Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-1-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Quantum Numbers	Visual aids (atomic models, electron cloud diagrams)	Define quantum numbers and their role in describing the position and energy of electrons in an atom	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Principal Quantum Number (nnn)	Diagrams, energy level charts	Explain the principal quantum number, its significance in determining energy levels and size of orbitals	Solve problems related to energy levels in hydrogen-like atoms	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Azimuthal Quantum Number (lll)	Orbital shapes (s, p, d, f), 3D animations	Discuss the azimuthal quantum number, its link to orbital shapes, and its range based on nnn	Observe animations, sketch orbital shapes	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Magnetic Quantum Number (mlm_lml)	Orbital orientation diagrams	Explain the magnetic quantum number, its role in orbital orientation, and its range of values	Relate mlm_lml values to specific orbital orientations	Understand, Apply, Logical-Mathematical
41-50	Spin Quantum Number (msm_sms)	Electron spin diagrams, comparative tables	Introduce the spin quantum number, its values, and its role in electron pairing	Solve spin-related problems, participate in discussions	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications of Quantum Numbers	Summary notes, periodic table analysis	Summarize quantum numbers, and discuss their application in electronic configuration and periodic trends	Summarize in their own words, relate to periodic table properties	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-1-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Bonding	Molecular models, periodic table references	Define chemical bonding and its importance; introduce hybridization and resonance as advanced concepts	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Concept of Hybridization	Orbital overlap diagrams, 3D molecular animations	Explain hybridization (sp, sp^2, sp^3), its types, and significance in molecular geometry and bonding	Sketch hybridized orbital diagrams, solve related exercises	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Resonance: Theory and Representation	Resonance structures, examples (e.g., benzene, carbonate ion)	Explain resonance: delocalization of electrons, resonance structures, and resonance energy	Draw resonance structures for given molecules	Apply, Analyze, Logical-Mathematical
31-40	Bonding Types and Strengths	Bond energy charts, diagrams of covalent and ionic bonds	Discuss covalent, ionic, and metallic bonds; explain factors influencing bond strength and length	Compare bond types in group discussions, solve bond energy problems	Understand, Analyze, Logical-Mathematical, Interpersonal
41-50	Applications in Molecular Structures	Case studies, examples (e.g., methane, ethylene, benzene)	Relate hybridization and resonance to molecular geometry and stability in real molecules	Solve structural questions, analyze molecule examples	Apply, Evaluate, Logical-Mathematical, Visual-Spatial
51-60	Summary and Practical Relevance	Summary notes, industrial examples	Recap key concepts, and discuss the relevance of hybridization and resonance in material design and reactivity	Summarize in their own words, reflect on real-world implications	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-1-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Kinetic Theory of Gases	Animated visuals, gas molecule simulations	Define kinetic theory of gases and its key assumptions about molecular motion	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Concept of Pressure	Diagrams of gas molecules colliding with walls	Explain how molecular collisions with container walls create pressure; derive the pressure equation	Observe visuals, solve problems using the pressure equation	Understand, Apply, Logical-Mathematical
21-30	Concept of Temperature	Energy diagrams, kinetic energy distribution charts	Relate temperature to the average kinetic energy of gas molecules and its connection to molecular motion	Discuss examples of temperature affecting molecular motion	Apply, Analyze, Logical-Mathematical
31-40	Collisions of Gas Molecules	Animations of gas molecule collisions, velocity distribution graphs	Explain molecular collisions, mean free path, and their impact on gas behavior	Analyze animations, solve related numerical problems	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Collision Diameter and Its Significance	Diagrams and comparative tables	Define collision diameter; explain its role in determining molecular interactions and collision frequency	Solve problems related to collision diameter and mean free path	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications	Summary notes, real-world examples (e.g., diffusion, effusion)	Recap key concepts and discuss the applications of kinetic theory in understanding real gas behavior	Summarize in their own words, connect concepts to practical applications	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-1-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Viscosity	Fluid flow simulations, viscosity examples	Define viscosity and explain its significance in understanding fluid resistance to flow	Note-taking, discussing examples of high and low-viscosity fluids	Remember, Understand, Linguistic, Logical-Mathematical
11-20	General Features of Fluid Flow	Flow diagrams (laminar and turbulent), animations	Explain types of fluid flow (laminar vs. turbulent); introduce the concept of streamlines	Observe flow animations, identify flow patterns in given scenarios	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Newton's Equation for Viscosity	Diagrams of shear forces in fluids, derivations	Derive Newton's law of viscosity and discuss its components	Solve numerical problems using Newton's equation	Apply, Analyze, Logical-Mathematical
31-40	Viscosity Coefficient (η)	Charts, units of viscosity, and comparative examples	Define viscosity coefficient; explain its dependence on temperature and molecular interactions	Compare viscosity coefficients of different fluids	Understand, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Poiseuille's Equation and Applications	Flowcharts, experimental data plots	Derive Poiseuille's equation for laminar flow in a cylindrical tube; discuss applications (e.g., blood flow)	Solve problems using Poiseuille's equation; analyze fluid flow rates	Apply, Evaluate, Logical-Mathematical, Intrapersonal
51-60	Summary and Practical Implications	Summary notes, real-world examples	Recap the key principles; discuss the relevance of viscosity in engineering, biology, and industrial processes	Summarize key concepts, reflect on applications (e.g., oil pipelines, healthcare)	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-2-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Chirality and Stereoaxis	3D molecular models, chirality animations	Define chirality and explain how chirality arises from stereoaxis rather than a chiral center	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Structure of Cumulenes and Stereoaxis	Molecular diagrams, cumulative double bond visuals	Explain the structure of cumulenes, and discuss the origin of chirality in cumulenes with stereoaxis	Observe 3D models, sketch molecular diagrams	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Even and Odd Double Bonds in Cumulenes	Comparative diagrams, stereoisomer animations	Explain how even and odd numbers of double bonds affect the geometry and stereoisomerism of cumulenes	Compare molecular structures and symmetry features of cumulenes	Analyze, Apply, Logical-Mathematical
31-40	Stereoisomerism in Substituted Cumulenes	Examples, configurations (E/Z), and molecular projections	Discuss stereoisomerism in substituted cumulenes; illustrate configurations using molecular projections	Identify stereoisomers for given substituted cumulenes	Apply, Analyze, Logical-Mathematical
41-50	Applications of Chirality in Cumulenes	Case studies, examples in pharmaceuticals	Discuss the role of chirality in cumulenes in biological systems and materials science	Research and present chirality applications in specific compounds	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Emerging Research	Summary notes, current studies on chirality	Recap key concepts; discuss recent advancements in the study of chiral cumulenes and their practical relevance	Summarize in their own words, reflect on future research possibilities	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (Honours)

