperature dependence and Arrhenius equation.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Homogeneous Catalysis: Acid-base catalysis and enzyme catalysis; Michaelis-Menten equation.	Laidler, K. J. Chemical Kinetics, Pearson	Explains and narrates with suitable bord work	Listens and writes	Analyze

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Department of Chemistry

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Paper: CEMA-CC-1-2

(Credits: 04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 38	Practice Class: Problems on enzyme catalysis, Michaelis-Menten equation, and lineweaver-Burk plot.	https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Bonding Geometries of Carbon Compounds: Tetrahedral nature of carbon and projection formulae (Fischer, Newman, etc.).	Nasipuri, D. Stereochemistry of Organic Compounds, Wiley Eastern Limited	Explains with board work	Listens and practice with teacher	Understanding
Class 40	Practice Class: Problems on bonding geometries and representation of molecules.	https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Chirality Arising from Stereoaxis: Stereoisomerism of substituted cumulenes with even and odd numbers of double bonds.	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with examples	Listens and writes	Understanding and apply
Class 02	Practice Class: Problem-solving on stereoisomerism in cumulenes.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Chiral Axis in Allenes, Spiro Compounds, Alkylidenecycloalkanes, and Biphenyls: Configuration descriptors (Ra/Sa).	Sykes, P. A guidebook to Mechanism in Organic Chemistry, Pearson Education, 2003.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Practice Class: Problems on chirality in allenes, spiro compounds, and biphenyls.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Atropisomerism: Racemization of chiral biphenyls.	Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.	Explains with examples	Listens and writes	Understanding and apply
Class 06	Practice Class: Problem-solving on atropisomerism and racemization.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Concept of Prostereoisomerism: Prostereogenic centre, pro-R/pro-S, pro-E/pro-Z, and Re/Si descriptors.	Clayden, J., Greeves, N. &Warren, S. Organic Chemistry, Second edition, Oxford UniversityPress, 2012.	Explains with board work	Listens and writes	Analyze
Class 08	Practice Class: Problems on prostereoisomerism and related configurational descriptors.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Pro-R and Pro-S Descriptors of Ligands on Propseudoasymmetric Centre: Understanding topicity of ligands and faces.	Smith, J. G. Organic Chemistry, Tata McGraw-Hill Publishing Company Limited. 10.Fleming,	Explains with board work	Listens and writes	Analyze

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Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Practice Class: Recap and problems on pro-R, pro-S, and pro-E, pro-Z descriptors.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Conformation: Conformational nomenclature, eclipsed, staggered, gauche, syn, and anti.	Robinson, M. J. T., Stereochemistry, Oxford Chemistry Primer, OxfordUniversity Press, 2005.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Practice Class: Problem-solving on conformational nomenclature and energy barriers.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Dihedral and Torsion Angles: Klyne-Prelog terminology and P/M descriptors.	Fleming I, MolecularOrbitalsandOrganicChemicalReactions, Reference/StudentEdition, Wiley, 2009	Explains with examples	Listens and writes	Understanding and apply
Class 14	Practice Class: Problems on dihedral and torsion angles, Klyne-Prelog terminology.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Energy Barrier of Rotation, Torsional and Steric Strains: Relative stability of conformers.	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with board work	Listens and writes	Analyze
Class 16	Practice Class: Problem-solving on conformational stability and steric effects.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Conformational Analysis of Alkanes: Analysis of ethane, propane, n-butane, 2-methylbutane, 2,3-dimethylbutane, haloalkanes, and 1,2-dihaloalkanes.	Sykes, P. A guidebook to Mechanism in Organic Chemistry, Pearson Education, 2003.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	Practice Class: Problems on conformational analysis of alkanes and dihalides.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Conformation of Conjugated Systems: Analysis of s-cis and s-trans configurations.	Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Practice Class: Recap and problem-solving on conjugated system conformations.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Reaction Thermodynamics: Free energy, equilibrium, enthalpy, and entropy factor.	Clayden, J., Greeves, N. &Warren, S. Organic Chemistry, Second edition, Oxford UniversityPress, 2012.	Explains with examples	Listens and writes	Understanding and apply
Class 22	Practice Class: Problems on reaction thermodynamics and enthalpy-entropy relationships.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Calculation of Enthalpy Change via BDE: Intermolecular and intramolecular reactions.	Smith, J. G. Organic Chemistry, Tata McGraw-Hill Publishing Company Limited. 10.Fleming,	Explains and narrates with suitable bord work	Listens	Understanding
Class 24	Practice Class: Problem-solving on enthalpy change calculations and BDE.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Concept of Organic Acids and Bases: Effect of structure, substituent, and solvent on acidity and basicity.	Robinson, M. J. T., Stereochemistry, Oxford Chemistry Primer, OxfordUniversity Press, 2005.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Practice Class: Problems on organic acids, bases, and the effect of substituents.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Nucleophilicity vs. Basicity: Comparison and application of thermodynamic principles.	Fleming I, MolecularOrbitalsandOrganicChemicalReactions, Reference/StudentEdition, Wiley, 2009	Explains and narrates with suitable bord work	Listens	Understanding
Class 28	Practice Class: Problems on nucleophilicity vs basicity.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Tautomerism: Prototropy (keto-enol, nitro-aci-nitro, nitroso-oximino, diazo-amino systems).	Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with examples	Listens and writes	Understanding and apply
Class 30	Practice Class: Problem-solving on tautomerism and various systems.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Valence Tautomerism and Ring-Chain Tautomerism: Composition of equilibrium in different systems.	Carey, F. A., Guiliano, R. M.Organic Chemistry, Eighth edition, McGraw Hill Education, 2012.	Explains with board work	Listens and writes	Analyze
Class 32	Practice Class: Problems on valence and ring-chain tautomerism.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Factors Affecting Keto-Enol Tautomerism: Thermodynamic principles in tautomeric equilibria.	Nasipuri, D.Stereochemistry of Organic Compounds, Wiley Eastern Limited.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 34	Practice Class: Problems on factors influencing keto-enol tautomerism.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Reaction Kinetics: Rate constant, free energy of activation, and free energy profiles for one-step, two-step, and three-step reactions.	Keeler, J., Wothers, P.Chemical Structure and Reactivity – An Integrated approach, Oxford University Press.	Explains with board work	Listens and writes	Analyze
Class 36	Practice Class: Problem-solving on reaction kinetics and free energy profiles.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Catalyzed Reactions: Electrophilic and nucleophilic catalysis, kinetic and thermodynamic control of reactions.	James, J., Peach, J. M. Stereochemistry at a Glance, Blackwell Publishing, 2003.	Explains with examples	Listens and writes	Understanding and apply
Class 38	Practice Class: Problems on catalyzed reactions and control of reactions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Isotope Effect: Primary and β-secondary kinetic isotopic effect (kH/kD).	Maskill, H., Mechanisms of Organic Reactions, Oxford Chemistry Primer, OxfordUniversity Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 40	Practice Class: Problem-solving on isotope effect and kinetic isotopic effect.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Ionic Bond: General characteristics, types of ions, size effects, radius ratio rule, packing of ions in crystals.	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains with examples	Listens and writes	Understanding and apply
Class 02	Practice Class: Recap and problem-solving on ionic bonds and radius ratio rule.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Born-Landé Equation: Derivation and importance of Kapustinskii expression for lattice energy.	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Practice Class: Problems on Born-Landé equation and lattice energy.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Madelung Constant, Born-Haber Cycle, and Solvation Energy: Application of Born-Haber cycle.	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains with board work	Listens and writes	Analyze
Class 06	Practice Class: Problem-solving on Born-Haber cycle, lattice energy, and solvation energy.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Defects in Solids and Solubility Energetics of Dissolution Process: Types of defects in solids and the dissolution process.	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains with examples	Listens and writes	Understanding and apply
Class 08	Practice Class: Recap and problem-solving on defects in solids and solubility energetics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Covalent Bond: Polarizing power, polarizability, ionic potential, Fazan's rules.	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Practice Class: Problems on polarizing power, ionic potential, and Fazan's rules.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Lewis Structures and Formal Charge: Introduction to Lewis structures and formal charges.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Practice Class: Problem-solving on Lewis structures and formal charge calculations.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Valence Bond Theory: The hydrogen molecule (Heitler-London approach).	Kaplan, I., Nuclear Physics, Addison-Wesley Publishing Company Inc. London, 1964.	Explains with examples	Listens and writes	Understanding and apply
Class 14	Practice Class: Recap and problem-solving on Valence Bond Theory and hydrogen molecule.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Directional Character of Covalent Bonds, Hybridization: Equivalent and non-equivalent hybrid orbitals.	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Practice Class: Problems on hybridization and the directional character of covalent bonds.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Bent's Rule, Dipole Moments, and VSEPR Theory: Shapes of molecules and ions.	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains with board work	Listens and writes	Analyze
Class 18	Practice Class: Recap and problem-solving on Bent's rule, dipole moments, and VSEPR theory.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Multiple Bonding (σ and π Bond Approach): Explanation and examples.	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains with examples	Listens and writes	Understanding and apply
Class 20	Practice Class: Problem-solving on multiple bonds and σ, π bonding.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Molecular Orbital Concept of Bonding: Approximations, LCAO, sigma and pi bonds.	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains with board work	Listens and writes	Analyze
Class 22	Practice Class: Recap and problem-solving on Molecular Orbital theory and LCAO.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Orbital Designations: gerade, ungerade, HOMO, LUMO, orbital mixing.	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains with board work	Listens and writes	Analyze
Class 24	Practice Class: Problems on orbital designations and HOMO-LUMO.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	MO Diagrams of Diatomic Molecules: H2, Li2, Be2, B2, C2, N2, O2, F2 and their ions.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).	Explains with examples	Listens and writes	Understanding and apply
Class 26	Practice Class: Recap and problem-solving on MO diagrams of diatomic molecules.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Heteronuclear Molecular Orbitals: CO, NO, NO+, CN-, HF, BeH2, CO2, H2O.	Kaplan, I., Nuclear Physics, Addison-Wesley Publishing Company Inc. London, 1964.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 28	Practice Class: Problems on heteronuclear molecular orbitals.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Bond Properties: Bond orders and bond lengths.	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains and narrates with suitable bord work	Listens	Understanding
Class 30	Practice Class: Problem-solving on bond properties like bond order and bond length.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Metallic Bond: Valence bond and band theories, semiconductors, and insulators.	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains with examples	Listens and writes	Understanding and apply
Class 32	Practice Class: Recap and problem-solving on metallic bonding and semiconductors.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and writes	Understanding and apply
Class 33	Defects in Solids: A deeper look into defects and their role in materials.	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains with board work	Listens and writes	Analyze
Class 34	Practice Class: Problems on defects in solids and metallic bonding.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Weak Chemical Forces: Hydrogen bonding theories, receptor-guest interactions, halogen bonds.	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains and narrates with suitable bord work	Listens	Understanding
Class 36	Practice Class: Recap and problem-solving on hydrogen bonding and weak chemical forces.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-2"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-2-4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 37	Effects of Chemical Forces: Melting and boiling points, intermolecular forces.	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Practice Class: Problems on effects of chemical forces and their applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Radioactivity: Nuclear stability, nuclear binding energy, meson exchange theory, nuclear models.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).	Explains with examples	Listens and writes	Understanding and apply
Class 40	Practice Class: Recap and problem-solving on nuclear models, stability, and nuclear forces	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Concept of heat, work, internal energy and statement of first law; enthalpy, H	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens	Understanding
Class 03	relation between heat capacities, calculations of q, w, ΔU and ΔH for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Comprehends	Understanding
Class 04	Joule's experiment and its consequence	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Standard states; Heats of reaction; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Comprehends	Understanding
Class 06	Laws of thermochemistry; bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchhoff's equations ; Adiabatic flame temperature.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens	Understanding
Class 07	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Need for a Second law; statement of the second law of thermodynamics; Concept of heat reservoirs and heat engines; Carnot cycle; Carnot engine and refrigerator	Castellan, G. W. Physical Chemistry, Narosa	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Kelvin – Planck and Clausius statements and equivalence of the two statements with entropic formulation; Carnot's theorem; Values of §dQ/T and Clausius inequality	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Physical concept of Entropy; Entropy is a measure of the microscopic disorder of the system	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Listens	Understanding
Class 11	Entropy change of systems and surroundings for various processes and transformations	Castellan, G. W. Physical Chemistry, Narosa	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Entropy and unavailable work; Auxiliary state functions (G and A) and their variation with T, P and V. Criteria for spontaneity and equilibrium	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Comprehends	Understanding
Class 13	Maxwell's relations; Gibbs- Helmholtz equation, Joule- Thomson experiment and its consequences	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 14	inversion temperature; Joule-Thomson coefficient for a van der Waals gas; General heat capacity relations	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Comprehends	Understanding
Class 15	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Partial molar quantities, dependence of thermodynamic parameters on composition	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Comprehends	Understanding
Class 17	Gibbs-Duhem equation, chemical potential of ideal mixtures	Castellan, G. W. Physical Chemistry, Narosa	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	change in thermodynamic functions inmixing of ideal gases	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Comprehends	Understanding
Class 19	Activities and activity coefficients	Castellan, G. W. Physical Chemistry, Narosa	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Fugacity and fugacity coefficient	Castellan, G. W. Physical Chemistry, Narosa	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 21	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Thermodynamic conditions for equilibrium, degree of advancement; van't Hoff's reaction isotherm (deduction from chemical potential); Variation of free energy with degree of advancement	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Equilibrium constant and standard Gibbs free energy change; Van't Hoff's reaction isobar and isochore from different standard states	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with board work	Comprehends	Understanding
Class 24	Le Chatelier's principle and its derivation, variation of equilibrium constant under different conditions Nernst's distribution law; Application- (eg. dimerization of benzene in benzoic acid). Solvent Extraction.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 26	Ion conductance; Conductance and measurement of conductance, cell constant, specific conductance and molar conductance; Variation of specific and equivalent conductance with dilution for strong and weak electrolytes; Kohlrausch's law of independent migration of ions	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 27	Equivalent and molar conductance at infinite dilution and their determination for strong and weak electrolytes; Debye –Huckel theory of Ion atmosphere (qualitative)-asymmetric effect, relaxation effect and electrophoretic effect; Debye-Huckel limiting law-brief qualitative description. Estimation of activity coefficient for electrolytes using Debye-Huckel limiting law. Ostwald's dilution law; Ionic mobility	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with board work	Listens and writes	Analyze
Class 28	Application of conductance measurement (determination of solubility product and ionic product of water); Conductometric titrations.Transport number, Principles of Hittorf's and Moving-boundary method; Wien effect, Debye-Falkenhagen effect, Walden's rule	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 32	common ion effect; dissociation constants of mono-, di-and triprotic acids (exact treatment).	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Salt hydrolysis- calculation of hydrolysis constant, degree of hydrolysis and pH for different salts (exact Treatment).Determination of hydrolysis constant conductometrically	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 34	Buffer solutions; derivation of Henderson equation and its applications; buffer capacity, buffer range, buffer action . Qualitative treatment of acid base titration curves (calculation of pH at various stages). Theory of acid–base indicators; selection of indicators and their limitations. Multistage equilibrium in polyelectrolyte systems; hydrolysis and hydrolysis constants	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Comprehends	Understanding
Class 35	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 36	Rules of oxidation/reduction of ions based on half-cell potentials,; Chemical cells, reversible and irreversible cells with examples; Electromotive force of a cell and its measurement	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Comprehends	Understanding
Class 37	Thermodynamic derivation of Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells.	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Listens	Understanding
Class 38	Application of EMF measurements in determining (i) free energy, enthalpy and entropy of a cell reaction, (ii) equilibrium constants, and (iii) pH values, using hydrogen, quinone-hydroquinone and glass electrodes	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 39	Concentration cells with and without transference, liquid junction potential; determination of activity coefficients and transference numbers; Potentiometric titrations (acid-base, redox, precipitation)	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains and narrates with suitable bord work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 2"

Chemistry (Honours)

Chemical Thermodynamics I, Chemical Thermodynamics II, Systems of Variable Composition, Applications of Thermodynamics – I, Conductance and transport number, Ionic equilibrium and Electromotive Force