Paper: CEMA-CC-2-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Conformation	3D molecular models, rotational animations	Define conformation; explain how rotation around single bonds leads to different spatial arrangements	Note-taking, observing animations	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Conformational Nomenclature	Newman projections, structural diagrams	Introduce conformational terms like eclipsed, staggered, gauche, syn, and anti using Newman projections	Draw Newman projections for simple molecules like ethane and butane	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Eclipsed and Staggered Conformations	Newman projections, energy diagrams	Explain eclipsed and staggered conformations, focusing on their relative stabilities and energy differences	Interpret energy diagrams, compare eclipsed and staggered conformations	Analyze, Apply, Logical-Mathematical, Visual-Spatial
31-40	Gauche, Syn, and Anti Conformations	Examples with butane and substituted alkanes	Discuss gauche, syn, and anti conformations with examples, highlighting steric and electronic effects	Identify and classify conformations in given examples	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Energy Profiles of Conformations	Rotational energy profiles, interactive graphs	Describe energy changes during bond rotation using energy profiles (e.g., ethane, butane conformations)	Solve problems on torsional strain and energy profiles	Analyze, Evaluate, Logical-Mathematical
51-60	Summary and Practical Relevance	Summary notes, applications in stereochemistry	Recap key concepts; discuss applications of conformational analysis in pharmaceuticals and materials science	Summarize in their own words, connect to stereochemical relevance	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-2-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Ionic Bonding	Visual aids (ionic crystal diagrams, charge distribution examples)	Define ionic bonding; explain how it forms through the transfer of electrons between atoms	Note-taking, asking basic questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	General Characteristics of Ionic Compounds	Charts showing properties (melting point, solubility)	Discuss general properties of ionic compounds: high melting points, solubility, and electrical conductivity	Compare properties of ionic and covalent compounds	Understand, Apply, Logical-Mathematical
21-30	Types of Ions and Size Effects	Models of cations and anions, size comparison charts	Explain cations and anions, their size differences, and factors influencing ion size	Analyze size trends of ions in the periodic table	Understand, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Radius Ratio Rule and Its Application	Interactive simulations, packing models	Introduce the radius ratio rule; explain its significance in predicting crystal structures of ionic compounds	Solve problems involving radius ratio calculations	Apply, Analyze, Logical-Mathematical
41-50	Packing of Ions in Crystals	Crystal lattice structures (e.g., NaCl, CsCl)	Discuss packing arrangements of ions in crystals, focusing on coordination number and stability	Interpret lattice diagrams, solve coordination number problems	Understand, Apply, Logical-Mathematical, Visual-Spatial
51-60	Summary and Real-World Applications	Summary notes, examples from material science	Recap key points; discuss applications of ionic bonds in everyday materials (e.g., salts, ceramics)	Summarize in their own words, relate to practical uses	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-2-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Molecular Orbital Theory	Atomic and molecular orbital diagrams	Define the molecular orbital theory (MOT) and its importance in understanding bonding	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Approximations in MOT	Mathematical derivations, orbital energy diagrams	Explain the approximations (e.g., Schrödinger equation solutions for molecules, electron delocalization)	Analyze given approximations, ask clarifying questions	Understand, Analyze, Logical-Mathematical
21-30	Linear Combination of Atomic Orbitals (LCAO)	Animations showing orbital overlap, bonding and antibonding MO formation	Explain the LCAO method; illustrate bonding and antibonding molecular orbitals formed via orbital overlap	Sketch bonding and antibonding MO diagrams	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Sigma (σ) and Pi (π) Bonds in MOT	Orbital overlap diagrams, molecular examples	Discuss the formation of sigma (σ) and pi (π) bonds in MOT; differentiate between their geometries	Draw examples of σ and π bonding in molecules (e.g., H2, C2H4)	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Energy-Level Diagrams for Molecules	MO diagrams for diatomic molecules (e.g., H2, O2, N2)	Construct MO energy-level diagrams; discuss bond order, magnetic properties, and stability of molecules	Solve numerical problems related to bond order and stability	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications	Summary notes, examples from spectroscopy and reactivity	Recap key concepts; discuss applications of MOT in spectroscopy, magnetism, and chemical reactivity	Summarize in their own words, relate to experimental observations	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-3-5