Paper: CEMA-CC-3-5

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 40	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-6
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Modern IUPAC Periodic Table and Effective Nuclear Charge	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Screening Effects and Penetration	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.	Explains with board work	Listens	Understanding
Class 03	Slater's Rules and Atomic Radii	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Ionic Radii (Pauling's Univalent) and Covalent Radii	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Lanthanide Contraction	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with board work	Comprehends	Understanding
Class 06	Ionization Potential and Electron Affinity	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains with board work	Listens	Understanding
Class 07	Electronegativity: Pauling's, Mulliken's, and Allred-Rochow's Scales	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Factors Influencing Ionization Potential, Electron Affinity, and Electronegativity	Albright, T., Orbital interactions in chemistry, John Wiley and Sons (2005).	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Group Electronegativities and Periodic Trends in s-, p-, and d-block Elements	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).	Explains with board work	Listens and writes	Analyze
Class 10	Secondary Periodicity, Relativistic Effect, and Inert Pair Effect	Miessler, G. L., Fischer, P. J., Tarr, D. A., Inorganic Chemistry, Pearson, 5th Edition.	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-6
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Question-Answer Practice on Chemical Periodicity	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Relative Stability of Different Oxidation States in s- and p-block Elements	Kaplan, I., Nuclear Physics, Addison-Wesley Publishing Company Inc. London, 1964.	Explains with board work	Comprehends	Understanding
Class 13	Diagonal Relationship and Anomalous Behaviour of First Member of Each Group	Friedlander, G., Kennedy, J. W., Macias, E. S. And Miller, J. M., Nuclear and Radiochemistry, Wiley, 1981	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Allotropy and Catenation in s- and p-block Elements	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains with board work	Comprehends	Understanding
Class 15	Hydrides Classification: Ionic, Covalent, and Interstitial	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.	Explains with board work	Listens	Understanding
Class 16	Basic Properties of Beryllium Hydrides and Halides	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains with board work	Comprehends	Understanding
Class 17	Boric Acid and Borates	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Boron Nitrides, Borohydrides (Diborane), and Graphitic Compounds	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with board work	Comprehends	Understanding
Class 19	Silanes and their Chemistry	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Oxides and Oxoacids of Nitrogen, Phosphorus, Sulphur, and Chlorine	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-6
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 21	Peroxo Acids of Sulphur and Sulphur-Nitrogen Compounds	Albright, T., Orbital interactions in chemistry, John Wiley and Sons (2005).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Interhalogen Compounds, Polyhalide Ions, and Pseudohalogens	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Fluorocarbons and Basic Properties of Halogens	Miessler, G. L., Fischer, P. J., Tarr, D. A., Inorganic Chemistry, Pearson, 5th Edition.	Explains with board work	Comprehends	Understanding
Class 24	Question-Answer Practice on Chemistry of s- and p-Block Elements	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Noble Gases: Occurrence, Uses, and Inertness	Kaplan, I., Nuclear Physics, Addison-Wesley Publishing Company Inc. London, 1964.	Explains with board work	Listens	Understanding
Class 26	Clathrates and Their Properties	Friedlander, G., Kennedy, J. W., Macias, E. S. And Miller, J. M., Nuclear and Radiochemistry, Wiley, 1981	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Preparation and Properties of Xenon Fluorides (XeF2, XeF4, XeF6)	Lee, J. D. Concise Inorganic Chemistry, 5thEd., Wiley India Pvt. Ltd., 2008.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Nature of Bonding in Noble Gas Compounds (Valence Bond and Molecular Orbital Treatment for XeF2 and XeF4)	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson, 2006.	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Xenon-Oxygen Compounds	Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Molecular Shapes of Noble Gas Compounds (VSEPR Theory)	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-6
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 31	Question-Answer Practice on Noble Gases	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 32	Introduction to Inorganic Polymers	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Types of Inorganic Polymers and Comparison with Organic Polymers	Cotton, F.A., Wilkinson, G., & Gaus, P.L. Basic Inorganic Chemistry 3rdEd.; Wiley India.	Explains with board work	Listens	Understanding
Class 34	Synthesis and Structural Aspects of Silicones and Siloxanes	Gillespie, R. J. and Hargittai, I., The VSEPR Model of Molecular Geometry, Prentice Hall (1992).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Borazines, Silicates, and Phosphazenes	Albright, T., Orbital interactions in chemistry, John Wiley and Sons (2005).	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Question-Answer Practice on Inorganic Polymers	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 37	Coordinate Bonding: Double and Complex Salts	Miessler, G. L., Fischer, P. J., Tarr, D. A., Inorganic Chemistry, Pearson, 5th Edition.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 38	Werner's Theory of Coordination Complexes	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 39	Classification of Ligands, Ambidentate Ligands, Chelates, and Coordination Numbers	Porterfield, H. W., Inorganic Chemistry, Second Edition, Academic Press, 2005.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 40	IUPAC Nomenclature and Isomerism in Coordination Compounds	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-7
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Addition to C=C: Mechanism and reactivity	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains with board work	Listens	Understanding
Class 02	Regioselectivity in C=C additions: Markovnikov and anti-Markovnikov additions	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Stereoselectivity in C=C additions	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Hydrogenation, halogenation, and hydrohalogenation of alkenes	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Hydration of alkenes: Oxymercuration-demercuration and hydroboration-oxidation	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Epoxidation, syn and anti-hydroxylation of alkenes	Arthur, I. Vogel, Quantitative Organic Analysis, Pearson	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Ozonolysis of alkenes	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Addition of singlet and triplet carbenes to alkenes	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains with board work	Listens and practice with teacher	Understanding
Class 09	Simmons-Smith cyclopropanation reaction	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 10	Electrophilic addition to conjugated dienes and allene	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-7
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Radical addition: HBr addition mechanism	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains with examples	Listens and writes	Understanding and apply
Class 12	Mechanism of allylic and benzylic bromination in competition with C=C bromination	Arthur, I. Vogel, Quantitative Organic Analysis, Pearson	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Use of NBS in bromination reactions	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains	Listens and writes	Understanding and apply
Class 14	Birch reduction of benzenoid aromatics	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Interconversion of E- and Z-alkenes	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Contra-thermodynamic isomerization of internal alkenes	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Question-Answer practice session on Alkenes and Alkynes	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Addition to C≡C: Mechanism, reactivity, and regioselectivity	Arthur, I. Vogel, Quantitative Organic Analysis, Pearson	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Stereoselectivity in C≡C additions	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains and Narrates with suitable board work	Listens and writes	Understanding and apply
Class 20	Hydrogenation and halogenation of alkynes	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-7
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 21	Hydrohalogenation and hydration of alkynes	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Oxymercuration-demercuration and hydroboration-oxidation of alkynes	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Dissolving metal reduction of alkynes (Birch reduction)	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Acidity of terminal alkynes and their reactions	Arthur, I. Vogel, Quantitative Organic Analysis, Pearson	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Interconversion of terminal and non-terminal alkynes	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 26	Question-Answer practice session on Alkenes and Alkynes	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Electrophilic aromatic substitution: Mechanism and evidence	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 28	Orientation and reactivity in electrophilic aromatic substitution	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Reactions of electrophilic aromatic substitution: Nitration, sulfonation, halogenation, Friedel-Crafts reactions	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	One-carbon electrophiles and their reactions: Friedel-Crafts, Vilsmeier-Haack, Reimer-Tiemann, etc.	Arthur, I. Vogel, Quantitative Organic Analysis, Pearson	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-7
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 31	Ipso substitution in aromatic systems	Bhattacharyya, R. C, A Manual of Practical Chemistry.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Nucleophilic aromatic substitution: Addition-elimination mechanism	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	SN1 mechanism in nucleophilic aromatic substitution	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains with practical examples in computer	Listens and practice with teacher	Understanding and apply
Class 34	Benzyne mechanism in nucleophilic aromatic substitution	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Structure and mechanism of benzyne formation	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Question-Answer practice session on Aromatic Substitution	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Addition to C=O: Structure, reactivity, and preparation of carbonyl compounds	Vogel, A. I. Elementary Practical Organic Chemistry, Part 2: Qualitative Organic Analysis, CBS Publishers and Distributors.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 38	Mechanism of nucleophilic addition-elimination reactions to carbonyl compounds	Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Reactions of carbonyl compounds: Benzoin condensation, Cannizzaro, Wittig, and Corey-Chaykovsky reactions	Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. Practical Organic Chemistry,5th Ed., Pearson (2012).	Explains with board work	Listens and practice with teacher	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-3"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-3-7
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 40	Exploitation of α-H acidity of carbonyl compounds and enolate formation	Dutta, S, B. Sc. Honours Practical Chemistry, Bharati Book Stall.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-8
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Amines: Preparation and separation methods (Hinsberg's method)	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with examples	Listens and writes	Understanding and apply
Class 02	Identification of primary, secondary, and tertiary amines	Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Eschweiler–Clarke methylation reaction	Norman, R.O. C., Coxon, J. M. Principles of Organic Synthesis, Third Edition, Nelson Thornes, 2003.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Diazo coupling reaction in amines	Clayden, J., Greeves, N., Warren, S., Organic Chemistry, Second edition, Oxford University Press 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Formation and reactions of phenylenediamines	Silverstein, R. M., Bassler, G. C., Morrill, T. C. Spectrometric Identification of Organic Compounds, John Wiley and Sons, INC, Fifth edition.	Explains with examples	Listens and writes	Understanding and apply
Class 06	Diazomethane and its reactions	Kemp, W. Organic Spectroscopy, Palgrave.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Diazoacetic ester and its reactions	Pavia, D. L. et al. Introduction to Spectroscopy, 5th Ed. Cengage Learning India Ed. (2015). 8. Dyer, J. Application of Absorption Spectroscopy of Organic Compounds, PHI Private Limited	Explains with board work	Listens and writes	Analyze
Class 08	Preparation and reactions of nitro compounds (aliphatic and aromatic)	March, J. Advanced Organic Chemistry, Fourth edition, Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-8
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 09	Reduction of nitro compounds under different conditions	Harwood, L. M., Polar Rearrangements, Oxford Chemistry Primer, Oxford University Press.	Explains with board work	Listens and writes	Analyze
Class 10	Nef carbonyl synthesis and its mechanism	Bailey, Morgan, Organonitrogen Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Henry reaction mechanism	Warren, S. Organic Synthesis the Disconnection Approach, John Wiley and Sons.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Conjugate addition of nitroalkane anion	Warren, S., Designing Organic Synthesis, Wiley India, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Preparation and reactions of alkyl nitriles and isonitriles	Carruthers, W. Modern methods of Organic Synthesis, Cambridge University Press.	Explains with examples	Listens and writes	Understanding and apply
Class 14	Thorpe nitrile condensation and its mechanism	Willis, C. A., Wills, M., Organic Synthesis, Oxford Chemistry Primer, Oxford University Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Von Richter reaction mechanism	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with board work	Listens and writes	Analyze
Class 16	Diazonium salts: Reactions involving diazo group replacement	Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Gomberg, Meerwein, Japp-Klingermann reactions	Norman, R.O. C., Coxon, J. M. Principles of Organic Synthesis, Third Edition, Nelson Thornes, 2003.	Explains with examples	Listens and writes	Understanding and apply
Class 18	Wagner-Meerwein rearrangement mechanism	Clayden, J., Greeves, N., Warren, S., Organic Chemistry, Second edition, Oxford University Press 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-8
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Pinacol rearrangement mechanism	Silverstein, R. M., Bassler, G. C., Morrill, T. C. Spectrometric Identification of Organic Compounds, John Wiley and Sons, INC, Fifth edition.	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Dienone-phenol rearrangement, Wolff rearrangement	Kemp, W. Organic Spectroscopy, Palgrave.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Arndt-Eistert synthesis and benzilic acid rearrangement	Pavia, D. L. et al. Introduction to Spectroscopy, 5th Ed. Cengage Learning India Ed. (2015). 8. Dyer, J. Application of Absorption Spectroscopy of Organic Compounds, PHI Private Limited	Explains with examples	Listens and writes	Understanding and apply
Class 22	Demjanov, Tiffeneau-Demjanov rearrangements	March, J. Advanced Organic Chemistry, Fourth edition, Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Hofmann, Curtius, Lossen, Schmidt, and Beckmann rearrangements	Harwood, L. M., Polar Rearrangements, Oxford Chemistry Primer, Oxford University Press.	Explains and narrates with suitable bord work	Listens	Understanding
Class 24	Baeyer-Villiger oxidation and Dakin reaction	Bailey, Morgan, Organonitrogen Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Fries rearrangement and Claisen rearrangement	Warren, S. Organic Synthesis the Disconnection Approach, John Wiley and Sons.	Explains with examples	Listens and writes	Understanding and apply
Class 26	Hofmann-Martius, Sommelet-Hauser, and other aromatic rearrangements	Warren, S., Designing Organic Synthesis, Wiley India, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	N-azo to C-azo rearrangement, Bamberger, Orton, and benzidine rearrangements	Carruthers, W. Modern methods of Organic Synthesis, Cambridge University Press.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-8
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 28	Retrosynthetic analysis: Disconnections and synthons	Willis, C. A., Wills, M., Organic Synthesis, Oxford Chemistry Primer, Oxford University Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Functional group interconversion (FGI) and functional group addition (FGA)	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with examples	Listens and writes	Understanding and apply
Class 30	C-C disconnections and synthesis: One-group and two-group disconnections	Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Protection-deprotection strategy for alcohols, amines, and carbonyl compounds	Norman, R.O. C., Coxon, J. M. Principles of Organic Synthesis, Third Edition, Nelson Thornes, 2003.	Explains with board work	Listens and writes	Analyze
Class 32	Strategy of ring synthesis: Thermodynamic and kinetic factors	Clayden, J., Greeves, N., Warren, S., Organic Chemistry, Second edition, Oxford University Press 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Asymmetric synthesis: Stereoselective and stereospecific reactions	Silverstein, R. M., Bassler, G. C., Morrill, T. C. Spectrometric Identification of Organic Compounds, John Wiley and Sons, INC, Fifth edition.	Explains with examples	Listens and writes	Understanding and apply
Class 34	UV Spectroscopy: Types of electronic transitions, chromophores, and auxochromes	Kemp, W. Organic Spectroscopy, Palgrave.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Woodward's Rules for λmax calculation (conjugated diene, α,β-unsaturated aldehydes, and ketones)	Pavia, D. L. et al. Introduction to Spectroscopy, 5th Ed. Cengage Learning India Ed. (2015). 8. Dyer, J. Application of Absorption Spectroscopy of Organic Compounds, PHI Private Limited	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-8
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	IR Spectroscopy: Molecular vibrations and diagnostic stretching frequencies	March, J. Advanced Organic Chemistry, Fourth edition, Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	NMR Spectroscopy: Nuclear spin, chemical shifts, and spin coupling	Harwood, L. M., Polar Rearrangements, Oxford Chemistry Primer, Oxford University Press.	Explains with examples	Listens and writes	Understanding and apply
Class 38	Interpretation of NMR spectra of simple organic compounds	Bailey, Morgan, Organonitrogen Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Applications of IR, UV, and NMR spectroscopy for identification of organic molecules	Warren, S. Organic Synthesis the Disconnection Approach, John Wiley and Sons.	Explains and narrates with suitable bord work	Listens	Understanding
Class 40	Revision and practice session: Spectroscopy and organic reaction mechanisms	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 3"

B.Sc. Chemistry (Honours)

Application of Thermodynamics – II, Foundation of Quantum Mechanics, Crystal Structure

Paper: CEMA-CC-4-9

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Vapour pressure of solution and ideal solutions, Raoult's law, and thermodynamic derivation of colligative properties.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 02	Relative lowering of vapour pressure and its application in determining molar mass of solutes.	Engel, T. & Reid, P. Physical Chemistry, 3rd Edition ,Pearson India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Elevation of boiling point and its thermodynamic derivation.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Depression of freezing point and osmotic pressure in relation to solute amount.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Abnormal colligative properties and their deviations from ideal behaviour.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India.	Explains with board work	Listens and writes	Analyze
Class 06	Definitions of phase, component, and degrees of freedom in phase equilibrium.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Derivations of phase rule and its application.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 08	Phase diagram for water, CO2, and sulfur.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	First-order phase transitions and Clapeyron equation.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with board work	Listens and writes	Analyze
Class 10	Clausius-Clapeyron equation and its use in phase transitions.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Ehrenfest Classification of phase transitions.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Liquid-vapour equilibrium for binary systems and ideal solutions.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 3"

B.Sc. Chemistry (Honours)

Application of Thermodynamics – II, Foundation of Quantum Mechanics, Crystal Structure

Paper: CEMA-CC-4-9

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 13	Principles of fractional distillation and Duhem-Margules equation.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 14	Henry's law, Konowaloff's rule, and deviations from ideal behaviour.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Azeotropic solutions and liquid-liquid phase diagrams (phenol-water system).	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Solid-liquid phase diagram and eutectic mixtures.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Three-component systems and triangular plots (water-chloroform-acetic acid system).	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens and writes	Analyze
Class 18	Introduction to quantum mechanics and black body radiation (concept only).	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Wave-particle duality and light as particles (photoelectric and Compton effects).	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 20	Electrons as waves and the de Broglie hypothesis.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Uncertainty relations in quantum mechanics.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens and writes	Analyze
Class 22	Postulates of quantum mechanics and Schrödinger's time-independent equation.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Nature and acceptability conditions for wave functions and probability interpretation.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens and writes	Analyze
Class 24	Vector representation of wave function and orthonormality of wave functions.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Concept of operators, eigenfunctions, eigenvalues, and their significance.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 3"

B.Sc. Chemistry (Honours)

Application of Thermodynamics – II, Foundation of Quantum Mechanics, Crystal Structure

Paper: CEMA-CC-4-9

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Commutation of operators, uncertainty relation, and properties of Hermitian operators.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Expansion of eigenfunctions and the complete set of eigenfunctions.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with board work	Listens and writes	Analyze
Class 28	Schrödinger equation for a one-dimensional box and its solution.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Properties of particle in a box wave functions (normalisation, orthogonality, probability).	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 30	Practice Class: Solving problems on wave functions and uncertainty principle.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Extension of the particle in a box problem to two and three dimensions.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 32	Revision Class: Recap of quantum mechanics, operators, and particle in a box.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and writes	Understanding and apply
Class 33	Degenerate energy levels in multi-dimensional systems.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with board work	Listens and writes	Analyze
Class 34	Types of solids, Bravais lattice, and Bragg's law of diffraction.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Laws of crystallography (Haüy's law and Steno's law).	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 36	Practice Class: Solving problems on Bravais lattices and crystal planes.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 3"

B.Sc. Chemistry (Honours)

Application of Thermodynamics – II, Foundation of Quantum Mechanics, Crystal Structure

Paper: CEMA-CC-4-9

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 37	Lattice, space lattice, unit cell, crystal planes, and Bravais lattices.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Packing of uniform hard spheres, close-packed arrangements (fcc and hcp).	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Revision Class: Recap of crystallography and solid-state concepts.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and writes	Understanding and apply
Class 40	Specific heat of solids, thermal expansion, compressibility, and Dulong-Petit law	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-10
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	VB description and its limitations in coordination chemistry.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Elementary Crystal Field Theory: Splitting of dn configurations in octahedral fields.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains with board work	Listens	Understanding
Class 03	Splitting of dn configurations in square planar and tetrahedral fields.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains with board work	Comprehends	Understanding
Class 04	Crystal Field Stabilization Energy (CFSE) in weak and strong fields; pairing energy.	Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 4th Ed., Pearson, 2010.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Spectrochemical series and its implications.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with board work	Comprehends	Understanding
Class 06	Jahn-Teller distortion and its effects.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains with board work	Listens	Understanding
Class 07	Octahedral Site Stabilization Energy (OSSE) in coordination compounds.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Metal-ligand bonding: MO concept, sigma and pi-bonding in octahedral complexes (qualitative pictorial approach).	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Oxidation states of transition metals and effects on bonding.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-10
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Magnetism and Colour in coordination complexes: Orbital and spin magnetic moments.	Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 4th Ed., Pearson, 2010.	Explains with board work	Listens	Understanding
Class 11	Spin-only moments of dn ions and their correlation with effective magnetic moments.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Quenching of magnetic moment: Super exchange and antiferromagnetic interactions.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains with board work	Comprehends	Understanding
Class 13	d-d transitions in coordination compounds.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 14	L-S coupling and qualitative Orgel diagrams for 3d1 to 3d9 ions.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains with board work	Comprehends	Understanding
Class 15	Racah parameter and its significance in coordination chemistry.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Selection rules for electronic spectral transitions in coordination complexes.	Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 4th Ed., Pearson, 2010.	Explains with board work	Comprehends	Understanding
Class 17	Charge transfer spectra in coordination chemistry (elementary idea).	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Revision and practice: Coordination chemistry theory (VB, CFSE, magnetism).	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-10
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	General comparison of 3d, 4d, and 5d transition elements (electronic configuration, oxidation states).	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Redox properties and coordination chemistry of transition elements.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Lanthanoids: Electronic configuration, oxidation states, colour, and spectral properties.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Magnetic properties of lanthanoids and the lanthanide contraction.	Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 4th Ed., Pearson, 2010.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Separation of lanthanides: Ion-exchange method (overview).	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with board work	Comprehends	Understanding
Class 24	Actinoids: Electronic configuration, oxidation states, colour, and spectral properties.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Comparison between lanthanoids and actinoids (overview).	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 26	Introduction to inorganic reaction mechanisms.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Substitution reactions in square planar complexes.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-10
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 28	Trans-effect: Its theories and applications in complex synthesis.	Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 4th Ed., Pearson, 2010.	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Mechanism of nucleophilic substitution in square planar complexes.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Thermodynamic and Kinetic stability of complexes.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Kinetics of octahedral substitution.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 32	Ligand field effects on reaction rates.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Mechanism of substitution in octahedral complexes.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains with board work	Listens	Understanding
Class 34	Revision and practice: Coordination chemistry and reaction mechanisms.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Comprehends	Understanding
Class 35	General revision of d- and f-block elements: Properties and trends.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 36	Review of key concepts: Magnetism, spectroscopy, and electronic transitions.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-4"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-4-10
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 37	Practice session: Substitution reactions and their mechanisms.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Listens	Understanding
Class 38	Advanced practice: Kinetics of substitution and ligand field effects.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 39	Comprehensive revision of coordination chemistry, redox properties, and mechanisms.	Mingos, D.M.P., Essential trends in inorganic chemistry. Oxford University Press (1998)	Explains and narrates with suitable bord work	Comprehends	Understanding
Class 40	Final practice class: Solving problems on coordination compounds and reaction kinetics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 4"

Chemistry (Honours)

Quantum Chemistry II, Statistical Thermodynamics and Numerical Analysis

Paper: CEMA-CC-5-11

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Simple Harmonic Oscillator:Setting up of One dimensional Schrödinger equation and discussion of solution and wave functions.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Classical turning points, Expectation values of x, x^2, p_x and p_x^2 .	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Listens	Understanding
Class 03	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Angular momentum: Commutation rules, quantization of square of total angular momentum and z-component	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Rigid rotator model of rotation of diatomic molecule; Schrödinger equation, transformation to spherical polar coordinates	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Comprehends	Understanding
Class 06	Separation of variables. Spherical harmonics; Discussion of solution	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Listens	Understanding
Class 07	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Hydrogen atom and hydrogen-like ions: Setting up of Schrödinger equation in spherical polar coordinates, Separation of variables	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Solution of angular Part (φ part only), quantization of energy (only final energy expression)	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Listens and writes	Analyze
Class 10	Real wave functions. Average and most probable distances of electron from nucleus	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Listens	Understanding
Class 11	Setting up of Schrödinger equation for many-electron atoms (He, Li)Need for approximation methods	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 4"

Chemistry (Honours)

Quantum Chemistry II, Statistical Thermodynamics and Numerical Analysis

Paper: CEMA-CC-5-11

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Statement of variation theorem and application to simple systems(particle in a box, harmonic oscillator, hydrogen atom)	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Comprehends	Understanding
Class 13	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	LCAO :Born-Oppenheimer approximation. Covalent bonding, valence bond and molecular orbital approaches, LCAO-MO treatment of H_2^+	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Comprehends	Understanding
Class 15	Bonding and antibonding orbitals; Qualitative extension to H_2	Levine, I. N. Physical Chemistry, 6th Edition McGraw-Hill India	Explains with board work	Listens	Understanding
Class 16	Comparison of LCAO-MO and VB treatments of H_2 and their limitations. (only wavefunctions, detailed solutionnot required) and their limitations.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Comprehends	Understanding
Class 17	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Configuration: Macrostates, microstates and configuration	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains with board work	Comprehends	Understanding
Class 19	calculation with harmonic oscillator; variation of W with E	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	equilibrium configuration	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 4"

Chemistry (Honours)

Quantum Chemistry II, Statistical Thermodynamics and Numerical Analysis

Paper: CEMA-CC-5-11

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 22	Boltzmann distribution and connection with equilibrium distribution	Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry* , 10th Edition Oxford University Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Thermodynamic probability, entropy and probability	Castellan, G. W. *Physical Chemistry* , Narosa	Explains with board work	Comprehends	Understanding
Class 24	Boltzmann distribution formula (with derivation)	Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry* , 10th Edition Oxford University Press	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Applications to barometric distribution; Partition function	Castellan, G. W. *Physical Chemistry* , Narosa	Explains with board work	Listens	Understanding
Class 26	concept of ensemble - canonical ensemble and grand canonical ensembles	Atkins, P. W. & Paula, J. de *Atkins' Physical Chemistry* , 10th Edition Oxford University Press	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Partition function: molecular partition function and thermodynamic properties	Castellan, G. W. *Physical Chemistry* , Narosa	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	3rd law: Absolute entropy, Plank's law, Calculation of entropy, Nernst heat theorem	Castellan, G. W. *Physical Chemistry* , Narosa	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 32	Adiabatic demagnetization	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 4"

Chemistry (Honours)

Quantum Chemistry II, Statistical Thermodynamics and Numerical Analysis

Paper: CEMA-CC-5-11

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 33	ApproachtozeroKelvin, adiabatic cooling, demagnetization, adiabatic demagnetization - involved curves	Castellan, G. W. *Physical Chemistry* , Narosa	Explains with board work	Listens	Understanding
Class 34	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Roots of Equation:Numerical methods for finding the roots of equations	V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Quadratic Formula, Iterative Methods (e.g., Newton Raphson Method)	V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 37	Least-Squares Fitting.Numerical Differentiation	V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 38	Numerical Integration (Trapezoidal)	V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 39	Numerical Integration (Simpson's Rule)	V. Rajaraman, Computer Oriented Numerical Methods, PHI Learning, 2013	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 40	Revision with question - answer discussion	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY - 5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-5-12
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Synthetic methods of polynuclear hydrocarbons: Haworth and Bardhan-Sengupta syntheses.	Clayden, J., Greeves, N., Warren, S. Organic Chemistry, Second edition, Oxford University Press 2012.	Explains with board work	Listens	Understanding
Class 02	Bogert-Cook and other important syntheses with mechanistic details.	Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Fixation of double bonds and Fries rule; reactions of naphthalene.	Nasipuri, D. Stereochemistry of Organic Compounds, Wiley Eastern Limited.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Reactions of anthracene and phenanthrene with mechanism.	Fleming, I. Molecular Orbitals and Organic Chemical reactions, Reference/Student Edition, Wiley, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Introduction to heterocyclic compounds: Biological importance.	Fleming, I. Pericyclic Reactions, Oxford Chemistry Primer, Oxford University Press.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Reactivity, orientation, and reactions of 5-membered rings: furan, pyrrole, and thiophene.	Gilchrist, T. L. & Storr, R. C. Organic Reactions and Orbital symmetry, Cambridge University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Synthesis of pyrrole: Knorr synthesis, Paal-Knorr synthesis, and Hantzsch methods.	Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Synthesis of furan: Paal-Knorr synthesis, Feist-Benary synthesis, and its variation.	Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with board work	Listens and practice with teacher	Understanding
Class 09	Synthesis of thiophenes: Paal-Knorr synthesis, Hinsberg synthesis.	Morrison, R. T. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY - 5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-5-12
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Reactivity, orientation, and reactions of pyridine; Hantzsch synthesis.	Loudon, G. M. Organic Chemistry, Fourth edition, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Benzo-fused heterocycles: Reactivity and reactions of indole, quinoline, and isoquinoline.	James, J., Peach, J. M. Stereochemistry at a Glance, Blackwell Publishing, 2003.	Explains with examples	Listens and writes	Understanding and apply
Class 12	Synthesis of indole (Fischer synthesis); quinoline (Skraup synthesis).	Robinson, M. J. T., Stereochemistry, Oxford Chemistry Primer, Oxford University Press, 2005.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Isoquinoline synthesis: Bischler-Napieralski method; retrosynthetic analysis.	Davis, B. G., Fairbanks, A. J., Carbohydrate Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains	Listens and writes	Understanding and apply
Class 14	Revision and practice: Carbocycles and heterocycles.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Concept of I-strain (Baeyer's strain theory) and its application to alicyclic compounds.	Acheson, R.M. Introduction to the Chemistry of Heterocyclic compounds, John Wiely & Sons (1976).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Conformational analysis of cyclohexane and mono-substituted cyclohexane.	Gilchrist, T. L. Heterocyclic Chemistry, 3rd edition, Pearson.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Conformational analysis of di-substituted cyclohexane and its optical activity.	Davies, D. T., Heterocyclic Chemistry, Oxford Chemistry Primer, Oxford University Press	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 18	Topomerisation, ring size, and ease of cyclisation.	Clayden, J., Greeves, N., Warren, S. Organic Chemistry, Second edition, Oxford University Press 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Conformation and reactivity of the cyclohexane system: steric and stereoelectronic effects.	Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London.	Explains and Narrates with suitable board work	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY - 5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-5-12
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 20	Elimination reactions (E2, E1); nucleophilic substitutions (SN1, SN2, SNi, NGP).	Nasipuri, D. Stereochemistry of Organic Compounds, Wiley Eastern Limited.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Merged substitution-elimination reactions and rearrangements.	Fleming, I. Molecular Orbitals and Organic Chemical reactions, Reference/Student Edition, Wiley, 2009.	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Oxidation of cyclohexanol; esterification, saponification, lactonisation.	Fleming, I. Pericyclic Reactions, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Epoxidation, pyrolytic syn elimination, and fragmentation reactions.	Gilchrist, T. L. & Storr, R. C. Organic Reactions and Orbital symmetry, Cambridge University Press.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Revision and practice: Cyclic stereochemistry.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Mechanism, stereochemistry, and regioselectivity of electrocyclic reactions: FMO approach.	Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 26	Thermal and photochemical 4π- and 6π-electron reactions; cycloreversions.	Morrison, R. T. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Cycloaddition reactions: FMO approach and Diels-Alder reaction.	Loudon, G. M. Organic Chemistry, Fourth edition, Oxford University Press.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 28	Photochemical [2+2] cycloadditions with mechanisms.	James, J., Peach, J. M. Stereochemistry at a Glance, Blackwell Publishing, 2003.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY - 5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-5-12
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 29	Sigmatropic shifts: FMO approach; [1,3] and [1,5] H shifts.	Robinson, M. J. T., Stereochemistry, Oxford Chemistry Primer, Oxford University Press, 2005.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	[3,3] Sigmatropic shifts: Claisen and Cope rearrangements.	Davis, B. G., Fairbanks, A. J., Carbohydrate Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Revision and practice: Pericyclic reactions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Structure and configuration of D-glucose and D-fructose (aldoses up to 6 carbons).	Acheson, R.M. Introduction to the Chemistry of Heterocyclic compounds, John Wiely & Sons (1976).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Ring structures of monosaccharides: Furanose and pyranose forms; Haworth representations.	Gilchrist, T. L. Heterocyclic Chemistry, 3rd edition, Pearson.	Explains with practical examples in computer	Listens and practice with teacher	Understanding and apply
Class 34	Anomeric effect, mutarotation, and epimerization in monosaccharides.	Davies, D. T., Heterocyclic Chemistry, Oxford Chemistry Primer, Oxford University Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Mechanistic reactions of monosaccharides: Glycosidation, osazone formation, oxidation.	Robinson, M. J. T., Stereochemistry, Oxford Chemistry Primer, Oxford University Press, 2005.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Lobry de Bruyn-van Ekenstein rearrangement; stepping-up and stepping-down of aldoses.	Davis, B. G., Fairbanks, A. J., Carbohydrate Chemistry, Oxford Chemistry Primer, Oxford University Press.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Revision and practice: Carbohydrates.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ORGANIC CHEMISTRY - 5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-5-12
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 38	Amino acids: Synthesis and reactions with mechanistic details.	Acheson, R.M. Introduction to the Chemistry of Heterocyclic compounds, John Wiely & Sons (1976).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Peptide synthesis, sequencing methods, and nucleic acid basics.	Gilchrist, T. L. Heterocyclic Chemistry, 3rd edition, Pearson.	Explains with board work	Listens and practice with teacher	Understanding
Class 40	Comprehensive revision of biomolecules and overall practice session.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-6-13
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Basic Principles: Analysis of cations and anions, solubility product, and common ion effect.	Lippard, S.J. & Berg, J.M. Principles of Bioinorganic Chemistry Panima Publishing Company 1994.	Explains with examples	Listens and writes	Understanding and apply
Class 02	Principles of cation group separation and choice of group reagents.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Interfering anions (fluoride, borate, oxalate, phosphate): Nature and removal after Group II.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Detailed study of solubility product and its role in qualitative analysis.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Applications of common ion effect in qualitative analysis.	Bertini, I., Gray, H. B., Lippard, S.J., Valentine, J. S., Viva, 2007.	Explains with examples	Listens and writes	Understanding and apply
Class 06	Review and problem-solving for theoretical principles in qualitative analysis.	Basolo, F, and Pearson, R.C. Mechanisms of Inorganic Chemistry, John Wiley & Sons, NY, 1967.	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Elements of Life: Essential and beneficial elements; major, trace, and ultratrace elements.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with board work	Listens and writes	Analyze
Class 08	Basic chemical reactions in biological systems and role of metal ions (Na+, K+, Mg2+, Ca2+).	Powell, P. Principles of Organometallic Chemistry, Chapman and Hall, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Role of Fe3+/2+, Cu2+/+, and Zn2+ in biological systems.	Collman, J. P. et al. Principles and Applications of Organotransition MetalChemistry. Mill Valley, CA: University Science Books, 1987.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-6-13
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Na+/K+-Ion Pump: Mechanism and significance in biological transport.	Crabtree, R. H. The Organometallic Chemistry of the Transition Metals. New York, NY: John Wiley, 2000	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Dioxygen Management Proteins: Structure and role of Haemoglobin and Myoglobin.	Lippard, S.J. & Berg, J.M. Principles of Bioinorganic Chemistry Panima Publishing Company 1994.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Dioxygen management by Hemocyanin and Hemerythrin.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Enzymes: Carbonate-bicarbonate buffering system; role of carbonic anhydrase and carboxyanhydrase A.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains with examples	Listens and writes	Understanding and apply
Class 14	Toxic metal ions: Effects and examples of metal-dependent diseases.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Chelation therapy and its applications (examples only).	Bertini, I., Gray, H. B., Lippard, S.J., Valentine, J. S., Viva, 2007.	Explains with board work	Listens and writes	Analyze
Class 16	Metal complexes in medicine: Pt and Au complexes as drugs (examples only).	Basolo, F, and Pearson, R.C. Mechanisms of Inorganic Chemistry, John Wiley & Sons, NY, 1967.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Case studies: Metal ion transport and disease management.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with examples	Listens and writes	Understanding and apply
Class 18	Review and discussion of bioinorganic chemistry topics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-6-13
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Introduction: Definition and classification of organometallic compounds by bond type.	Collman, J. P. et al. Principles and Applications of Organotransition MetalChemistry. Mill Valley, CA: University Science Books, 1987.	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Concept of hapticity of organic ligands; 18-electron and 16-electron rules (pictorial MO approach).	Crabtree, R. H. The Organometallic Chemistry of the Transition Metals. New York, NY: John Wiley, 2000	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Applications of the 18-electron rule to metal carbonyls, nitrosyls, and cyanides.	Lippard, S.J. & Berg, J.M. Principles of Bioinorganic Chemistry Panima Publishing Company 1994.	Explains with examples	Listens and writes	Understanding and apply
Class 22	General methods of preparation for mono- and binuclear carbonyls of 3d series.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Structures of mononuclear and binuclear carbonyls; pi-acceptor behavior of CO.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 24	Synergic Effect: Explanation using IR data; extent of back bonding in metal carbonyls.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Zeise's Salt: Preparation, structure, and synergic effect evidence.	Bertini, I., Gray, H. B., Lippard, S.J., Valentine, J. S., Viva, 2007.	Explains with examples	Listens and writes	Understanding and apply
Class 26	Ferrocene: Preparation, acetylation, alkylation, metallation reactions.	Basolo, F, and Pearson, R.C. Mechanisms of Inorganic Chemistry, John Wiley & Sons, NY, 1967.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-6-13
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 27	Mannich Condensation in Ferrocene: Mechanism and applications.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains and narrates with suitable bord work	Listens	Understanding
Class 28	Reactions of organometallic complexes: Substitution and oxidative addition.	Powell, P. Principles of Organometallic Chemistry, Chapman and Hall, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Reductive elimination and insertion reactions in organometallic chemistry.	Collman, J. P. et al. Principles and Applications of Organotransition MetalChemistry. Mill Valley, CA: University Science Books, 1987.	Explains with examples	Listens and writes	Understanding and apply
Class 30	Problem-solving and case studies in organometallic chemistry.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Alkene Hydrogenation: Mechanism and role of Wilkinson's Catalyst.	Lippard, S.J. & Berg, J.M. Principles of Bioinorganic Chemistry Panima Publishing Company 1994.	Explains with board work	Listens and writes	Analyze
Class 32	Hydroformylation: Process, significance, and industrial applications.	Huheey, J. E.; Keiter, E.A. & Keiter, R.L. Inorganic Chemistry, Principles ofStructure and Reactivity 4th Ed., Harper Collins 1993, Pearson,2006.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Wacker Process: Mechanism and role in oxidation reactions.	Greenwood, N.N. & Earnshaw A. Chemistry of the Elements, Butterworth-Heinemann, 1997.	Explains with examples	Listens and writes	Understanding and apply
Class 34	Synthetic Gasoline: Fischer-Tropsch reaction; steps and industrial relevance.	Cotton, F.A., Wilkinson, G., Murrillo, C. A., Bochmann, M., Advanced Inorganic Chemistry 6th Ed. 1999.,Wiley.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Ziegler-Natta Catalysis: Mechanism and applications in olefin polymerization.	Bertini, I., Gray, H. B., Lippard, S.J., Valentine, J. S., Viva, 2007.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC CHEMISTRY-5"

B.Sc. Chemistry (Honours)

Paper: CEMA-CC-6-13
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	Comparative study of catalytic processes involving organometallic compounds.	Basolo, F, and Pearson, R.C. Mechanisms of Inorganic Chemistry, John Wiley & Sons, NY, 1967.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Applications of catalytic processes in industries.	Purecell, K.F. and Kotz, J.C., An Introduction toInorganic Chemistry, Saunders: Philadelphia, 1980.	Explains with examples	Listens and writes	Understanding and apply
Class 38	Problem-solving and revision of catalytic reactions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Recap of Theoretical Principles in Qualitative Analysis with problem-solving.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens	Understanding
Class 40	Comprehensive review of Bioinorganic Chemistry, Organometallic Chemistry, and Catalysis with applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 5"

B.Sc. Chemistry (Honours)

Molecular Spectroscopy, Photochemistry and Theory of reaction rate, Surface phenomenon and Dipole moment and polarizability

Paper: CEMA-CC-6-14

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Interaction of electromagnetic radiation with molecules; types of spectra (rotational, vibrational, electronic).	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 02	Rotation Spectroscopy: Selection rules and intensities of spectral lines.	Castellan, G. W. Physical Chemistry, Narosa	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Determination of bond lengths for diatomic and linear triatomic molecules.	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Isotopic substitution and its applications in rotation spectroscopy.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Vibrational Spectroscopy: Classical equation of vibration; force constant calculation.	Engel, T. & Reid, P. Physical Chemistry, 3rd Edition ,Pearson India	Explains with board work	Listens and writes	Analyze
Class 06	Amplitude of diatomic molecular vibrations; anharmonicity and Morse potential.	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Dissociation energies; fundamental frequencies, overtones, and hot bands.	Maron, S. & Prutton , Physical Chemistry	Explains with examples	Listens and writes	Understanding and apply
Class 08	Degrees of freedom for polyatomic molecules; modes of vibration.	Ball, D. W. Physical Chemistry, Thomson Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Diatomic vibrating rotator; P, Q, R branches.	Mortimer, R. G. Physical Chemistry, 2nd Edition, Elsevier	Explains with board work	Listens and writes	Analyze
Class 10	Electronic Spectroscopy: Potential energy curves for diatomic molecules.	Banwell, C. N. Fundamentals of Molecular Spectroscopy, Tata-McGraw-Hill	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Frank-Condon principle; vibrational structure of electronic spectra.	Barrow, G. M. Molecular Spectroscopy, McGraw-Hill	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Determination of dissociation energy; radiative and non-radiative decay pathways.	Hollas, J.M. Modern Spectroscopy, Wiley India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 5"

B.Sc. Chemistry (Honours)

Molecular Spectroscopy, Photochemistry and Theory of reaction rate, Surface phenomenon and Dipole moment and polarizability

Paper: CEMA-CC-6-14

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 13	Pre-dissociation; fluorescence and phosphorescence.	McHale, J. L. Molecular Spectroscopy, Pearson Education	Explains with examples	Listens and writes	Understanding and apply
Class 14	Jablonskii diagram and its significance.	Wayne, C. E. & Wayne, R. P. Photochemistry, OUP	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Raman Spectroscopy: Classical treatment; rotational Raman effect.	Brown, J. M. Molecular Spectroscopy, OUP	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Vibrational Raman spectra; Stokes and anti-Stokes lines, intensity differences.	Levine, I. N. Physical Chemistry, 6th Edition , McGraw-Hill India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Rule of mutual exclusion and its applications in Raman spectroscopy.	Castellan, G. W. Physical Chemistry, Narosa	Explains with board work	Listens and writes	Analyze
Class 18	Recapitulation and Summary of molecular spectroscopy techniques and comparative analysis	McQuarrie, D. A. & Simons, J. D. Physical Chemistry: A Molecular Approach, Viva Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Lambert-Beer's Law: Characteristics of electromagnetic radiation, significance, and limitations.	Kapoor K.L, A Text Book Of Physical Chemistry , McGraw Hill India	Explains with examples	Listens and writes	Understanding and apply
Class 20	Stark-Einstein law, quantum yield, and actinometry; examples of high and low quantum yields.	Engel, T. & Reid, P. Physical Chemistry, 3rd Edition ,Pearson India	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Rate of Photochemical Processes: Photochemical equilibrium and photostationary state.	Atkins, P. W. & Paula, J. de Atkins' Physical Chemistry, 10th Edition, Oxford University Press	Explains with board work	Listens and writes	Analyze
Class 22	Differential rate of photochemical reactions with examples: HI decomposition, H2-Br2 reaction.	Maron, S. & Prutton , Physical Chemistry	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Dimerization of anthracene; photosensitized reactions and quenching.	Ball, D. W. Physical Chemistry, Thomson Press	Explains with board work	Listens and writes	Analyze
Class 24	Role of photochemical reactions in biochemical processes.	Mortimer, R. G. Physical Chemistry, 2nd Edition, Elsevier	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Chemiluminescence and its significance in photochemistry.	Banwell, C. N. Fundamentals of Molecular Spectroscopy, Tata-McGraw-Hill	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 5"

B.Sc. Chemistry (Honours)

Molecular Spectroscopy, Photochemistry and Theory of reaction rate, Surface phenomenon and Dipole moment and polarizability

Paper: CEMA-CC-6-14

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Collision Theory: Principles of reaction rate theory; detailed treatment of collision theory.	Barrow, G. M. Molecular Spectroscopy, McGraw-Hill	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Lindemann theory for unimolecular reactions.	Hollas, J.M. Modern Spectroscopy, Wiley India	Explains with board work	Listens and writes	Analyze
Class 28	Outline of transition state theory; primary kinetic salt effect.	McHale, J. L. Molecular Spectroscopy, Pearson Education	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Surface Tension and Energy: Definitions, excess pressure, capillary rise.	Wayne, C. E. & Wayne, R. P. Photochemistry, OUP	Explains and narrates with suitable bord work	Listens	Understanding
Class 30	Work of cohesion and adhesion; spreading of liquids; vapor pressure over curved surfaces.	Brown, J. M. Molecular Spectroscopy, OUP	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Temperature dependence of surface tension; practical implications.	Banwell, C. N. Fundamentals of Molecular Spectroscopy, Tata-McGraw-Hill	Explains with examples	Listens and writes	Understanding and apply
Class 32	Adsorption: Physical and chemical adsorption; Freundlich and Langmuir adsorption isotherms.	Barrow, G. M. Molecular Spectroscopy, McGraw-Hill	Explains with examples	Listens and writes	Understanding and apply
Class 33	Multilayer adsorption; BET isotherm (without derivation); Gibbs adsorption isotherm and surface excess.	Hollas, J.M. Modern Spectroscopy, Wiley India	Explains with board work	Listens and writes	Analyze
Class 34	Heterogeneous catalysis (single reactant).	McHale, J. L. Molecular Spectroscopy, Pearson Education	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Colloids: Lyophobic and lyophilic sols; charge origin and stability	Wayne, C. E. & Wayne, R. P. Photochemistry, OUP	Explains and narrates with suitable bord work	Listens	Understanding
Class 36	Polarizability of atoms and molecules; dielectric constant and polarization.	Brown, J. M. Molecular Spectroscopy, OUP	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Molar polarization for polar and non-polar molecules.	Hollas, J.M. Modern Spectroscopy, Wiley India	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Physical Chemistry - 5"