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Thermodynamic Variables	Examples (e.g., temperature, volume, pressure), charts	Define thermodynamic variables; differentiate between intensive and extensive variables	Note-taking, participate in identifying examples of each variable	Remember, Understand, Linguistic, Logical-Mathematical
11-20	State and Path Functions	Graphs (P-V, T-S), examples of functions	Explain state functions (e.g., internal energy) and path functions (e.g., work, heat); highlight differences	Solve problems differentiating state and path functions	Understand, Apply, Logical-Mathematical
21-30	Types of Systems	Diagrams of isolated, closed, and open systems	Define isolated, closed, and open systems; discuss their characteristics and relevance in thermodynamics	Classify systems in given examples	Understand, Analyze, Logical-Mathematical
31-40	Zeroth Law of Thermodynamics	Temperature measurement devices, graphical representations	State the zeroth law; explain thermal equilibrium and its implications for temperature measurement	Analyze simple equilibrium systems, relate to thermometer calibration	Understand, Apply, Logical-Mathematical
41-50	Applications of Thermodynamic Concepts	Real-world examples (e.g., refrigeration, engine systems)	Connect concepts to practical systems like refrigerators, engines, and biological processes	Discuss and identify thermodynamic principles in daily-life systems	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Conceptual Integration	Summary notes, problem-solving practice	Recap the key concepts; integrate variables, functions, system types, and the zeroth law into thermodynamic analysis	Solve conceptual and numerical problems, summarize key ideas	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (Honours)