B.Sc. Chemistry (Honours)

Molecular Spectroscopy, Photochemistry and Theory of reaction rate, Surface phenomenon and Dipole moment and polarizability

Paper: CEMA-CC-6-14

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 38	Clausius-Mosotti and Debye equations (without derivations).	McHale, J. L. Molecular Spectroscopy, Pearson Education	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Applications of dipole moments; determination methods.	Wayne, C. E. & Wayne, R. P. Photochemistry, OUP	Explains with examples	Listens and writes	Understanding and apply
Class 40	Recap of dipole moment and polarizability concepts.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "MOLECULAR MODELLING AND DRUG DESIGN"

B.Sc. Chemistry (Honours)

Introduction to Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation, Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design

Paper: CEMA-DSE-A1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Overview of Molecular Modelling and Applications: Introduction, history, and scope of molecular modelling. Real-world applications.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Coordinate Systems: Cartesian, spherical, and internal coordinates.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains with board work	Listens	Understanding
Class 03	Potential Energy Surfaces: Definition and role in molecular simulations. Examples and visualization.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Comprehends	Understanding
Class 04	Molecular Graphics Surfaces: Tools and methods for molecular visualization.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Review Session for Introduction and Concepts: Interactive Q&A and solving conceptual problems.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 06	Quiz/Practice Problems: Tests on introductory concepts.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Overview of Force Fields: General introduction and applications.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 08	Bond Stretching: Energy representation and force constants.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Listens	Understanding
Class 09	Angle Bending: Energy calculations for angular deformations.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "MOLECULAR MODELLING AND DRUG DESIGN"

B.Sc. Chemistry (Honours)

Introduction to Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation, Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design

Paper: CEMA-DSE-A1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Nonbonded Interactions: Overview of van der Waals and electrostatic forces.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 11	Electrostatic Interactions: Coulomb's law and applications.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding
Class 12	van der Waals Interactions: Lennard-Jones potential.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 13	Hydrogen Bonding and Liquid Water Models: Force field models for water simulations.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 14	Q&A Session and Force Field Problem Solving: Focused discussion on challenging topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Quiz/Practice Problems on Force Fields: Practical application questions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Introduction to Energy Minimization: Concepts and its significance in simulations.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 17	Non-derivative Methods: Examples and comparison with other methods.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	First and Second Order Minimization Methods: Newton-Raphson, conjugate gradient methods.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "MOLECULAR MODELLING AND DRUG DESIGN"

B.Sc. Chemistry (Honours)

Introduction to Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation, Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design

Paper: CEMA-DSE-A1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Introduction to Computer Simulation Methods: Overview and classifications.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding
Class 20	Thermodynamic Properties and Phase Space Boundaries: Concepts and calculations.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Error Analysis and Result Interpretation: Understanding and mitigating errors in simulations.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding
Class 22	Review and Q&A Session: Discussion on complex methods and doubts.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Practice Problems and Quiz: Applying concepts in simulation scenarios.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 24	Introduction to Molecular Dynamics Simulation: Overview and significance.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 25	Molecular Dynamics using Simple Models: Basic setups and examples.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Listens	Understanding
Class 26	Molecular Dynamics with Continuous Potentials: Handling potential energy variations.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains with board work	Comprehends	Understanding
Class 27	Molecular Dynamics at Constant Temperature: Canonical ensemble techniques.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "MOLECULAR MODELLING AND DRUG DESIGN"

B.Sc. Chemistry (Honours)

Introduction to Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation, Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design

Paper: CEMA-DSE-A1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 28	Molecular Dynamics at Constant Pressure: Isobaric-isothermal ensemble.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Comprehends	Understanding
Class 29	Introduction to Monte Carlo Simulations: Metropolis method and its application.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding
Class 30	Monte Carlo Simulation of Molecules: Examples and interpretation of results.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Combined Review Session on Molecular Dynamics and Monte Carlo: Q&A and problem-solving.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 32	Quiz and Practice: Focused on molecular dynamics and Monte Carlo methods.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Introduction to Structure Prediction and Drug Design: Role of modelling in drug discovery.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Comprehends	Understanding
Class 34	Comparative Modelling and Sequence Alignment: Tools and techniques.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains and narrates with suitable bord work	Listens	Understanding
Class 35	Constructing and Evaluating Comparative Models: Practical applications and tools.	A.R. Leach, Molecular Modelling Principles and Application, Longman, 2001.	Explains with board work	Comprehends	Understanding
Class 36	Predicting Protein Structures by Threading: Concept and tools.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "MOLECULAR MODELLING AND DRUG DESIGN"

B.Sc. Chemistry (Honours)

Introduction to Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation, Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design

Paper: CEMA-DSE-A1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 37	Molecular Docking and Ligand Design: Structure-based drug discovery methods.	J.M. Haile, Molecular Dynamics Simulation Elementary Methods, John Wiley and Sons, 1997.	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Introduction to QSAR: Quantitative structure-activity relationship models.	Satya Prakash Gupta, QSAR and Molecular Modeling, Springer - Anamaya Publishers, 2008	Explains with board work	Comprehends	Understanding
Class 39	Q&A and Review Session: Summary and clarification of doubts.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 40	Final Quiz and Practice Problems: Comprehensive quiz covering all modules	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "APPLICATIONS OF COMPUTERS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Computer Programming Basics: Overview of programming and FORTRAN language.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Elements of FORTRAN Language: Syntax, structure, and basic programming flow.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains with computer work	Listens	Understanding
Class 03	FORTRAN Keywords and Commands: Common keywords and their applications.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 04	Logical and Relational Operators in FORTRAN: Practical usage in programming.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Iteration in FORTRAN: Loops and control structures.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains with computer work	Comprehends	Understanding
Class 06	Array Variables: Definition, declaration, and manipulation in FORTRAN.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains with computer work	Listens	Understanding
Class 07	Matrix Addition and Multiplication in FORTRAN: Writing and executing programs.	Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 08	Functions and Subroutines in FORTRAN: Modular programming concepts.	Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).	Explains and narrates with suitable computer work	Listens and practice	Understanding
Class 09	Q&A Session for FORTRAN Basics: Solving coding challenges.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 10	Practical Session: Writing basic FORTRAN programs.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "APPLICATIONS OF COMPUTERS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Introduction to Spreadsheet Software (MS Excel): Overview of interface and applications.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Creating a Spreadsheet: Entering and formatting data.	Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).	Explains with computer work	Comprehends	Understanding
Class 13	Basic Functions and Formulae in Excel: Arithmetic and logical functions.	Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 14	Creating Charts, Tables, and Graphs: Visualization of data in Excel.	Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)	Explains with computer work	Comprehends	Understanding
Class 15	Incorporating Tables and Graphs into Word Processing Documents: Practical applications.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains with compter work	Listens	Understanding
Class 16	Simple Calculations Using Excel: Hands-on examples.	Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)	Explains with computer work	Comprehends	Understanding
Class 17	Excel Solver for Simultaneous Equations: Solving chemical equilibrium problems.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 18	Using Excel Goal Seek Function: Applications in problem-solving.	Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)	Explains with computer work	Comprehends	Understanding
Class 19	Q&A Session for Excel Basics: Interactive doubt-solving.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "APPLICATIONS OF COMPUTERS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 20	Practical Session: Simultaneous equations and Goal Seek applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 21	Introduction to Numerical Modelling: Basics and applications in science.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 22	Simulation of pH Metric Titration Curves Using Excel: Step-by-step guide.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Using Excel Functions LINEST and Least Squares: Curve fitting techniques.	Levie, R. de, How to use Excel in analytical chemistry and in general scientific data analysis, Cambridge Univ. Press (2001)	Explains with computer work	Comprehends	Understanding
Class 24	Numerical Curve Fitting and Regression: Concepts and examples.	Martin Cwiakala, Schaum's Outline of Programming with FORTRAN 77, 1995	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Numerical Differentiation: Techniques and applications.	https://www.youtube.com/watch?v=FVx3rpahvzk&pp=	Explains with computer work	Listens	Understanding
Class 26	Numerical Integration: Methods and implementation in Excel.	https://www.youtube.com/watch?v=Gc56XG8sUJ0&pp=ygU7TnVtZXJpY2FsIEludGVncmF0aW9uOiBNZXRob2RzIGFuZCBpbXBsZW1lbnRhdGlvbiBpbiBFeGNlbC4%3D	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Q&A Session for Numerical Modelling: Discussion and clarification.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 28	Practical Session: Numerical modelling exercises.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "APPLICATIONS OF COMPUTERS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 29	Statistical Analysis Overview: Importance in data processing.	https://www.youtube.com/watch?v=vppdZ0H63XY&pp=ygU9U3RhdGlzdGljYWwgQW5hbHlzaXMgT3ZlcnZpZXc6IEltcG9ydGFuY2UgaW4gZGF0YSBwcm9jZXNzaW5nLg%3D%3D	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 30	Gaussian Distribution: Properties and significance in statistical analysis.	https://www.youtube.com/watch?v=UQOTNkq0X48&pp=ygVLR2F1c3NpYW4gRGlzdHJpYnV0aW9uOiBQcm9wZXJ0aWVzIGFuZCBzaWduaWZpY2FuY2UgaW4gc3RhdGlzdGljYWwgYW5hbHlzaXMu	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Errors in Measurement: Impact on data sets and analysis.	https://www.youtube.com/watch?v=7A8dAYeulL4&pp=ygVPRGVzY3JpcHRpdmUgU3RhdGlzdGljcyBVc2luZyBFeGNlbDogTWVhbiwgbWVkaWFuLCBtb2RlLCBhbmQgc3RhbmRhcmQgZGV2aWF0aW9uLg%3D%3D	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 32	Descriptive Statistics Using Excel: Mean, median, mode, and standard deviation.	V. Rajaraman, Computer Programming in FORTRAN 77, Prentice Hall, 1997	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Statistical Significance Testing: Concepts and importance.	https://www.youtube.com/watch?v=KS6KEWaoOOE&p	Explains with computer work	Listens	Understanding
Class 34	Performing the T Test in Excel: Step-by-step guide with examples.	https://www.youtube.com/watch?v=BlS11D2VL_U&pp=ygVBUGVyZm9ybWluZyB0aGUgVCBUZXN0IGluIEV4Y2VsOiBTdGVwLWJ5LXN0ZXAgZ3VpZGUgd2l0aCBleGFtcGxlcy4%3D	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 35	Performing the F Test in Excel: Practical application with datasets.	https://www.youtube.com/watch?v=1KbXEyoCxmQ&pp=ygVEUGVyZm9ybWluZyB0aGUgRiBUZXN0IGluIEV4Y2VsOiBQcmFjdGljYWwgYXBwbGljYXRpb24gd2l0aCBkYXRhc2V0cy4%3D	Explains with practical examples in computer	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "APPLICATIONS OF COMPUTERS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	Review Session: Summary of statistical analysis and common challenges.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 37	Q&A Session for Statistical Analysis: Solving sample problems.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 38	Practical Session: Statistical analysis using Excel.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 39	Comprehensive Review: Combining programming, Excel, numerical, and statistical analysis.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply
Class 40	Final Quiz and Problem Solving: Testing understanding of all modules	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable computer work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Green Chemistry: Definition, need, and goals of green chemistry.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with board work	Listens	Understanding
Class 02	Limitations and Obstacles in Green Chemistry: Challenges in achieving green chemistry goals.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Twelve Principles of Green Chemistry: Overview and significance.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Explanation of the Twelve Principles: Examples for each principle.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Designing Green Synthesis: Concepts and strategies.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Prevention of Waste and Byproducts: Techniques for waste minimization.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Atom Economy: Definition and importance in green chemistry.	Finar, I. L. Organic Chemistry (Volume 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Calculating Atom Economy: Rearrangement, addition, substitution, and elimination reactions.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with board work	Listens and practice with teacher	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 09	Reducing Toxicity: Prevention and minimization of hazardous products.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 10	Q&A Session: Clarification on green synthesis and principles.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Green Solvents: Overview of supercritical fluids and their applications.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains with examples	Listens and writes	Understanding and apply
Class 12	Water as a Solvent: Use in organic reactions and advantages.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Ionic Liquids and PEG: Applications in green chemistry.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.	Explains	Listens and writes	Understanding and apply
Class 14	Solventless Processes: Techniques and examples.	Finar, I. L. Organic Chemistry (Volume 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Energy Requirements in Green Chemistry: Alternatives like microwaves and ultrasonic energy.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Microwave-Assisted Reactions in Water: Examples like Hofmann Elimination and benzoic acid synthesis.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Microwave-Assisted Reactions in Organic Solvents: Diels-Alder and decarboxylation reactions.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with practical examples in computer	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	Ultrasound-Assisted Reactions: Sonochemical Simmons-Smith reaction.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Q&A Session: Discussion on energy-efficient reactions and green solvents.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 20	Catalysis in Green Chemistry: Preference for catalytic over stoichiometric reagents.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Examples of Green Synthesis: Adipic acid, catechol, and disodium iminodiacetate.	Finar, I. L. Organic Chemistry (Volume 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Green Counterparts of Organic Reactions: Aldol, Friedel-Crafts, Michael, and Knoevenagel.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Green Counterparts (Cont.): Cannizzaro, benzoin, and Dieckmann condensations.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Rearrangement Reactions by Green Approach: Fries, Claisen, and Beckmann rearrangements.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Rearrangement Reactions (Cont.): Baeyer-Villiger oxidation and its green applications.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains with practical examples in computer	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Q&A Session: Review of green reactions and synthesis.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Future Trends in Green Chemistry: Oxidation reagents, catalysts, and biomimetic reagents.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 28	Solventless Reactions and Combinatorial Green Chemistry: Applications and future scope.	Finar, I. L. Organic Chemistry (Volume 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Green Chemistry in Sustainable Development: Contributions to global sustainability.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	Alkaloids Introduction: Occurrence, structural features, and physiological action.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Hoffmann's Exhaustive Methylation and Emde's Modification: Mechanisms and examples.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Synthesis of Hygrine: Methods and applications.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Medicinal Importance of Alkaloids: Nicotine, hygrine, and quinine.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains with practical examples in computer	Listens and practice with teacher	Understanding and apply
Class 34	Medicinal Importance of Alkaloids (Cont.): Morphine, cocaine, and reserpine.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 35	Terpenes Introduction: Occurrence, classification, and isoprene rule.	Finar, I. L. Organic Chemistry (Volume 2), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Structure Elucidation of Terpenes: Techniques and principles.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Synthesis of Citral: Methods and applications.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 38	Q&A Session: Clarifications on alkaloids and terpenes.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Comprehensive Review: Summarizing green chemistry, alkaloids, and terpenes.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 40	Final Quiz and Problem-Solving Session: Testing knowledge across all topics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous classes, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Optical Methods of Analysis: Origin of spectra and interaction of radiation with matter.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 02	Fundamental Laws of Spectroscopy: Selection rules and validity of Beer-Lambert's law.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	UV-Visible Spectrometry: Basic principles and instrumentation for single and double beam instruments.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Quantitative Analysis with UV-Visible Spectrometry: Estimation of metal ions, geometrical isomers, and keto-enol tautomers.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Determination of Metal Complex Composition: Job's method and mole ratio method.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 06	Q&A Session: Review of UV-Visible Spectrometry and quantitative analysis.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Infrared Spectrometry: Principles and instrumentation for single and double beam instruments.	Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.	Explains with board work	Listens and writes	Analyze
Class 08	Sampling Techniques in IR Spectrometry: Solids, liquids, and gases.	Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Structural Illustration Through IR Data Interpretation: Isotope substitution effects.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Flame Atomic Absorption and Emission Spectrometry: Principles and instrumentation.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Flame and Burner Design: Techniques for atomization and sample introduction.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Background Correction and Chemical Interferences: Removal methods.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Quantitative Estimation of Trace Metal Ions: Applications in water analysis.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 14	Q&A Session: Discussion on IR and atomic absorption/emission spectrometry.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Theory of Thermogravimetry (TG): Basic principles and instrumentation.	Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.	Explains with board work	Listens and writes	Analyze
Class 16	Quantitative Estimation of Ca and Mg Mixtures: Applications of thermogravimetry.	Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Introduction to Electroanalytical Methods: Classification and principles.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	pH Metric Titrations: Determination of equivalence points.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Potentiometric and Conductometric Titrations: Techniques and applications.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Determination of pKa Values: Applications in electroanalytical methods.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Q&A Session: Electroanalytical and thermal analysis review.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with examples	Listens and writes	Understanding and apply
Class 22	Solvent Extraction: Classification, principles, and efficiency.	Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Mechanism of Solvent Extraction: Extraction by solvation and chelation.	Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.	Explains and narrates with suitable bord work	Listens	Understanding
Class 24	Techniques of Extraction: Batch, continuous, and counter-current methods.	Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Applications of Solvent Extraction: Metal ions and organic species.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Chromatography Overview: Classification, principles, and efficiency.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Mechanism of Separation in Chromatography: Adsorption, partition, and ion exchange.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 28	Development of Chromatograms: Frontal, elution, and displacement methods.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Quantitative Aspects of Chromatography: IC, GLC, and GPC.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 30	Qualitative Aspects of Chromatography: TLC and HPLC.	Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Stereoisomeric Separation: Techniques and measurement of optical rotation.	Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.	Explains with board work	Listens and writes	Analyze
Class 32	Calculation of Enantiomeric and Diastereomeric Excess: Methods and applications.	Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Determination of Enantiomeric Composition: NMR, chiral solvents, and chiral shift reagents.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (Honours)

Paper: CEMA-DSE-A4
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 34	Chiral Chromatographic Techniques: GC and HPLC with chiral columns.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Role of Computers in Instrumental Analysis: Data acquisition and processing.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains with board work	Listens and writes	Analyze
Class 36	Comprehensive Review: Optical methods of analysis.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Comprehensive Review: Thermal and electroanalytical methods.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with examples	Listens and writes	Understanding and apply
Class 38	Comprehensive Review: Separation techniques and stereoisomeric analysis.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Final Q&A Session: Discussion and doubt clarification.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 40	Final Quiz and Problem-Solving Session: Comprehensive test of all modules	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE"

B.Sc. Chemistry (Honours)

Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, Chemical explosives

Paper: CEMA-DSE-B1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Silicate Industries: Overview and significance in the chemical industry.	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains with examples	Listens and writes	Understanding and apply
Class 02	Glass: Properties and Classification: Glassy state, silicate vs. non-silicate glasses.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Manufacture and Processing of Glass: Techniques and industrial processes.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Composition and Properties of Glass Types (I): Soda lime, lead glass, and armoured glass.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Composition and Properties of Glass Types (II): Safety glass, borosilicate, and fluorosilicate glass.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains with board work	Listens and writes	Analyze
Class 06	Special Glasses: Coloured, photosensitive, and other specialty glasses.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Ceramics: Types and Manufacturing: Important clays, feldspar, and general ceramic production.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry,Vikas Publications, New Delhi.	Explains with examples	Listens and writes	Understanding and apply
Class 08	High-Technology Ceramics: Applications in superconducting and semiconducting oxides.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Advanced Carbon Materials: Fullerenes, carbon nanotubes, and carbon fibers.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE"

B.Sc. Chemistry (Honours)

Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, Chemical explosives

Paper: CEMA-DSE-B1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Cements: Classification and Ingredients: Role of components in cement properties.	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Manufacture and Setting Process of Cement: Industrial production techniques.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Specialty Cements: Quick-setting and their applications.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Q&A Session: Review of silicate industries topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with examples	Listens and writes	Understanding and apply
Class 14	Introduction to Fertilizers: Types and role in agriculture.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Manufacture of Nitrogen-Based Fertilizers: Urea, ammonium nitrate, and calcium ammonium nitrate.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Phosphate-Based Fertilizers: Ammonium phosphates, polyphosphate, and superphosphate.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry,Vikas Publications, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Potassium-Based Fertilizers: Potassium chloride, potassium sulfate, and compound fertilizers.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE"

B.Sc. Chemistry (Honours)

Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, Chemical explosives

Paper: CEMA-DSE-B1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	Q&A Session: Fertilizers manufacturing and types.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Surface Coatings: Objectives and Preparation: Surface preparation and treatment techniques.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with examples	Listens and writes	Understanding and apply
Class 20	Paints and Pigments: Formulation, composition, and properties.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Types of Paints: Oil paints, enamels, water-based paints, and additives.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains with board work	Listens and writes	Analyze
Class 22	Special Paints: Heat/fire retardant, eco-friendly, and plastic paints.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Metallic Coatings: Electrolytic, electroless methods, and anodizing.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with board work	Listens and writes	Analyze
Class 24	Q&A Session: Surface coatings and their applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Batteries Overview: Classification and characteristics of primary and secondary batteries.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains with examples	Listens and writes	Understanding and apply
Class 26	Working of Batteries (I): Lead-acid, lithium-ion, and solid-state batteries.	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE"

B.Sc. Chemistry (Honours)

Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, Chemical explosives

Paper: CEMA-DSE-B1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 27	Working of Batteries (II): Fuel cells, solar cells, and polymer cells.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with board work	Listens and writes	Analyze
Class 28	Q&A Session: Battery components and applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Introduction to Alloys: Classification, ferrous vs. non-ferrous alloys, and properties.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics,Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 30	Manufacture of Steel: Silicon removal, decarbonization, and other processes.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Steel Surface Treatment: Techniques like nitriding, carburizing, and heat treatment.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with examples	Listens and writes	Understanding and apply
Class 32	Composition and Properties of Steels: Types and their industrial applications.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry,Vikas Publications, New Delhi.	Explains with examples	Listens and writes	Understanding and apply
Class 33	Q&A Session: Alloys, steel manufacture, and treatment.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Listens and writes	Analyze
Class 34	Introduction to Catalysis: Principles and general properties of catalysts.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Homogeneous and Heterogeneous Catalysis: Mechanisms and examples.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "INORGANIC MATERIALS OF INDUSTRIALIMPORTANCE"

B.Sc. Chemistry (Honours)

Silicate Industries, Fertilizers, Surface Coatings, Batteries, Alloys, Catalysis, Chemical explosives

Paper: CEMA-DSE-B1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	Special Catalysts: Phase transfer catalysts and zeolites.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry,Vikas Publications, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Chemical Explosives: Origin, preparation, and properties of lead azide, PETN, and RDX.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Rocket Propellants: Introduction and types of propellants.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Q&A Session: Catalysis and chemical explosives.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 40	Final Quiz and Comprehensive Review: Covering all topics from silicate industries to explosives	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "NOVEL INORGANIC SOLIDS"

B.Sc. Chemistry (Honours)

Synthesis and modification of inorganic solids, Inorganic solids of technological importance, Nanomaterials, Introduction to engineering materials for mechanical construction, Composite materials, Speciality polymers

Paper: CEMA-DSE-B2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Synthesis of Inorganic Solids: Overview and significance.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Conventional Heat and Beat Methods: Basics and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Listens	Understanding
Class 03	Co-precipitation Method: Principles and examples.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Comprehends	Understanding
Class 04	Sol-Gel Methods: Mechanism and synthesis applications.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Hydrothermal Method: Processes and advantages.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 06	Ion-Exchange and Intercalation Methods: Principles and technological applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Q&A Session: Review of synthesis and modification techniques.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 08	Introduction to Inorganic Solids of Technological Importance: Overview and significance.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "NOVEL INORGANIC SOLIDS"

B.Sc. Chemistry (Honours)

Synthesis and modification of inorganic solids, Inorganic solids of technological importance, Nanomaterials, Introduction to engineering materials for mechanical construction, Composite materials, Speciality polymers

Paper: CEMA-DSE-B2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 09	Solid Electrolytes: Cationic, anionic, and mixed electrolytes.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 10	Inorganic Pigments: Colored solids, white and black pigments.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 11	Molecular Materials: Fullerides, one-dimensional metals, and molecular magnets.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 12	Inorganic Liquid Crystals: Chemistry and applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains and narrates with suitable bord work	Listens	Understanding
Class 13	Q&A Session: Review of inorganic solids and molecular materials.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 14	Introduction to Nanomaterials: Overview and classification of nanostructures.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Preparation of Gold and Silver Nanoparticles: Methods and applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Self-Assembled Nanostructures: Control of nanoarchitecture.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "NOVEL INORGANIC SOLIDS"

B.Sc. Chemistry (Honours)

Synthesis and modification of inorganic solids, Inorganic solids of technological importance, Nanomaterials, Introduction to engineering materials for mechanical construction, Composite materials, Speciality polymers

Paper: CEMA-DSE-B2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 17	Carbon Nanotubes and Inorganic Nanowires: Properties and uses.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Bio-Inorganic Nanomaterials: DNA, natural, and artificial nanomaterials.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Listens	Understanding
Class 19	Bionano Composites: Concepts and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 20	Q&A Session: Nanostructures, synthesis methods, and applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Introduction to Engineering Materials for Mechanical Construction: Overview and importance.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 22	Cast Irons: Composition, characteristics, and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Plain Carbon and Alloy Steels: Properties and uses.	Frank J. Ovens, Introduction to Nanotechnology	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 24	Copper and Aluminum Alloys: Duralumin, brasses, and bronzes.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "NOVEL INORGANIC SOLIDS"

B.Sc. Chemistry (Honours)

Synthesis and modification of inorganic solids, Inorganic solids of technological importance, Nanomaterials, Introduction to engineering materials for mechanical construction, Composite materials, Speciality polymers

Paper: CEMA-DSE-B2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 25	Cutting Tool Materials and Super Alloys: Mechanical properties and applications.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Listens	Understanding
Class 26	Thermoplastics and Thermosets: Characteristics and fabrication techniques.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 27	Composite Materials: Introduction: Definition, importance, and limitations of conventional materials.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 28	Matrix in Composites: Role, classification, and examples.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 29	Reinforcements in Composites: Types, properties, and applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Comprehends	Understanding
Class 30	Environmental Effects on Composites: Impact and solutions.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Applications of Composites: Case studies and examples.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 32	Q&A Session: Review of engineering and composite materials.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "NOVEL INORGANIC SOLIDS"

B.Sc. Chemistry (Honours)

Synthesis and modification of inorganic solids, Inorganic solids of technological importance, Nanomaterials, Introduction to engineering materials for mechanical construction, Composite materials, Speciality polymers

Paper: CEMA-DSE-B2
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 33	Introduction to Specialty Polymers: Conducting polymers and their importance.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 34	Conduction Mechanism in Polymers: Polyacetylene, polyparaphenylene, and polypyrole.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and narrates with suitable bord work	Listens	Understanding
Class 35	Applications of Conducting Polymers: Technological relevance and future prospects.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Comprehends	Understanding
Class 36	Ion-Exchange Resins: Mechanism and applications in industries.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 37	Ceramics and Refractories: Introduction, classification, and properties.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Manufacturing and Applications of Ceramics: Raw materials and techniques.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 39	Q&A Session: Specialty polymers and ceramics review.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 40	Final Quiz and Comprehensive Review: Covering all topics from synthesis to applications	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "POLYMER CHEMISTRY"

B.Sc. Chemistry (Honours)

Introduction and history of polymeric materials, Functionality and its importance, Kinetics of Polymerization, Crystallization and crystallinity, Nature and structure of polymers, Determination of molecular weight of polymers, Glass transition temperature (Tg) and determination of Tg, Polymer Solution, Properties of Polymer

Paper: CEMA-DSE-B3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Polymers: Overview and significance of polymers in materials science.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Classification of Polymers: Different schemes of classification and examples.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains with board work	Listens	Understanding
Class 03	Polymer Nomenclature: Rules and systems for naming polymers.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Molecular Forces and Chemical Bonding in Polymers: Impact on polymer properties.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Texture of Polymers: Understanding morphology and surface properties.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains with board work	Comprehends	Understanding
Class 06	Q&A Session: Review of polymer basics and classifications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Listens	Understanding
Class 07	Criteria for Synthetic Polymer Formation: Key principles and examples.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Classification of Polymerization Processes: Step-growth, chain-growth, and others.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Functionality and Polymerization: Relationship between functionality, extent of reaction, and degree of polymerization.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains with board work	Listens and writes	Analyze
Class 10	Bi-Functional and Poly-Functional Systems: Case studies and examples.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "POLYMER CHEMISTRY"

B.Sc. Chemistry (Honours)

Introduction and history of polymeric materials, Functionality and its importance, Kinetics of Polymerization, Crystallization and crystallinity, Nature and structure of polymers, Determination of molecular weight of polymers, Glass transition temperature (Tg) and determination of Tg, Polymer Solution, Properties of Polymer

Paper: CEMA-DSE-B3
(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Step-Growth Polymerization: Mechanism and kinetics.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Radical Chain Growth Polymerization: Mechanism and kinetics.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains with board work	Comprehends	Understanding
Class 13	Ionic Chain Polymerization (Cationic and Anionic): Mechanism and applications.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Coordination Polymerization: Mechanisms and industrial relevance.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains with board work	Comprehends	Understanding
Class 15	Copolymerization: Mechanism and kinetics.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains with board work	Listens	Understanding
Class 16	Polymerization Techniques: Bulk, solution, suspension, and emulsion processes.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains with board work	Comprehends	Understanding
Class 17	Q&A Session: Polymer formation and polymerization mechanisms review.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Crystalline Melting Point and Degree of Crystallinity: Methods of determination.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains with board work	Comprehends	Understanding
Class 19	Morphology of Crystalline Polymers: Factors affecting crystallinity.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Factors Affecting Crystalline Melting Point: Temperature, molecular structure, and other influences.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Structure-Property Relationships in Polymers: Molecular architecture and macroscopic properties.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "POLYMER CHEMISTRY"

B.Sc. Chemistry (Honours)

Introduction and history of polymeric materials, Functionality and its importance, Kinetics of Polymerization, Crystallization and crystallinity, Nature and structure of polymers, Determination of molecular weight of polymers, Glass transition temperature (Tg) and determination of Tg, Polymer Solution, Properties of Polymer

Paper: CEMA-DSE-B3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 22	Molecular Weights of Polymers: Mn, Mw, etc., and methods of determination.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Polydispersity Index: Significance and calculation.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains with board work	Comprehends	Understanding
Class 24	Q&A Session: Crystallinity and structure-property relationship review	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Free Volume Theory: Impact on polymer properties.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains with board work	Listens	Understanding
Class 26	WLF Equation: Application to polymer behavior.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Glass Transition Temperature (Tg): Factors influencing Tg.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Polymer Solubility Criteria: Solubility parameters and Flory-Huggins theory.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Thermodynamics of Polymer Solutions: Entropy, enthalpy, and free energy changes.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Lower and Upper Critical Solution Temperatures: Definitions and examples.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains and narrates with suitable bord work	Listens	Understanding
Class 31	Q&A Session: Thermal and solubility properties review.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "POLYMER CHEMISTRY"

B.Sc. Chemistry (Honours)

Introduction and history of polymeric materials, Functionality and its importance, Kinetics of Polymerization, Crystallization and crystallinity, Nature and structure of polymers, Determination of molecular weight of polymers, Glass transition temperature (Tg) and determination of Tg, Polymer Solution, Properties of Polymer

Paper: CEMA-DSE-B3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 32	Polyolefins: Preparation, structure, and uses.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Polystyrene and Styrene Copolymers: Properties and industrial applications.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains with board work	Listens	Understanding
Class 34	PVC and Related Polymers: Characteristics and applications.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Poly(vinyl acetate) and Acrylic Polymers: Synthesis and uses.	R.W. Lenz: Organic Chemistry of Synthetic High Polymers. Interscience Publishers, New York, 1967	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Fluoropolymers: Teflon and other examples.	R.B. Seymour & C.E. Carraher: Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 37	Polyamides and Related Polymers: Nylon and its applications.	G. Odian: Principles of Polymerization, 4th Ed. Wiley, 2004.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 38	Phenol-Formaldehyde Resins: Bakelite, Novolac, and their properties.	F.W. Billmeyer: Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 39	Specialty Polymers: Conducting polymers like polyacetylene, polyaniline, polypyrrole, etc.	P. Ghosh: Polymer Science & Technology, Tata McGraw-Hill Education, 1991.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 40	Q&A Session: Comprehensive review of polymer types, properties, and applications.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Mathematics and Statistics for Chemists"

B.Sc. Chemistry (Honours)

Mathematics and Statistics for Chemists

Paper: CEMA-SEC-A1

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Functions, Limits, and Derivatives - Basic concepts, physical significance, and rules of differentiation.	The Chemical Maths Book, E. Steiner, Oxford University Press (1996).	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Maxima, Minima, and Applications in Chemistry - Applications of derivatives in chemistry and error functions.	Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. OxfordUniversity Press.	Explains with examples	Listens and writes	Understanding and apply
Class 03	Gamma Function, Exact & Inexact Differentials - Introduction and properties.	Higher Engineering Mathematics, Grewal B.S., Khanna Publishers, 43rd Edition.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Taylor & McLaurin Series - Derivation and applications.	Advanced Engineering Mathematics, Kreyszig Erwin, Wiley, 10th Edition	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Fourier Series & Fourier Transform - Concepts and applications.	The Chemical Maths Book, E. Steiner, Oxford University Press (1996).	Explains with examples	Listens and writes	Understanding and apply
Class 06	Laplace Transform - Definition, properties, and applications in chemistry.	Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. OxfordUniversity Press.	Explains with board work	Listens and writes	Analyze
Class 07	Partial Differentiation & Integration Basics - Concepts and rules of integration.	Higher Engineering Mathematics, Grewal B.S., Khanna Publishers, 43rd Edition.	Explains with board work	Listens and writes	Analyze
Class 08	Definite & Indefinite Integrals - Evaluation techniques and applications.	Advanced Engineering Mathematics, Kreyszig Erwin, Wiley, 10th Edition	Explains with examples	Listens and writes	Understanding and apply
Class 09	Q&A & Review of Calculus & Functions	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 10	Basics of Differential Equations - Introduction, separation of variables, and homogeneous equations.	Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. OxfordUniversity Press.	Explains with examples	Listens and writes	Understanding and apply
Class 11	Exact and Linear Differential Equations - Solving exact and linear first-order equations.	The Chemical Maths Book, E. Steiner, Oxford University Press (1996).	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "Mathematics and Statistics for Chemists"

B.Sc. Chemistry (Honours)

Mathematics and Statistics for Chemists

Paper: CEMA-SEC-A1

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Second-Order Differential Equations - Techniques for solving second-order equations.	Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. OxfordUniversity Press.	Explains with board work	Listens and writes	Analyze
Class 13	Series Solution Methods - Solving differential equations using series.	Higher Engineering Mathematics, Grewal B.S., Khanna Publishers, 43rd Edition.	Explains with board work	Listens and writes	Analyze
Class 14	Q&A & Review of Differential Equations	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Permutations, Combinations, and Probability - Basics of probability theory.	The Chemical Maths Book, E. Steiner, Oxford University Press (1996).	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Vectors and Vector Operations - Dot, cross, and triple products.	Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. OxfordUniversity Press.	Explains with examples	Listens and writes	Understanding and apply
Class 17	Matrix Algebra - Basics of matrices, operations, inverse, adjoint, and transpose.	Higher Engineering Mathematics, Grewal B.S., Khanna Publishers, 43rd Edition.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Qualitative and Quantitative Analysis Basics - Sampling, evaluation, errors, and data interpretation.	Advanced Engineering Mathematics, Kreyszig Erwin, Wiley, 10th Edition	Explains with board work	Listens and writes	Analyze
Class 19	Statistical Tests - F, Q, and t tests, confidence intervals, and ANOVA.	The Chemical Maths Book, E. Steiner, Oxford University Press (1996).	Explains with examples	Listens and writes	Understanding and apply
Class 20	Q&A & Review Session (Final)	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL CLINICAL BIOCHEMISTRY "

B.Sc. Chemistry (Honours)

ANALYTICAL CLINICAL BIOCHEMISTRY

Paper: CEMA-SEC-A2

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Biological Importance of Carbohydrates & Metabolism Basics - Overview and significance in biological systems. ATP and Glycolysis - Role of ATP as cellular currency; detailed steps of glycolysis.	Cooper, T.G. Tool of Biochemistry. Wiley-Blackwell (1977).	Explains with examples	Listens and writes	Understanding and apply
Class 02	Fermentation Processes - Alcoholic and lactic acid fermentations. Krebs Cycle - Steps, significance, and energy yield of the Krebs cycle. Isolation and Characterization of Polysaccharides - Techniques and applications.	Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Q&A and Review of Carbohydrates & Metabolism	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Practical : Carbohydrates – qualitative and quantitative	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Practical : Lipids – qualitative	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with board work	Listens and writes	Analyze
Class 06	Protein Classification and Biological Importance - Types and roles of proteins. Protein Structure: Primary, Secondary, Tertiary - α-helix, β-pleated sheets, and structural significance.	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Protein Isolation, Characterization, and Denaturation - Laboratory techniques and factors affecting protein stability.	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.	Explains with examples	Listens and writes	Understanding and apply
Class 08	Q&A and Review of Protein Structure and Function	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Practical : Determination of the iodine number of oil; Determination of the saponification number of oil	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL CLINICAL BIOCHEMISTRY "

B.Sc. Chemistry (Honours)

ANALYTICAL CLINICAL BIOCHEMISTRY

Paper: CEMA-SEC-A2

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Practical : Determination of cholesterol using Liebermann- Burchard reaction	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Enzyme Nomenclature, Characteristics, and Classification - Introduction, including ribozymes and classifications.	https://www.youtube.com/watch?v=R23ZXqysTZc&pp=ygVxRW56eW1lIE5vbWVuY2xhdHVyZSwgQ2hhcmFjdGVyaXN0aWNzLCBhbmQgQ2	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Mechanism of Enzyme Action & Stereospecificity - Active site, enzyme-substrate interactions., Coenzymes, Cofactors, and Enzyme Inhibitors - Role of coenzymes, cofactors, and inhibition mechanisms.	Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Practical : Proteins – qualitative, Isolation of protein	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with examples	Listens and writes	Understanding and apply
Class 14	Biocatalysis in Green Chemistry & Industry - Applications in sustainable chemistry and industrial processes.	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Q&A and Review of Enzyme Function	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Lipid Classification and Biological Importance - Triglycerides, phosphoglycerides, cholesterol, and lipid membrane.	O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Lipoproteins & Steroid Hormones - Properties, functions, and biochemistry of lipoproteins and steroid hormones. DNA and RNA Structure & Genetic Code - Watson-Crick model, replication, transcription, and translation processes.	Berg, J.M., Tymoczko, J.L. & Stryer, L. Biochemistry, W.H. Freeman, 2002.	Explains with board work	Listens and writes	Analyze
Class 18	Blood & Urine Analysis - Blood composition, functions, coagulation; urine formation, sample collection, and disease diagnostics.	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL CLINICAL BIOCHEMISTRY "

B.Sc. Chemistry (Honours)

ANALYTICAL CLINICAL BIOCHEMISTRY

Paper: CEMA-SEC-A2

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Q&A, Practical Review & Wrap-Up	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 20	Practical : Determination of protein by the Biuret reaction, Determination of nucleic acids	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with practical examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PHARMACEUTICALS CHEMISTRY"

B.Sc. Chemistry (Honours)

PHARMACEUTICALS CHEMISTRY

Paper: CEMA-SEC-B3

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Drug Discovery and Development - Overview of stages from discovery to clinical trials.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Retrosynthetic Analysis - Basic principles and approaches in drug design.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains with board work	Listens	Understanding
Class 03	Analgesics, Antipyretics, and Anti-inflammatory Drugs - Synthesis and mechanism of action (Aspirin, Paracetamol, Ibuprofen).	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains with board work	Comprehends	Understanding
Class 04	Antibiotics and Antibacterials - Mechanism and synthesis (Chloramphenicol, Sulphonamides).	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Antifungal and Antiviral Agents - Synthesis and applications (Sulphamethoxazole, Trimethoprim, Acyclovir).	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 06	Central Nervous System Agents - Mechanism and synthesis (Phenobarbital, Diazepam).	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Cardiovascular Agents and Antileprosy Drugs - Mechanism and synthesis (Glyceryl trinitrate, Dapsone).	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens	Understanding
Class 08	HIV-AIDS Related Drugs - Overview and synthesis of AZT (Zidovudine).	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains with board work	Listens	Understanding
Class 09	Q&A and Review of Drug Discovery & Synthesis	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PHARMACEUTICALS CHEMISTRY"