Paper: CEMA-CC-3-5

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Thermodynamic Equilibrium	Graphical examples of equilibrium systems	Define thermodynamic equilibrium; discuss the conditions (constant temperature, pressure, and Gibbs free energy)	Note-taking, observing equilibrium illustrations	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Degree of Advancement (ξ)	Reaction coordinate diagrams, example equations	Define degree of advancement; explain its role in quantifying reaction progress and equilibrium	Solve problems calculating ξ for given reactions	Understand, Apply, Logical-Mathematical
21-30	Van't Hoff's Reaction Isotherm	Mathematical derivation, potential diagrams	Derive Van't Hoff's reaction isotherm from chemical potential ($\Delta G=\Delta G0+RTlnQ$); connect to equilibrium constant	Follow derivations step-by-step, apply to reaction examples	Apply, Analyze, Logical-Mathematical
31-40	Variation of Free Energy with Degree of Advancement	Energy vs. advancement plots, case studies	Explain how Gibbs free energy changes with the degree of advancement; highlight the minimum at equilibrium	Sketch and interpret free energy diagrams for reactions	Understand, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Applications of Equilibrium Concepts	Industrial examples (e.g., Haber process, catalytic reactions)	Discuss practical applications of equilibrium and Van't Hoff's isotherm in chemical and industrial systems	Relate concepts to real-world processes, solve relevant problems	Analyze, Evaluate, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (Honours)

Paper: CEMA-CC-3-5

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Problem-Solving Practice	Summary notes, equilibrium-related exercises	Recap key concepts; practice problems on equilibrium conditions, ξ, and free energy variations	Summarize key ideas, solve numerical and conceptual problems	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-3-6

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to the Modern IUPAC Periodic Table	Periodic table visuals, periodic trends	Discuss the structure of the modern IUPAC periodic table; explain the significance of periodicity	Note-taking, discussing the arrangement of elements in the periodic table	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Organization of Elements in the Periodic Table	Periodic table, electron configuration diagrams	Explain the organization of elements based on atomic number, electron configuration, and chemical properties	Classify elements based on their position in the periodic table	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Effective Nuclear Charge (Zeff)	Graphs of ionization energies, electron shielding models	Define effective nuclear charge; explain how it is calculated and its role in atomic properties	Solve problems calculating Zeff, discuss trends in ionization energies	Apply, Analyze, Logical-Mathematical
31-40	Trends in Effective Nuclear Charge across Periods and Groups	Graphs showing trends across periods and groups	Discuss the trend of Zeff across periods (increases) and groups (relatively constant)	Analyze trends in atomic radii, ionization energy, and electron affinity	Understand, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Applications of Effective Nuclear Charge	Case studies in atomic size, ionization energy, and electronegativity	Discuss how Zeff influences chemical reactivity, atomic size, and other properties	Relate Zeff to chemical behavior in specific elements	Apply, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Recap of Key Concepts	Summary notes, periodic table exercises	Recap key concepts such as periodicity, Zeff, and trends in atomic properties	Summarize in their own words, solve problems involving periodic trends	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-3-6