B.Sc. Chemistry (Honours)

PHARMACEUTICALS CHEMISTRY

Paper: CEMA-SEC-B3

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Introduction to Fermentation - Basics of aerobic and anaerobic fermentation processes.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens	Understanding
Class 11	Industrial Production of Ethyl Alcohol and Citric Acid - Techniques and applications in the pharmaceutical industry.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains with board work	Comprehends	Understanding
Class 12	Antibiotic Production: Penicillin and Cephalosporin - Fermentation processes, challenges, and applications.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and narrates with suitable bord work	Listens	Understanding
Class 13	Antibiotic Production: Chloromycetin and Streptomycin - Production techniques and pharmaceutical applications.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and narrates with suitable bord work	Listens	Understanding
Class 14	Amino Acid Production: Lysine and Glutamic Acid - Fermentation and applications in pharmaceuticals and food industries.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Vitamin Production: Vitamin B2 and Vitamin B12 - Production processes and health significance.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Vitamin C Production - Fermentation techniques and its importance in health and industry.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and narrates with suitable bord work	Listens	Understanding
Class 17	Biochemical and Pharmaceutical Applications of Fermentation - Broad applications in medicine, agriculture, and food.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Q&A and Review of Fermentation	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PHARMACEUTICALS CHEMISTRY"

B.Sc. Chemistry (Honours)

PHARMACEUTICALS CHEMISTRY

Paper: CEMA-SEC-B3

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Practical Synthesis Techniques Review - Synthesis techniques for representative drugs (e.g., aspirin, antacids).	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains with practical examples	Listens and writes	Understanding and apply
Class 20	Final Q&A, Comprehensive Review, and Exam Preparation	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PESTICIDE CHEMISTRY"

B.Sc. Chemistry (Honours)

PESTICIDE CHEMISTRY

Paper: CEMA-SEC-B4

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Pesticides - Overview of natural and synthetic pesticides, their development, and usage.	https://www.youtube.com/watch?v=MAlfQJlFIS0&pp=ygVoSW50cm9kdWN0aW9uIHRvIFBlc3RpY2lkZXMgLSBPdmVydmlldyBvZiBuYXR1cmFsIGFuZCBzeW50aGV0aWMgcGVzdGljaWRlcywgdGhlaXIgZGV2ZWxvcG1lbnQsIGFuZCB1c2FnZS4%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Benefits and Adverse Effects of Pesticides - Environmental and health impacts.	https://www.youtube.com/watch?v=lH_8N9HRsys&pp=ygVOQmVuZWZpdHMgYW5kIEFkdmVyc2UgRWZmZWN0cyBvZiBQZXN0aWNpZGVzIC0gRW52aXJvbm1lbnRhbCBhbmQgaGVhbHRoIGltcGFjdHMu	Explains with board work	Listens	Understanding
Class 03	Evolving Concepts in Pesticide Use - Shifts in pesticide usage, regulatory perspectives, and sustainable approaches.	https://www.youtube.com/shorts/W9YLra2NqPc	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Structure-Activity Relationship (SAR) in Pesticides - Basic principles and its importance in pesticide design.	https://www.youtube.com/watch?v=djwFQwy4WF0&pp=ygVuU3RydWN0dXJlLUFjdGl2aXR5IFJlbGF0aW9uc2hpcCAoU0FSKSBpbiBQZXN0aWNpZGVzIC0gQmFzaWMgcHJpbmNpcGxlcyBhbmQgaXRzIGltcG9ydGFuY2UgaW4gcGVzdGljaWRlIGRlc2lnbi4%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Organochlorines Overview - Mechanism of action and environmental impact. Synthesis of DDT - Step-by-step synthesis, properties, and historical context.	https://www.youtube.com/watch?v=PBCIVmMo1vs&pp=ygWXAU9yZ2Fub2NobG9yaW5lcyBPdmVydmlldyAtIE1lY2hhbmlzbSBvZiBhY3Rpb24gYW5kIGVudmlyb25tZW50YWwgaW1wYWN0LiBTeW50aGVzaXMgb2YgRERUIC0gU3RlcC1ieS1zdGVwIHN5bnRoZXNpcywgcHJvcGVydGllcywgYW5kIGhpc3RvcmljYWwgY29udGV4dC4%3D	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PESTICIDE CHEMISTRY"

B.Sc. Chemistry (Honours)

PESTICIDE CHEMISTRY

Paper: CEMA-SEC-B4

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 06	Practical to calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications	https://www.youtube.com/watch?v=U3qwOL6TPok&pp=ygVtUHJhY3RpY2FsIHRvIGNhbGN1bGF0ZSBhY2lkaXR5L2Fsa2FsaW5pdHkgaW4gZ2l2ZW4gc2FtcGxlIG9mIHBlc3RpY2lkZSBmb3JtdWxhdGlvbnMgYXMgcGVyIEJJUyBzcGVjaWZpY2F0aW9ucw%3D%3D	Explains with practical examples	Listens and practice with teacher	Understanding and apply
Class 07	Synthesis and Use of Gammexene - Technical manufacture, applications, and risks.	https://www.youtube.com/watch?v=7O7dEHp8dNw&pp=ygVQU3ludGhlc2lzIGFuZCBVc2Ugb2YgR2FtbWV4ZW5lIC0gVGVjaG5pY2FsIG1hbnVmYWN0dXJlLCBhcHBsaWNhdGlvbnMsIGFuZCByaXNrcy4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Q&A and Review of Organochlorines	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Practical of preparation of simple organophosphates, phosphonates and thiophosphates	https://www.youtube.com/shorts/zoBXRLvczCc	Explains with practical examples	Listens and writes	Analyze
Class 10	Organophosphates Overview - Mechanism, benefits, and toxicity concerns., Synthesis of Malathion - Production techniques, properties, and uses.	https://www.youtube.com/watch?v=ZJi65oFjwkE&pp=ygWOAU9yZ2Fub3Bob3NwaGF0ZXMgT3ZlcnZpZXcgLSBNZWNoYW5pc20sIGJlbmVmaXRzLCBhbmQgdG94aWNpdHkgY29uY2VybnMuLCBTeW50aGVzaXMgb2YgTWFsYXRoaW9uIC0gUHJvZHVjdGlvbiB0ZWNobmlxdWVzLCBwcm9wZXJ0aWVzLCBhbmQgdXNlcy4%3D	Explains with board work	Listens	Understanding
Class 11	Synthesis and Applications of Parathion - Technical manufacture, applications, and safety considerations.	https://www.youtube.com/watch?v=ZJi65oFjwkE&pp=ygVpU3ludGhlc2lzIGFuZCBBcHBsaWNhdGlvbnMgb2YgUGFyYXRoaW9uIC0gVGVjaG5pY2FsIG1hbnVmYWN0dXJlLCBhcHBsaWNhdGlvbnMsIGFuZCBzYWZldHkgY29uc2lkZXJhdGlvbnMu	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PESTICIDE CHEMISTRY"

B.Sc. Chemistry (Honours)

PESTICIDE CHEMISTRY

Paper: CEMA-SEC-B4

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Q&A and Review of Organophosphates	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Comprehends	Understanding
Class 13	Carbamates Overview - Mode of action, benefits, and adverse effects.	https://www.youtube.com/watch?v=ELyqEmXEqo4&pp=ygVEQ2FyYmFtYXRlcyBPdmVydmlldyAtIE1vZGUgb2YgYWN0aW9uLCBiZW5lZml0cywgYW5kIGFkdmVyc2UgZWZmZWN0cy4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Synthesis of Carbofuran - Technical process and applications. Synthesis of Carbaryl - Properties, production, and uses.	https://www.youtube.com/watch?v=5bJi8cigPdk&pp=ygV3U3ludGhlc2lzIG9mIENhcmJvZnVyYW4gLSBUZWNobmljYWwgcHJvY2VzcyBhbmQgYXBwbGljYXRpb25zLiBTeW50aGVzaXMgb2YgQ2FyYmFyeWwgLSBQcm9wZXJ0aWVzLCBwcm9kdWN0aW9uLCBhbmQgdXNlcy4%3D	Explains with board work	Comprehends	Understanding
Class 15	Q&A and Review of Carbamates	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens	Understanding
Class 16	Revision Practical to calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications	https://www.youtube.com/watch?v=U3qwOL6TPok&pp=ygV2UmV2aXNpb24gUHJhY3RpY2FsIHRvIGNhbGN1bGF0ZSBhY2lkaXR5L2Fsa2FsaW5pdHkgaW4gZ2l2ZW4gc2FtcGxlIG9mIHBlc3RpY2lkZSBmb3JtdWxhdGlvbnMgYXMgcGVyIEJJUyBzcGVjaWZpY2F0aW9ucw%3D%3D	Recap from previous class, Explains and Narrates	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "PESTICIDE CHEMISTRY"

B.Sc. Chemistry (Honours)

PESTICIDE CHEMISTRY

Paper: CEMA-SEC-B4

(Credits: 02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 17	Quinones and Anilides Overview - Characteristics and mode of action. Synthesis of Chloranil - Technical manufacture and uses.	https://www.youtube.com/watch?v=RIYRoYmkZhs&pp=ygV9UXVpbm9uZXMgYW5kIEFuaWxpZGVzIE92ZXJ2aWV3IC0gQ2hhcmFjdGVyaXN0aWNzIGFuZCBtb2RlIG9mIGFjdGlvbi4gU3ludGhlc2lzIG9mIENobG9yYW5pbCAtIFRlY2huaWNhbCBtYW51ZmFjdHVyZSBhbmQgdXNlcy4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Synthesis and Applications of Alachlor and Butachlor - Production processes, applications, and environmental impact.	https://www.youtube.com/watch?v=M0wznAjBKJ4&pp=ygV0U3ludGhlc2lzIGFuZCBBcHBsaWNhdGlvbnMgb2YgQWxhY2hsb3IgYW5kIEJ1dGFjaGxvciAtIFByb2R1Y3Rpb24gcHJvY2Vzc2VzLCBhcHBsaWNhdGlvbnMsIGFuZCBlbnZpcm9ubWVudGFsIGltcGFjdC4%3D	Explains with board work	Comprehends	Understanding
Class 19	Final Q&A and Comprehensive Review	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and writes	Analyze
Class 20	Revision of preparation of simple organophosphates, phosphonates and thiophosphates	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with practical examples	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC1/GE1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Concept of Pressure and Temperature	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with board work	Listens	Understanding
Class 02	Collision of Gas Molecules, Collision Number, and Mean Free Path	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Distribution of Velocities & Maxwell's Distribution of Speed	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Maxwell's Distribution of Kinetic Energy, Average & Root Mean Square Velocity	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Most Probable Velocity & Equipartition of Energy Principle	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Deviation of Real Gases from Ideal Behavior, Compressibility Factor	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Boyle Temperature, Andrew's and Amagat's Plots	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Van der Waals Equation and Its Features	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains with board work	Listens and practice with teacher	Understanding
Class 09	Existence of Critical State & Critical Constants (van der Waals constants)	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 10	Law of Corresponding States	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC1/GE1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Q&A / Review for Kinetic Theory of Gases and Real Gases	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 12	Surface Tension: Definition, Dimension, and Measurement	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Viscosity: Definition and Measurement Using Ostwald Viscometer	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains	Listens and writes	Understanding and apply
Class 14	Effect of Temperature on Surface Tension & Coefficient of Viscosity (Qualitative)	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Q&A / Review for Liquids	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Rate Law, Order, Molecularity, and Extent of Reaction	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	First Order Reactions: Rate Constants, Differential and Integrated Forms	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 18	Second and nth Order Reactions: Differential and Integrated Forms	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Pseudo First Order Reactions, Determination of Reaction Order	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and writes	Understanding and apply
Class 20	Temperature Dependence of Rate Constant; Arrhenius Equation	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC1/GE1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 21	Activation Energy	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Q&A / Review for Chemical Kinetics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Bohr's Theory for Hydrogen Atom & Atomic Spectra	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Sommerfeld's Model and Quantum Numbers	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Pauli Exclusion Principle and Hund's Rule	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 26	Electronic Configuration of Many-Electron Atoms, Aufbau Principle & Its Limitations	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Q&A / Review for Atomic Structure	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Classification of Elements by Electronic Configuration (s-, p-, d-, and f-block)	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Position of Hydrogen and Noble Gases	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	Atomic & Ionic Radii, Ionization Potential	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC1/GE1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 31	Electron Affinity and Electronegativity	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Periodic Trends in s- and p-block Elements	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Q&A / Review for Chemical Periodicity	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 34	Brönsted-Lowry Concept: Conjugate Acids/Bases and Relative Strengths	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Lewis Acid-Base Concept, Classification of Acids and Bases	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	HSAB Concept and Applications, Lux-Flood and Solvent System Concepts	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Q&A / Review for Acids and Bases	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 38	Electronic Displacements: Inductive Effect, Resonance, and Hyperconjugation	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Nucleophiles and Electrophiles; Reactive Intermediates (Carbocations, Carbanions, Radicals)	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with board work	Listens and practice with teacher	Understanding
Class 40	Q&A / Review for Fundamentals of Organic Chemistry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC2/GE2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Intensive and Extensive Variables; State and Path Functions	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with board work	Listens	Understanding
Class 02	Isolated, Closed, and Open Systems; Zeroth Law of Thermodynamics	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Concepts of Heat, Work, and Internal Energy; First Law of Thermodynamics	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Enthalpy (H); Relation Between Heat Capacities; Calculations for q, w, ΔU, and ΔH	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Reversible, Irreversible, and Free Expansion of Gases	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Standard States; Heats of Reaction, Enthalpy of Formation and Combustion	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Laws of Thermochemistry; Kirchhoff's Equations	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Second Law of Thermodynamics; Heat Reservoirs and Heat Engines	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains with board work	Listens and practice with teacher	Understanding
Class 09	Carnot Cycle; Physical Concept of Entropy	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 10	Entropy Change of Systems and Surroundings in Various Processes	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Auxiliary State Functions (G and A) and Criteria for Spontaneity and Equilibrium	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC2/GE2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Q&A / Review for Chemical Thermodynamics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Thermodynamic Conditions for Equilibrium; Degree of Advancement	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains	Listens and writes	Understanding and apply
Class 14	Free Energy Variation with Degree of Advancement; Equilibrium Constant & Gibbs Free Energy	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Definitions of KP, KC, and KX; Relations Among Them	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Van't Hoff's Reaction Isotherm, Isobar, and Isochore	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Shifting of Equilibrium: Temperature and Pressure Changes	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 18	Equilibrium Constant Variation with Addition of Inert Gas; Le Chatelier's Principle	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Q&A / Review for Chemical Equilibrium	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 20	Ideal Solutions and Raoult's Law	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Non-Ideal Solutions: Deviations from Raoult's Law	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with board work	Listens and practice with teacher	Understanding
Class 22	Vapour Pressure-Composition & Temperature-Composition Curves	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC2/GE2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 23	Distillation of Solutions; Lever Rule; Azeotropes	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 24	Nernst Distribution Law and Its Applications; Solvent Extraction	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Q&A / Review for Solutions	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 26	Phases, Components, and Degrees of Freedom; Phase Equilibrium Criteria	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Gibbs Phase Rule; Clausius-Clapeyron Equation Derivation & Importance	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 28	Phase Diagrams of One-Component Systems (Water and CO_2)	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Forms of Solids; Crystal Systems; Unit Cells	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 30	Bravais Lattice Types; Symmetry Elements	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Laws of Crystallography; Law of Constancy of Interfacial Angles & Rational Indices	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 32	Miller Indices, Interplanar Distance, and Bragg's Law	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC2/GE2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 33	Q&A / Review for Phase Equilibria and Solids	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 34	Alkanes (up to 5 Carbons): Preparation (Catalytic Hydrogenation, Wurtz Reaction, Kolbe's Synthesis)	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Alkenes (up to 5 Carbons): Preparation (Elimination Reactions, Cis & Trans Formation)	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Alkenes: Reactions (Bromine Addition, Markownikoff's and Anti-Markownikoff's Addition, Ozonolysis)	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Alkynes (up to 5 Carbons): Preparation and Reactions (Metal Acetylides, Hydration)	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 38	Q&A / Review for Aliphatic Hydrocarbons	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Error Analysis: Accuracy, Precision, Types of Errors; Least Squares and Standard Deviations	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with board work	Listens and practice with teacher	Understanding
Class 40	Computer Applications: General Introduction, Hardware, Software, Input and Output Devices	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC3/GE3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Chemical Bonding: Overview, ionic bonding, lattice energy, solvation energy, and stability of ionic compounds.	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains with examples	Listens and writes	Understanding and apply
Class 02	Born-Landé Equation and Born-Haber Cycle: Applications and importance.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Polarizing Power, Polarizability, and Fajan's Rules: Ionic character in covalent compounds.	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Bond and Dipole Moments: Percentage ionic character and examples.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Covalent Bonding: VSEPR theory and hybridization (linear, trigonal planar, square planar).	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with examples	Listens and writes	Understanding and apply
Class 06	Hybridization: Tetrahedral, trigonal bipyramidal, and octahedral arrangements.	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Resonance and Resonating Structures: Examples in inorganic and organic compounds.	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains with board work	Listens and writes	Analyze
Class 08	Molecular Orbital (MO) Theory I: LCAO method, bonding, antibonding MOs.	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	MO Theory II: Homonuclear and heteronuclear diatomic molecules (CO, NO, NO+).	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains with board work	Listens and writes	Analyze
Class 10	Comparison of VB and MO Theories: Key differences and applications.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Group III Elements: Trends and compounds of B, Al, Ga, In, Tl.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC3/GE3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Group IV Elements: Trends and compounds of C, Si, Ge, Sn, Pb.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Group V Elements: Trends and compounds of N, P, As, Sb, Bi.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with examples	Listens and writes	Understanding and apply
Class 14	Group VI Elements: Trends and compounds of O, S, Se, Te.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Group VII Elements: Trends and compounds of F, Cl, Br, I.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with board work	Listens and writes	Analyze
Class 16	Inert Pair Effect: Its implications in different groups.	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Q&A and Review: Addressing doubts from sessions 11–16.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	3d Series Transition Elements: Trends in electronic configuration, valency, and color.	Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co.: New York (1985)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Catalytic and Magnetic Properties: Stability of oxidation states (Mn, Fe, Cu).	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Lanthanoids and Actinoids: Trends, properties, and lanthanide contraction.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Separation of Lanthanides: Ion-exchange method.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with examples	Listens and writes	Understanding and apply
Class 22	Q&A and Review: Summarizing transition metals and lanthanoids.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC3/GE3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 23	Werner's Coordination Theory: Introduction and basic concepts.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and narrates with suitable bord work	Listens	Understanding
Class 24	Valence Bond Theory (VBT): Inner and outer orbital complexes.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Isomerism in Complexes: Structural and stereoisomerism, drawbacks of VBT.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains with examples	Listens and writes	Understanding and apply
Class 26	IUPAC Nomenclature of Complexes: Rules and examples.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Ionic Equilibria I: Electrolytes, ionization constants, and ionic product of water.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and narrates with suitable bord work	Listens	Understanding
Class 28	Ionic Equilibria II: Salt hydrolysis, buffer solutions, solubility, and solubility product.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Conductance I: Specific and molar conductance, Kohlrausch's law.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with examples	Listens and writes	Understanding and apply
Class 30	Conductance II: Applications and conductometric titrations.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Electromotive Force I: Faraday's laws, oxidation/reduction rules, electrolysis.	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains with board work	Listens and writes	Analyze
Class 32	Electromotive Force II: Chemical cells, Nernst equation, and concentration cells.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	pH Determination and Potentiometry: Using electrodes and titrations.	Shriver, D.F. & Atkins, P.W. Inorganic Chemistry, Oxford University Press	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC3/GE3