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Peroxo Acids of Sulfur	Molecular models, structure diagrams	Define peroxo acids and explain their formation and importance in sulfur chemistry	Note-taking, observing molecular models and diagrams	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Structure and Types of Peroxo Acids of Sulfur	Structural examples of H_2SO_5, $H_2S_2O_8$, and related compounds	Discuss the different types of peroxo acids of sulfur, their structure, and bonding	Classify peroxo acids based on their structures	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Properties and Reactivity of Peroxo Acids	Reactivity tables, reaction mechanisms	Explain the chemical properties and reactivity of peroxo acids of sulfur, focusing on oxidation and reduction reactions	Solve problems involving reactions of peroxo acids	Understand, Apply, Logical-Mathematical, Intrapersonal
31-40	Sulfur-Nitrogen Compounds: Introduction and Classification	Examples of sulfur-nitrogen compounds (e.g., thiourea, sulfonamides)	Define sulfur-nitrogen compounds and discuss their importance in organic and inorganic chemistry	Classify sulfur-nitrogen compounds and discuss their uses in chemistry	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Reactivity and Synthesis of Sulfur-Nitrogen Compounds	Reaction mechanisms, synthesis examples	Discuss key reactions for the formation and synthesis of sulfur-nitrogen compounds, highlighting their applications	Solve synthesis problems and review reaction mechanisms	Apply, Analyze, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications of Sulfur-Nitrogen Chemistry	Case studies in agrochemicals, pharmaceuticals	Recap the key concepts; discuss the role of sulfur-nitrogen compounds in industries such as agrochemicals and medicine	Summarize key applications, reflect on real-world examples	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-3-7

Addition to C=C: Mechanism and reactivity

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introductio and Idea of Addition to C=C with example.	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Verbal-linguistic
15	Concept of reaction mechanism	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Types of reaction and importance of reaction mechanism	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	Concept of rate determining steps and reactivity	Pictures Presentation	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Conclusion, summary and where we go from here	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 37

Chemistry (Honours)

Paper: CEMA-CC-3-7

Addition to C=C: Mechanism and reactivity

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction of carbonyl chemisrty: key of organic chemistry	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Verbal-linguistic
15	VBT and structure of carbonyl chemistry	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Carbonyl bond energy	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	Reactivity and preparation of carbonyl chemistry	Pictures Presentation	Explains	Listens Participates Discusses	Analyzing Logical Linguistic
10	Conclusion, summary and recape of the whole class	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-4-8

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction of Amines and thei derivatives	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Verbal-linguistic
15	Preparation of Amines	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Separation of Amines	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	separation methods (Hinsberg's method)	Pictures Presentation	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Recap, conclusion and sumary of the whole class.	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 23

Chemistry (Honours)

Paper: CEMA-CC-4-8

Rearrangment to electron-deficient nitrogen: Hofmann, Curtius, Lossen, Schmidt, and Beckmann

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introductin of Rearrangment to electron-deficient nitrogen	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Verbal-linguistic
15	Discussion and mechanism of Hofmann, Curtius, Lossen, Schmidt rearrangements	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Explain how the rearrangments follow the same mechanistic path-way	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	Discussion and mechanism of Beckmann rearrangements	Pictures Presentation	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Conclusion, summary and where we go from here	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-4-9