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 34	Review and Problem Solving: Numerical and conceptual problems.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Q&A: Addressing doubts on Electrochemistry.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 36	Aromatic Hydrocarbons: Benzene preparation and electrophilic substitution reactions.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Organometallic Compounds: Grignard reagents and Reformatsky reaction.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains with examples	Listens and writes	Understanding and apply
Class 38	Aryl Halides: Preparation, Sandmeyer reaction, and nucleophilic substitution.	Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Comprehensive Q&A: Covering doubts from sessions 36–38.	Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)	Explains and narrates with suitable bord work	Listens	Understanding
Class 40	Final Review and Exam Preparation: Overall syllabus recap and mock Q&A.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Preparation of primary alcohols using Grignard reagent and reduction of aldehydes.	Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010	Explains with examples	Listens and writes	Understanding and apply
Class 02	Preparation of secondary and tertiary alcohols; reduction of ketones, carboxylic acids, and esters.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Reactions of alcohols with sodium and oxidation reactions (alkaline KMnO4, acidic dichromate).	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Preparation and mechanism of Pinacol-Pinacolone rearrangement.	Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Preparation of phenols via cumene hydroperoxide method and diazonium salts.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains with board work	Listens and writes	Analyze
Class 06	Acidic nature of phenols; electrophilic substitution reactions: nitration and halogenation.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Reimer-Tiemann reaction, Schotten-Baumann reaction, Fries rearrangement.	https://www.youtube.com/watch?v=3lV7AUXzXeI&pp=ygVIUmVpbWVyLVRpZW1hbm4gcmVhY3Rpb24sIFNjaG90dGVuLUJhdW1hbm4gcmVhY3Rpb24sIEZyaWVzIHJlYXJyYW5nZW1lbnQu	Explains with examples	Listens and writes	Understanding and apply
Class 08	Claisen rearrangement; Preparation of ethers by Williamson's synthesis.	https://www.youtube.com/watch?v=g01PkhFOASM&pp=ygVJQ2xhaXNlbiByZWFycmFuZ2VtZW50OyBQcmVwYXJhdGlvbiBvZiBldGhlcnMgYnkgV2lsbGlhbXNvbuKAmXMgc3ludGhlc2lzLg%3D%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Cleavage of ethers with HI; Review and problem-solving for Alcohols, Phenols, and Ethers.	https://www.youtube.com/watch?v=K6Pj-qOBPwA&pp=ygVZQ2xlYXZhZ2Ugb2YgZXRoZXJzIHdpdGggSEk7IFJldmlldyBhbmQgcHJvYmxlbS1zb2x2aW5nIGZvciBBbGNvaG9scywgUGhlbm9scywgYW5kIEV0aGVycy4%3D	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Q&A session and discussion on common reactions.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Preparation of aldehydes and ketones from acid chlorides, nitriles, and Grignard reagents.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	General properties and reactions of aldehydes and ketones (HCN, NaHSO3, NH2-G derivatives).	Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Tollens' and Fehling's test; iodoform test and aldol condensation (with mechanism).	https://www.youtube.com/watch?v=Msqkh97bQ1Y&pp=ygVXVG9sbGVuc-KAmSBhbmQgRmVobGluZ-KAmXMgdGVzdDsgaW9kb2Zvcm0gdGVzdCBhbmQgYWxkb2wgY29uZGVuc2F0aW9uICh3aXRoIG1lY2hhbmlzbSku	Explains with examples	Listens and writes	Understanding and apply
Class 14	Cannizzaro reaction and mechanism, Wittig reaction, benzoin condensation.	https://www.youtube.com/watch?v=a9673oqiDOE&pp=ygVJQ2Fubml6emFybyByZWFjdGlvbiBhbmQgbWVjaGFuaXNtLCBXaXR0aWcgcmVhY3Rpb24sIGJlbnpvaW4gY29uZGVuc2F0aW9uLg%3D%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Reduction reactions: Clemmensen reduction and Wolff-Kishner reduction.	https://www.youtube.com/watch?v=ZwAtBmxnyBI&pp=ygVGUmVkdWN0aW9uIHJlYWN0aW9uczogQ2xlbW1lbnNlbiByZWR1Y3Rpb24gYW5kIFdvbGZmLUtpc2huZXIgcmVkdWN0aW9uLg%3D%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Strength of organic acids; factors affecting pKa values.	https://www.youtube.com/watch?v=DWF-3mbMcK0&pp=ygU4U3RyZW5ndGggb2Ygb3JnYW5pYyBhY2lkczsgZmFjdG9ycyBhZmZlY3RpbmcgcEthIHZhbHVlcy4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 17	Preparation of carboxylic acids via hydrolysis of esters and Grignard reagents.	https://www.youtube.com/watch?v=ieqppArSxsE&pp=ygVPUHJlcGFyYXRpb24gb2YgY2FyYm94eWxpYyBhY2lkcyB2aWEgaHlkcm9seXNpcyBvZiBlc3RlcnMgYW5kIEdyaWduYXJkIHJlYWdlbnRzLg%3D%3D	Explains with board work	Listens and writes	Analyze
Class 18	Review and Q&A for Carbonyl Compounds and Carboxylic Acids.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Preparation of acid derivatives: acid chlorides, anhydrides, esters, and amides from acids.	https://www.youtube.com/watch?v=SRPQ62dR6b4&pp=ygVbUHJlcGFyYXRpb24gb2YgYWNpZCBkZXJpdmF0aXZlczogYWNpZCBjaGxvcmlkZXMsIGFuaHlkcmlkZXMsIGVzdGVycywgYW5kIGFtaWRlcyBmcm9tIGFjaWRzLg%3D%3D	Explains with examples	Listens and writes	Understanding and apply
Class 20	Interconversion of acid derivatives; Claisen condensation and Perkin reaction.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Preparation of aliphatic and aromatic amines; Hofmann degradation.	Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010	Explains with board work	Listens and writes	Analyze
Class 22	Reactions of amines with HNO2 and distinction tests for 1°, 2°, and 3° amines.	Sethi, A. Conceptual Organic Chemistry; New Age International Publisher	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Diazonium salts: preparation and reactions; nitro compounds reduction under various conditions.	Sethi, A. Conceptual Organic Chemistry; New Age International Publisher	Explains with board work	Listens and writes	Analyze
Class 24	Review and Q&A for Amines, Diazonium salts, and Nitro compounds.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Reduction of nitro compounds (aromatic) under acidic, neutral, and alkaline conditions.	Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 26	Preparation of amino acids (glycine and alanine): Strecker and Gabriel's phthalimide synthesis.	https://www.youtube.com/watch?v=Ahq20vDB40s&pp=ygVhUHJlcGFyYXRpb24gb2YgYW1pbm8gYWNpZHMgKGdseWNpbmUgYW5kIGFsYW5pbmUpOiBTdHJlY2tlciBhbmQgR2FicmllbOKAmXMgcGh0aGFsaW1pZGUgc3ludGhlc2lzLg%3D%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Properties of amino acids: Zwitterion and isoelectric point.	https://www.youtube.com/watch?v=YyFXsHF7jPo&pp=ygU8UHJvcGVydGllcyBvZiBhbWlubyBhY2lkczogWndpdHRlcmlvbiBhbmQgaXNvZWxlY3RyaWMgcG9pbnQu	Explains with board work	Listens and writes	Analyze
Class 28	Classification and general properties of carbohydrates.	Sethi, A. Conceptual Organic Chemistry; New Age International Publisher	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Constitution of glucose and fructose; osazone formation. Oxidation-reduction reactions of glucose and fructose.	Sethi, A. Conceptual Organic Chemistry; New Age International Publisher	Explains and narrates with suitable bord work	Listens	Understanding
Class 30	Ascending (Kiliani-Fischer) and descending (Ruff's) methods in monosaccharides. Mutarotation in monosaccharides.	Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Crystal field effect: Octahedral symmetry, CFSE, and factors affecting Δ. Crystal field effects for weak and strong fields; tetrahedral symmetry.	https://www.youtube.com/watch?v=rNQUmESlb_A&pp=ygWSAUNyeXN0YWwgZmllbGQgZWZmZWN0OiBPY3RhaGVkcmFsIHN5bW1ldHJ5LCBDRlNFLCBhbmQgZmFjdG9ycyBhZmZlY3RpbmcgzpQuIENyeXN0YWwgZmllbGQgZWZmZWN0cyBmb3Igd2VhayBhbmQgc3Ryb25nIGZpZWxkczsgdGV0cmFoZWRyYWwgc3ltbWV0cnku	Explains with examples	Listens and writes	Understanding and apply
Class 32	Spectrochemical series; comparison of CFSE for Oh and Td complexes.	https://www.youtube.com/watch?v=c2O7hJwaYoU&pp=ygVDU3BlY3Ryb2NoZW1pY2FsIHNlcmllczsgY29tcGFyaXNvbiBvZiBDRlNFIGZvciBPaCBhbmQgVGQgY29tcGxleGVzLg%3D%3D	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 33	Jahn-Teller distortion and tetragonal distortion of octahedral geometry; square planar coordination.	https://www.youtube.com/watch?v=-PWDV9vT_9Q&pp=ygVkSmFobi1UZWxsZXIgZGlzdG9ydGlvbiBhbmQgdGV0cmFnb25hbCBkaXN0b3J0aW9uIG9mIG9jdGFoZWRyYWwgZ2VvbWV0cnk7IHNxdWFyZSBwbGFuYXIgY29vcmRpbmF0aW9uLg%3D%3D	Explains with board work	Listens and writes	Analyze
Class 34	Introduction to spectroscopy; wave-particle duality; link between spectroscopy and quantum chemistry.	Mandal, A. K. Degree Physical and General Chemistry Sarat Book House	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Electromagnetic radiation and interaction with matter; types of spectroscopy; atomic vs. molecular spectra.	Mandal, A. K. Degree Physical and General Chemistry Sarat Book House	Explains and narrates with suitable bord work	Listens	Understanding
Class 36	Postulates of quantum mechanics and quantum mechanical operators. Free particle; particle in a 1-D box (solution and quantization).	https://www.youtube.com/watch?v=7TVdth6U4j4&pp=ygWDAVBvc3R1bGF0ZXMgb2YgcXVhbnR1bSBtZWNoYW5pY3MgYW5kIHF1YW50dW0gbWVjaGFuaWNhbCBvcGVyYXRvcnMuIEZyZWUgcGFydGljbGU7IHBhcnRpY2xlIGluIGEgMS1EIGJveCAoc29sdXRpb24gYW5kIHF1YW50aXphdGlvbiku	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Rotational motion: Schrödinger equation for a rigid rotator, quantization, and selection rules.	https://www.youtube.com/watch?v=PTaLlNqVp_Y&pp=ygVgUm90YXRpb25hbCBtb3Rpb246IFNjaHLDtmRpbmdlciBlcXVhdGlvbiBmb3IgYSByaWdpZCByb3RhdG9yLCBxdWFudGl6YXRpb24sIGFuZCBzZWxlY3Rpb24gcnVsZXMu	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Microwave spectroscopy: Rotational spectra of diatomic molecules and structural information.	Mandal, A. K. Degree Physical and General Chemistry Sarat Book House	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Vibrational motion: Schrödinger equation of a linear harmonic oscillator, quantization, and selection rules.	Mandal, A. K. Degree Physical and General Chemistry Sarat Book House	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-CC4/GE4

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 40	IR spectra of diatomic molecules; review and Q&A for spectroscopy and quantum chemistry.	https://www.youtube.com/watch?v=MkS1J9eq-Eo&pp=ygVYSVIgc3BlY3RyYSBvZiBkaWF0b21pYyBtb2xlY3VsZXM7IHJldmlldyBhbmQgUSZBIGZvciBzcGVjdHJvc2NvcHkgYW5kIHF1YW50dW0gY2hlbWlzdHJ5Lg%3D%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to inorganic solids and conventional "heat and beat" methods.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Co-precipitation methods: principles, techniques, and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Listens	Understanding
Class 03	Sol-gel methods: introduction, procedure, and applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Comprehends	Understanding
Class 04	Hydrothermal method: process, advantages, and examples.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Ion-exchange methods and intercalation methods.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 06	Comparative analysis of all synthesis methods.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Listens	Understanding
Class 07	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Solid electrolytes: cationic, anionic, and mixed conductors.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Technological applications of solid electrolytes.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Listens and writes	Analyze
Class 10	Inorganic pigments: colored solids.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	White and black pigments: preparation and applications.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Molecular materials and fullerides: introduction and properties.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 13	One-dimensional metals and molecular magnets.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 14	Inorganic liquid crystals: principles and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 15	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Overview and classification of nanostructures and nanomaterials.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 17	Preparation of gold and silver metallic nanoparticles.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Self-assembled nanostructures: principles and techniques.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Control of nanoarchitecture: one-dimensional control.	Frank J. Ovens, Introduction to Nanotechnology	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Carbon nanotubes: synthesis, structure, and applications.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens	Understanding
Class 21	Inorganic nanowires: synthesis and applications.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Bio-inorganic nanomaterials: DNA and nanomaterials.	Frank J. Ovens, Introduction to Nanotechnology	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Natural and artificial nanomaterials; bio-nano composites.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 24	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Composition and characteristics of cast irons.	Frank J. Ovens, Introduction to Nanotechnology	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 26	Plain carbon and alloy steels: properties and applications.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 27	Copper, aluminum, and their alloys (e.g., duralumin, brasses, bronzes).	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Listens and writes	Analyze
Class 28	Cutting tool materials: superalloys and their applications.	Frank J. Ovens, Introduction to Nanotechnology	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Thermoplastics, thermosets, and composite materials.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Introduction and limitations of conventional engineering materials.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 32	Role of matrix materials in composites.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Classification and properties of composite materials.	Frank J. Ovens, Introduction to Nanotechnology	Explains with board work	Listens	Understanding
Class 34	Metal-matrix composites and polymer-matrix composites.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains with board work	Comprehends	Understanding
Class 35	Fiber-reinforced composites and environmental effects.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	Applications of composite materials.	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains with board work	Comprehends	Understanding
Class 37	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 38	Conducting polymers: introduction and conduction mechanisms.	Shriver & Atkins. Inorganic Chemistry, Peter Alkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, 5th Edition, Oxford University Press (2011-2012)	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 39	Applications of conducting polymers, ion-exchange resins. Ceramic and refractory materials: classification, properties, and applications	Adam, D.M. Inorganic Solids: An introduction to concepts in solid-state structural chemistry.	Explains and narrates with suitable bord work	Comprehends	Understanding
Class 40	Q&A and revision	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Glassy state: properties and classification (silicate and non-silicate glasses).	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Manufacture and processing of glass.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with board work	Listens	Understanding
Class 03	Composition and properties of soda lime, lead, and armoured glass.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Safety, borosilicate, fluorosilicate, coloured, and photosensitive glass.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Important clays and feldspar: types and properties.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with board work	Comprehends	Understanding
Class 06	Types and manufacture of ceramics.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains with board work	Listens	Understanding
Class 07	High-technology ceramics, superconducting, and semiconducting oxides.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Fullerenes, carbon nanotubes, and carbon fibers.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Classification of cement and role of ingredients.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with board work	Listens and writes	Analyze
Class 10	Manufacture and setting process of cement, including quick-setting cements.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Q&A and revision for Glass, Ceramics, and Cements	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 12	Types of fertilizers: classification and importance.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with board work	Comprehends	Understanding
Class 13	Manufacture of urea and ammonium nitrate.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Manufacture of calcium ammonium nitrate, ammonium phosphates, and polyphosphates.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains with board work	Comprehends	Understanding
Class 15	Manufacture of superphosphate, compound fertilizers, potassium chloride, and potassium sulfate.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with board work	Listens	Understanding
Class 16	Objectives of surface coatings and preliminary surface treatment.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains with board work	Comprehends	Understanding
Class 17	Classification of surface coatings: paints, pigments, and their formulation.	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Oil paints, vehicles, modified oils, pigments, thinners, and fillers.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with board work	Comprehends	Understanding
Class 19	Special paints: heat retardant, fire retardant, eco-friendly, and plastic paints.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Metallic coatings: electrolytic, electroless, metal spraying, and anodizing.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 21	Q&A and revision for Fertilizers and Surface Coatings	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 22	Primary and secondary batteries: components and characteristics.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 23	Working of Pb-acid, lithium batteries, and solid-state electrolyte batteries.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains with board work	Comprehends	Understanding
Class 24	Fuel cells, solar cells, and polymer cells.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and narrates with suitable bord work	Listens and practice with teacher	Understanding and apply
Class 25	Classification of alloys: ferrous and non-ferrous.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with board work	Listens	Understanding
Class 26	Specific properties of elements in alloys.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 27	Manufacture of steel: silicon removal, decarbonization, and demanganization.	E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 28	Desulphurization, dephosphorisation, annealing, and heat treatment of steel.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 29	Nitriding and carburizing processes.	W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Composition and properties of different types of steels.	J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 31	Q&A and revision for Batteries, Cells, and Alloys	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 32	General principles and properties of catalysts.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains and narrates with suitable bord work	Listens	Understanding
Class 33	Homogeneous catalysis: steps, examples, and industrial applications.	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains with board work	Listens	Understanding
Class 34	Heterogeneous catalysis: steps, examples, and industrial applications.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Deactivation, regeneration, phase-transfer catalysts, and zeolites as catalysts.	P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 36	Origin of explosive properties in organic compounds.	R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 37	Preparation and explosive properties of lead azide, PETN, and cyclonite (RDX).	R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas, Publications, New Delhi.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 38	Introduction to rocket propellants.	Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996)	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 39	Q&A and revision for Catalysts, Explosives, and Rocket Propellants	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-A-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 40	Comprehensive Q&A and review of all topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Definition and concept of Green Chemistry.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with examples	Listens and writes	Understanding and apply
Class 02	Need for Green Chemistry: environmental, economic, and societal factors.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Goals of Green Chemistry: sustainability, efficiency, and safety.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Limitations and obstacles in achieving Green Chemistry goals.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Q&A and revision on Green Chemistry basics	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 06	Overview of the Twelve Principles of Green Chemistry.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Principle 1: Prevention of waste/byproducts and its applications.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with board work	Listens and writes	Analyze
Class 08	Principle 2: Atom economy – explanation, examples, and calculations for rearrangement, addition, substitution, and elimination reactions.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Principle 3: Designing safer chemicals and reducing toxicity.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with board work	Listens and writes	Analyze

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Principle 4: Use of safer solvents and auxiliaries – green solvents (supercritical fluids, water, ionic liquids, PEG, and solventless processes).	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Principles 5-7: Energy efficiency, renewable feedstocks, and reduction of derivatives.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Principle 8: Use of catalytic reagents over stoichiometric reagents – catalysis and green chemistry.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Principles 9-12: Biodegradability, real-time monitoring, accident prevention, and reduced environmental impact.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with examples	Listens and writes	Understanding and apply
Class 14	Q&A and discussion on the Twelve Principles	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Green Synthesis of adipic acid, catechol, and disodium iminodiacetate.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains with board work	Listens and writes	Analyze
Class 16	Microwave-assisted reactions in water: Hofmann Elimination and oxidation of toluene and alcohols.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Microwave-assisted reactions in organic solvents: Diels-Alder and decarboxylation reactions.	https://www.youtube.com/watch?v=4YQov_xXspk&pp=ygVcTWljcm93YXZlLWFzc2lzdGVkIHJlYWN0aW9ucyBpbiBvcmdhbmljIHNvbHZlbnRzOiBEaWVscy1BbGRlciBhbmQgZGVjYXJib3h5bGF0aW9uIHJlYWN0aW9ucy4%3D	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	Ultrasound-assisted reactions: Simmons-Smith Reaction and applications.	https://www.youtube.com/watch?v=W38aZ6XWJps&pp=ygVHVWx0cmFzb3VuZC1hc3Npc3RlZCByZWFjdGlvbnM6IFNpbW1vbnMtU21pdGggUmVhY3Rpb24gYW5kIGFwcGxpY2F0aW9ucy4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Green counterparts of organic reactions: Aldol, Friedel-Crafts, Michael, and Knoevenagel condensations.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens	Understanding
Class 20	Cannizzaro, benzoin condensation, and Dieckmann condensation using green methods.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Rearrangement reactions by green approach: Fries and Claisen rearrangements.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with examples	Listens and writes	Understanding and apply
Class 22	Beckmann rearrangement and Baeyer-Villiger oxidation.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Q&A and revision on Green Synthesis and Techniques	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 24	Oxidation reagents and catalysts: green methods and applications.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Biomimetic and multifunctional reagents: principles and examples.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains with examples	Listens and writes	Understanding and apply
Class 26	Combinatorial Green Chemistry and solventless reactions.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 27	Green chemistry in sustainable development.	Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 28	Q&A and revision on Oxidation and Catalysis	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Hoffmann's exhaustive methylation and Emde's modification.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with examples	Listens and writes	Understanding and apply
Class 30	Structure elucidation and physiological action of Nicotine and Hygrine.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Medicinal importance of Quinine, Morphine, Cocaine, and Reserpine.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains with board work	Listens and writes	Analyze
Class 32	Natural occurrence and synthesis of Hygrine.	Ahluwalia, V. K & Kidwai, M. R. New Trends in Green Chemistry, Anamalaya Publishers, 2005	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 33	Q&A and revision on Natural Products and Medicinal Chemistry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 34	Occurrence and classification of terpenes.	Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Isoprene rule: applications and significance.	Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).	Explains with board work	Listens and writes	Analyze
Class 36	Structure elucidation of citral.	Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Synthesis and applications of citral.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-1

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 38	Q&A and revision on Isoprenoids and Terpenes	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Comprehensive review of the syllabus with integrated Q&A.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 40	Case studies, real-world applications, and final clarifications.	Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Origin of spectra and interaction of radiation with matter.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 02	Fundamental laws of spectroscopy and selection rules.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Validity of Beer-Lambert's law and its applications.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Basic principles of UV-Visible spectrometry: choice of source, monochromator, and detector for single and double beam instruments.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Quantitative analysis: estimation of metal ions from aqueous solution and analysis of geometrical isomers.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains with board work	Listens and writes	Analyze
Class 06	Keto-enol tautomers and determination of metal complex composition using Job's method and mole ratio method.	Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Q&A and revision for UV-Visible spectrometry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Basic principles of IR spectrometry: instrumentation (choice of source, monochromator, and detector).	https://www.youtube.com/watch?v=7P_p_VnuOFo&pp=ygVlQmFzaWMgcHJpbmNpcGxlcyBvZiBJUiBzcGVjdHJvbWV0cnk6IGluc3RydW1lbnRhdGlvbiAoY2hvaWNlIG9mIHNvdXJjZSwgbW9ub2Nocm9tYXRvciwgYW5kIGRldGVjdG9yKS4%3D	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 09	Sampling techniques in IR spectroscopy.	Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974	Explains with board work	Listens and writes	Analyze
Class 10	Interpretation of IR data for structural elucidation.	https://www.youtube.com/watch?v=xEFItMymtmU&pp=ygUnU2FtcGxpbmcgdGVjaG5pcXVlcyBpbiBJUiBzcGVjdHJvc2NvcHku	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Effect and importance of isotope substitution in spectrometry.	https://www.youtube.com/watch?v=C6_v5PtSAnE&pp=ygU-RWZmZWN0IGFuZCBpbXBvcnRhbmNlIG9mIGlzb3RvcGUgc3Vic3RpdHV0aW9uIGluIHNwZWN0cm9tZXRyeS4%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Q&A and revision for IR spectrometry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Flame atomic absorption and emission spectrometry: principles and instrumentation.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 14	Choice of flame, burner designs, and atomization techniques.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Methods of background correction and chemical interference removal.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and narrates with suitable bord work	Listens	Understanding
Class 16	Quantitative estimation of trace metal ions from water samples.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Q&A and revision for atomic spectrometry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 18	Theory of thermogravimetry: principles and applications.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Instrumentation and techniques for quantitative estimation of calcium and magnesium in mixtures.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains with examples	Listens and writes	Understanding and apply
Class 20	Q&A and revision for thermogravimetry	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 21	Classification of electroanalytical methods: pH metric, potentiometric, and conductometric titrations.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains with board work	Listens and writes	Analyze
Class 22	Determination of equivalence points in titrations.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 23	Techniques for determining pKa values.	https://www.youtube.com/watch?v=JjMHbN3BdBs&pp=ygUmVGVjaG5pcXVlcyBmb3IgZGV0ZXJtaW5pbmcgcEthIHZhbHVlcy4%3D	Explains with board work	Listens and writes	Analyze
Class 24	Q&A and revision for electroanalytical methods	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 25	Classification, principles, and efficiency of solvent extraction.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains with examples	Listens and writes	Understanding and apply
Class 26	Mechanisms: extraction by solvation and chelation.	Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 27	Techniques of solvent extraction: batch, continuous, and counter-current extraction.	Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.	Explains with board work	Listens and writes	Analyze
Class 28	Qualitative and quantitative aspects: extraction of metal ions and organic species.	Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 29	Q&A and revision for solvent extraction.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 30	Classification, principles, and efficiency of chromatographic techniques.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 31	Mechanisms of separation: adsorption, partition, and ion exchange.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 32	Development of chromatograms: frontal, elution, and displacement methods.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains with examples	Listens and writes	Understanding and apply
Class 33	Qualitative and quantitative aspects of IC, GLC, GPC, TLC, and HPLC.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with board work	Listens and writes	Analyze
Class 34	Q&A and revision for chromatography	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 35	Measurement of optical rotation and calculation of enantiomeric excess (ee) and diastereomeric excess (de) ratios.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan on "ANALYTICAL METHODS IN CHEMISTRY"

B.Sc. Chemistry (General)

Paper: CEMG-DSE-B-2

(Credits: Theory-04)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 36	Determination of enantiomeric composition using NMR, chiral solvents, and chiral shift reagents.	Willard, H.H. et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 37	Chiral chromatographic techniques: chiral columns in GC and HPLC.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains and narrates with suitable bord work	Listens	Understanding
Class 38	Q&A and revision for stereoisomeric analysis	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 39	Role of computers in instrumental methods of analysis.	Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6thEd., Pearson, 2009.	Explains with examples	Listens and writes	Understanding and apply
Class 40	Comprehensive review of all topics and final Q&A	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan
B.Sc. Chemistry (General)
Paper: CEMG-SEC-A1
(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Introduction to Analytical Chemistry: Interdisciplinary nature, concept of sampling, importance of accuracy, precision, and errors in analytical measurements.	Willard, H. H. Instrumental Methods of Analysis, CBS Publishers.	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Presentation of experimental data and significant figures.	Skoog & Lerry. Instrumental Methods of Analysis, Saunders College Publications, New York.	Explains with board work	Listens	Understanding
Class 03	Composition of soil, concept of pH, and pH measurement.	Skoog & Lerry. Instrumental Methods of Analysis, Saunders College Publications, New York.	Explains with board work	Comprehends	Understanding
Class 04	Complexometric titrations: Chelation, chelating agents, and use of indicators.	Willard, H. H. Instrumental Methods of Analysis, CBS Publishers.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Determination of pH of soil samples (Practical).	Skoog, D.A.; West, D.M. & Holler, F.J. Fundamentals of Analytical Chemistry 6th Ed., Saunders College Publishing, Fort Worth (1992).	Explains with board work	Comprehends	Understanding
Class 06	Estimation of calcium and magnesium ions as calcium carbonate by complexometric titration (Practical).	Skoog, D.A.; West, D.M. & Holler, F.J. Fundamentals of Analytical Chemistry 6th Ed., Saunders College Publishing, Fort Worth (1992).	Explains with board work	Listens	Understanding
Class 07	Q&A and recap of soil analysis topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Definition of pure water, sources of contamination, and water sampling methods.	Dean, J. A. Analytical Chemistry Notebook, McGraw Hill.	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Water purification methods.	Day, R. A. & Underwood, A. L. Quantitative Analysis, Prentice Hall of India.	Explains with board work	Listens and writes	Analyze
Class 10	Determination of pH, acidity, and alkalinity of a water sample (Practical).	Freifelder, D. Physical Biochemistry 2nd Ed., W.H. Freeman and Co., N.Y. USA (1982).	Explains with board work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-A1

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 11	Determination of dissolved oxygen (DO) of a water sample (Practical).	Cooper, T.G. The Tools of Biochemistry, John Wiley and Sons, N.Y. USA. 16 (1977).	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Q&A and recap of water analysis topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Nutritional value of foods, food processing, preservation, and adulteration.	Vogel, A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Prentice Hall.	Explains with board work	Listens and practice with teacher	Understanding and apply
Class 14	Identification of adulterants in food items (Practical).	Robinson, J.W. Undergraduate Instrumental Analysis 5th Ed., Marcel Dekker, Inc., New York	Explains with board work	Comprehends	Understanding
Class 15	Analysis of preservatives and coloring matter in food (Practical).	Willard, H. H. Instrumental Methods of Analysis, CBS Publishers.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 16	Q&A and recap of food analysis topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Principles of chromatography, paper chromatography, and TLC.	Skoog & Lerry. Instrumental Methods of Analysis, Saunders College Publications, New York.	Explains and narrates with suitable bord work	Listens	Understanding
Class 18	Paper chromatographic separation of metal ions (Fe^{3+} and Al^{3+}) and TLC comparison of paint samples (Practical).	Willard, H. H. Instrumental Methods of Analysis, CBS Publishers.	Explains with board work	Comprehends	Understanding
Class 19	Ion-exchange chromatography and determination of ion-exchange capacity.	Skoog, D.A.; West, D.M. & Holler, F.J. Fundamentals of Analytical Chemistry 6th Ed., Saunders College Publishing, Fort Worth (1992).	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Analysis of cosmetics: Deodorants, antiperspirants, and talcum powder	Skoog, D.A.; West, D.M. & Holler, F.J. Fundamentals of Analytical Chemistry 6th Ed., Saunders College Publishing, Fort Worth (1992).	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-A2

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Biological importance of carbohydrates and their role in metabolism.	Cooper, T.G. Tool of Biochemistry. Wiley-Blackwell (1977).	Explains and narrates with suitable bord work	Listens	Understanding
Class 02	Cellular currency of energy (ATP), glycolysis, and fermentation processes (alcoholic and lactic acid fermentations).	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with board work	Listens	Understanding
Class 03	Krebs cycle and its significance in metabolism. Isolation and characterization of polysaccharides (Practical).	Varley, H., Gowenlock, A.H & Bell, M.: Practical Clinical Biochemistry, Heinemann, London (1980).	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 04	Classification and biological importance of proteins.	Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.	Explains and narrates with suitable bord work	Listens	Understanding
Class 05	Primary, secondary, and tertiary structures of proteins: α-helix and β-pleated sheets.	Berg, J.M., Tymoczko, J.L. & Stryer, L. Biochemistry, W.H. Freeman, 2002.	Explains with board work	Comprehends	Understanding
Class 06	Isolation, characterization, and denaturation of proteins (Practical).	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains with board work	Listens	Understanding
Class 07	Enzymes: Nomenclature, characteristics (including ribozymes), and classification.	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 08	Active site, mechanism of enzyme action, stereospecificity, coenzymes, and cofactors.	O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961	Explains and narrates with suitable bord work	Listens and practice	Understanding
Class 09	Enzyme inhibitors and introduction to biocatalysis with applications in green chemistry and the chemical industry.	Cooper, T.G. Tool of Biochemistry. Wiley-Blackwell (1977).	Explains with board work	Listens and writes	Analyze
Class 10	Lipids: Classification and biological importance of triglycerides, phosphoglycerides, and cholesterol.	Wilson, K. & Walker, J. Practical Biochemistry. Cambridge University Press (2009).	Explains with board work	Listens	Understanding
Class 11	Lipid membranes, liposomes, their functions, and applications.	Varley, H., Gowenlock, A.H & Bell, M.: Practical Clinical Biochemistry, Heinemann, London (1980).	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-A2

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 12	Lipoproteins: Properties, functions, and biochemical functions of steroid hormones.	Devlin, T.M., Textbook of Biochemistry with Clinical Correlations, John Wiley & Sons, 2010.	Explains with board work	Comprehends	Understanding
Class 13	Biochemistry of peptide hormones and their biological roles.	Berg, J.M., Tymoczko, J.L. & Stryer, L. Biochemistry, W.H. Freeman, 2002.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 14	Structure of DNA (Watson-Crick model) and RNA, and the genetic code.	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains with board work	Comprehends	Understanding
Class 15	Biological roles of DNA and RNA: Replication, transcription, and translation.	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.	Explains with board work	Listens	Understanding
Class 16	Introduction to gene therapy and its significance.	O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961	Explains with board work	Comprehends	Understanding
Class 17	Biochemistry of diseases: Diagnostic approach through blood and urine analysis.	Talwar, G.P. & Srivastava, M. Textbook of Biochemistry and Human Biology, 3rd Ed. PHI Learning.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 18	Blood: Composition, functions, coagulation, collection, and preservation.	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.	Explains with board work	Comprehends	Understanding
Class 19	Estimation and interpretation of blood sugar, urea, creatinine, cholesterol, and bilirubin.	O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods, D. Van Nostrand & Co., 1961	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 20	Urine: Collection, preservation, formation, composition, and estimation of normal and pathological constituents.	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry, W.H. Freeman, 2013.	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B3

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	Drug discovery, design, and development: Overview of the basic retrosynthetic approach.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains with board work	Listens	Understanding
Class 02	Synthesis of analgesic agents: Aspirin, paracetamol, and ibuprofen.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Synthesis of antipyretic agents: Paracetamol and ibuprofen.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 04	Synthesis of anti-inflammatory agents: Aspirin, paracetamol, and ibuprofen.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Synthesis of antibiotics: Chloramphenicol.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 06	Synthesis of antibacterial and antifungal agents: Sulphonamides (Sulphanethoxazol, Sulphacetamide, Trimethoprim).	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Synthesis of antiviral agents: Acyclovir.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 08	Synthesis of Central Nervous System agents: Phenobarbital, Diazepam.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains with board work	Listens and practice with teacher	Understanding
Class 09	Synthesis of cardiovascular drugs: Glyceryl trinitrate.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B3

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 10	Synthesis of antilaprosy drug: Dapsone.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Synthesis of HIV-AIDS related drugs: AZT (Zidovudine).	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains with examples	Listens and writes	Understanding and apply
Class 12	Aerobic fermentation: Process and applications.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Anaerobic fermentation: Process and applications.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains	Listens and writes	Understanding and apply
Class 14	Production of ethyl alcohol and citric acid via fermentation.	Patrick, G. L. Introduction to Medicinal Chemistry, Oxford University Press, UK, 2013.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Production of antibiotics via fermentation: Penicillin, Cephalosporin, Chloromycetin, and Streptomycin.	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and narrates with suitable bord work	Listens and writes	Analyze
Class 16	Production of amino acids and vitamins via fermentation: Lysine, Glutamic acid, Vitamin B2, Vitamin B12, and Vitamin C.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Overview of industrial fermentation processes and their biotechnological significance.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains with practical examples in computer	Listens and writes	Understanding and apply
Class 18	Fermentation-based production of biofuels and other pharmaceuticals.	Foye, W.O., Lemke, T.L. & William, D.A.: Principles of Medicinal Chemistry, 4th ed., B..I. Waverly Pvt. Ltd. New Delhi	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B3

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 19	Q&A and recap of drug synthesis and fermentation topics.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 20	Applications of drug synthesis and fermentation in the pharmaceutical and biotechnology industries	Singh, H. & Kapoor, V.K. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi, 2012.	Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B4

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 01	General introduction to pesticides: Natural and synthetic types.	https://www.youtube.com/watch?v=MAlfQJlFIS0&pp=ygVAR2VuZXJhbCBpbnRyb2R1Y3Rpb24gdG8gcGVzdGljaWRlczogTmF0dXJhbCBhbmQgc3ludGhldGljIHR5cGVzLg%3D%3D	Explains with examples	Listens and writes	Understanding and apply
Class 02	Benefits and adverse effects of pesticides.	R. Cremlyn: Pesticides, John Wiley	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 03	Changing concepts of pesticides and their regulation.	https://www.youtube.com/watch?v=WhbAswK1qZs&pp=ygU1Q2hhbmdpbmcgY29uY2VwdHMgb2YgcGVzdGljaWRlcyBhbmQgdGhlaXIgcmVndWxhdGlvbi4%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 04	Structure-activity relationship (SAR) in pesticides.	https://www.youtube.com/watch?v=djwFQwy4WF0&pp=ygU0U3RydWN0dXJlLWFjdGl2aXR5IHJlbGF0aW9uc2hpcCAoU0FSKSBpbiBwZXN0aWNpZGVzLg%3D%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 05	Synthesis and technical manufacture of pesticides.	R. Cremlyn: Pesticides, John Wiley	Explains with board work	Listens and writes	Analyze
Class 06	Uses and applications of representative pesticides: Organochlorines (DDT, Gammexene).	https://www.youtube.com/watch?v=PBCIVmMo1vs&pp=ygVVVXNlcyBhbmQgYXBwbGljYXRpb25zIG9mIHJlcHJlc2VudGF0aXZlIHBlc3RpY2lkZXM6IE9yZ2Fub2NobG9yaW5lcyAoRERULCBHYW1tZXhlbmUpLg%3D%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 07	Uses and applications of representative pesticides: Organophosphates (Malathion, Parathion).	https://www.youtube.com/watch?v=ZJi65oFjwkE&pp=ygVcVXNlcyBhbmQgYXBwbGljYXRpb25zIG9mIHJlcHJlc2VudGF0aXZlIHBlc3RpY2lkZXM6IE9yZ2Fub3Bob3NwaGF0ZXMgKE1hbGF0aGlvbiwgUGFyYXRoaW9uKS4%3D	Explains with examples	Listens and writes	Understanding and apply

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B4

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 08	Uses and applications of representative pesticides: Carbamates (Carbofuran, Carbaryl).	https://www.youtube.com/watch?v=5bJi8cigPdk&pp=ygVWVXNlcyBhbmQgYXBwbGljYXRpb25zIG9mIHJlcHJlc2VudGF0aXZlIHBlc3RpY2lkZXM6IENhcmJhbWF0ZXMgKENhcmJvZnVyYW4sIENhcmJhcnlsKS4%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 09	Uses and applications of representative pesticides: Quinones (Chloranil).	R. Cremlyn: Pesticides, John Wiley	Explains with board work	Listens and writes	Analyze
Class 10	Uses and applications of representative pesticides: Anilides (Alachlor, Butachlor).	https://www.youtube.com/watch?v=M0wznAjBKJ4&pp=ygVTVXNlcyBhbmQgYXBwbGljYXRpb25zIG9mIHJlcHJlc2VudGF0aXZlIHBlc3RpY2lkZXM6IEFuaWxpZGVzIChBbGFjaGxvciwgQnV0YWNobG9yKS4%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 11	Mechanism of action of organochlorine pesticides.	https://www.youtube.com/watch?v=vZHLgV6A6sg&pp=ygUxTWVjaGFuaXNtIG9mIGFjdGlvbiBvZiBvcmdhbm9jaGxvcmluZSBwZXN0aWNpZGVzLg%3D%3D	Explains and narrates with suitable bord work	Listens	Understanding
Class 12	Mechanism of action of organophosphate pesticides.	R. Cremlyn: Pesticides, John Wiley	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 13	Mechanism of action of carbamate pesticides.	https://www.youtube.com/watch?v=ELyqEmXEqo4&pp=ygUsTWVjaGFuaXNtIG9mIGFjdGlvbiBvZiBjYXJiYW1hdGUgcGVzdGljaWRlcy4%3D	Explains with examples	Listens and writes	Understanding and apply
Class 14	Environmental impact of pesticide use.	https://www.youtube.com/watch?v=LwILnNS0VkU&pp=ygUmRW52aXJvbm1lbnRhbCBpbXBhY3Qgb2YgcGVzdGljaWRlIHVzZS4%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 15	Pesticide resistance: Causes and management.	R. Cremlyn: Pesticides, John Wiley	Explains and narrates with suitable bord work	Listens	Understanding

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Lecture Plan

B.Sc. Chemistry (General)

Paper: CEMG-SEC-B4

(Credits: Theory-02)

Class	Content	Suggested Books / Links	Faculty approach	Student Activity	Learning Outcome
Class 16	Pesticide degradation and persistence in the environment.	https://www.youtube.com/watch?v=LZ-3QKqmC74&pp=ygU5UGVzdGljaWRlIGRlZ3JhZGF0aW9uIGFuZCBwZXJzaXN0ZW5jZSBpbiB0aGUgZW52aXJvbm1lbnQu	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 17	Health and safety concerns related to pesticide exposure.	https://www.youtube.com/watch?v=B1ubWgAEx_c&pp=ygU5SGVhbHRoIGFuZCBzYWZldHkgY29uY2VybnMgcmVsYXRlZCB0byBwZXN0aWNpZGUgZXhwb3N1cmUu	Explains with board work	Listens and writes	Analyze
Class 18	Pesticide residue analysis and regulatory standards.	https://www.youtube.com/watch?v=eiO-Cqzqd04&pp=ygU0UGVzdGlqaWRlIHJlc2lkdWUgYW5hbHlzaXMgYW5kIHJlZ3VsYXRvcnkgc3RhbmRhcmRzLg%3D%3D	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply
Class 19	Alternatives to chemical pesticides: Biological and integrated pest management.	R. Cremlyn: Pesticides, John Wiley	Explains with examples	Listens and writes	Understanding and apply
Class 20	Q&A and recap of pesticide chemistry, benefits, and risks.	Link : https://drive.google.com/drive/folders/1akkuttfUkyTx6purQDvPf7tS-QQg4NX0	Recap from previous class, Explains and Narrates with suitable board work	Listens and practice with teacher	Understanding and apply