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Vapour Pressure of Solutions	Graphs of vapour pressure vs. composition	Define vapour pressure and explain its significance in solutions, contrasting ideal and non-ideal solutions	Note-taking, discussing examples of volatile and non-volatile solutes	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Ideal Solutions and Raoult's Law	Molecular models, Raoult's law formula	Define ideal solutions and introduce Raoult's Law; discuss the relationship between vapour pressure and mole fraction	Solve problems applying Raoult's Law to ideal solutions	Understand, Apply, Logical-Mathematical
21-30	Derivation of Raoult's Law from Thermodynamics	Derivation steps on whiteboard, energy diagrams	Derive Raoult's Law thermodynamically from the concept of chemical potential and ideal behavior of solutions	Follow and solve thermodynamic derivations of Raoult's Law	Analyze, Apply, Logical-Mathematical
31-40	Colligative Properties of Solutions	Tables and graphs of freezing point depression, boiling point elevation, osmotic pressure, vapor pressure lowering	Introduce colligative properties and explain their dependence on solute concentration, not identity	Solve problems calculating colligative properties (e.g., freezing point depression)	Understand, Apply, Logical-Mathematical, Intrapersonal
41-50	Thermodynamic Basis of Colligative Properties	Entropy and enthalpy diagrams, molecular level explanations	Explain the thermodynamic derivation of colligative properties using concepts of entropy, enthalpy, and Gibbs free energy	Analyze and solve problems involving colligative property calculations	Analyze, Apply, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-4-9

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Real-World Applications	Examples from real-world applications (e.g., antifreeze, desalination)	Recap key concepts; discuss practical applications of colligative properties in everyday scenarios (e.g., antifreeze, food preservation)	Summarize key points, discuss industrial and biological applications	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-4-9

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Uncertainty Principle	Graphical illustrations, example wavefunctions	Introduce Heisenberg's Uncertainty Principle; explain its significance in quantum mechanics	Note-taking, discussing implications of uncertainty in quantum systems	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Mathematical Formulation of Uncertainty	Whiteboard derivations, formula presentation	Derive the uncertainty relations mathematically: $\Delta x \Delta p \geq \hbar/2$	Solve problems using the uncertainty relation	Apply, Analyze, Logical-Mathematical, Visual-Spatial
21-30	Interpretation of Position and Momentum Uncertainty	Diagrams of wave packets, particle trajectories	Discuss the physical meaning of the uncertainty in position and momentum, and how they affect wave functions	Visualize wave function spread and its relation to uncertainty	Understand, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Uncertainty in Energy and Time	Energy-time uncertainty relation, graphical examples	Derive the energy-time uncertainty principle and its implications for quantum systems	Solve examples related to energy-time uncertainty	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Implications of the Uncertainty Principle	Examples from atomic and molecular systems	Explain the practical implications of uncertainty: limitation on measurement precision, quantum tunneling	Discuss examples like quantum tunneling or atomic energy states	Evaluate, Apply, Logical-Mathematical, Intrapersonal
51-60	Summary and Philosophical Implications	Summary notes, historical context	Recap key concepts; discuss the philosophical and conceptual implications of the uncertainty principle in the interpretation of quantum mechanics	Summarize in their own words, discuss the philosophical impact of uncertainty	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-4-10

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Valence Bond (VB) Theory	Diagrams of atomic orbitals, bond formation	Define Valence Bond theory and its basic assumptions; explain how VB theory describes bond formation	Note-taking, drawing bond formation diagrams	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Application of VB Theory in Coordination Chemistry	Examples of coordination complexes, bond diagrams	Explain how VB theory is applied to coordination complexes, focusing on the nature of the metal-ligand bond	Classify coordination complexes and discuss their bonding	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Hybridization in VB Theory for Coordination Complexes	Hybridization diagrams, metal-ligand bond models	Discuss hybridization of metal orbitals in coordination chemistry, particularly in square planar, octahedral, and tetrahedral complexes	Sketch hybridized orbitals for different coordination geometries	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Limitations of VB Theory in Coordination Chemistry	Comparative examples with Molecular Orbital (MO) Theory	Explain the limitations of VB theory in describing coordination complexes, focusing on its inability to account for all bonding interactions	Discuss the differences between VB and MO theory for coordination complexes	Analyze, Evaluate, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-4-10

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
41-50	Comparison of VB Theory with Molecular Orbital (MO) Theory	Energy level diagrams, bonding vs. antibonding interactions	Compare the strengths and weaknesses of VB and MO theory, highlighting MO theory's advantages in explaining delocalization and bonding in coordination complexes	Compare VB and MO theory to explain coordination chemistry behaviors	Evaluate, Analyze, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications in Coordination Chemistry	Real-world examples (e.g., metal-ligand complexes in bioinorganic chemistry)	Recap key concepts, applications, and limitations of VB theory in coordination chemistry, linking to real-world examples	Summarize key concepts, apply them to real-world examples of coordination compounds	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-4-10

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Lanthanoids	Periodic table, electron configuration charts	Define lanthanoids and discuss their position in the periodic table; highlight the unique features of lanthanoids	Note-taking, discussing the placement and properties of lanthanoids	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Electronic Configuration of Lanthanoids	Electronic configuration diagrams	Explain the general electronic configuration of lanthanoids and the filling of f-orbitals	Write out the electronic configuration of select lanthanoids	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Oxidation States of Lanthanoids	Table of oxidation states, oxidation potential diagrams	Discuss the typical oxidation states of lanthanoids (mostly +3) and the reasons for their stability and variability	Classify lanthanoid ions based on their oxidation states	Understand, Apply, Logical-Mathematical
31-40	Colour of Lanthanoid Compounds	Color charts, UV-Vis spectra, sample compounds	Explain the factors influencing the color of lanthanoid compounds, focusing on d-f transitions and coordination environment	Observe and compare the colors of different lanthanoid salts	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Spectral Properties of Lanthanoids	Spectral data, examples of absorption and emission spectra	Discuss the spectral properties of lanthanoids, including f-f transitions, absorption spectra, and emission spectra	Analyze UV-Vis and fluorescence spectra of lanthanoid compounds	Analyze, Apply, Logical-Mathematical, Visual-Spatial

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-4-10

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Applications and Summary of Lanthanoid Properties	Case studies (e.g., phosphors, catalysts)	Recap the electronic properties, oxidation states, color, and spectra of lanthanoids; highlight practical applications	Discuss the role of lanthanoids in modern technology (e.g., lighting, catalysis)	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-5-11

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Simple Harmonic Oscillator	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic
10	Setting up of One dimensional Schrödinger equation	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
15	Solve and discussion of solution	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	wave functions and classical limitations	Pictures Presentation	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Recapitulation	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 18

Chemistry (Honours)

Paper: CEMA-CC-5-11

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction of Statistical Thermodynamics	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic
10	Defination of Macrostates	Demonstration, Picture Presentation and Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
15	Defination of Microstates	Demonstration, Picture Presentation and Discussions	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
15	Connection and calculation of microstates, macrostates and different configurations of a system	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
10	Recapitulation	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-5-12

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Concept about carbocycle and heterocycle	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Verbal-linguistic
15	Introduction to polynuclear hydrocarbon and derivatives	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Synthetic method - Howrath method	Pictures Presentation	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	Discussion to Bardhan-Sengupta Synthesis	Pictures Presentation	Case-study	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
10	Conclusion and summary of the whole class	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 32

Chemistry (Honours)

Paper: CEMA-CC-5-12

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction about carbohydrate chemistry	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Verbal-linguistic
15	Defination, nomenciature and ciassification	Demonstration Discussions	Case-study	Explains	Remembering Understanding Verbal-linguistic
10	Conformational aspects of monisacharides	Pictures Presentation	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
15	Structure and configuration of D-glucose and D-fructose (aldoses up to 6 carbons).	Pictures Presentation	Case-study	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
10	conclusion and summary of the class	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-6-13

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Analysis of Cations and Anions	Flow charts of cation and anion analysis	Introduce the concept of qualitative analysis of cations and anions; explain the systematic approach to their detection	Note-taking, discussing steps of qualitative analysis	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Solubility Product (Ksp)	Ksp tables, solubility equilibrium diagrams	Define solubility product (Ksp) and explain its role in determining the solubility of salts in solution	Solve problems calculating solubility from Ksp values	Understand, Apply, Logical-Mathematical
21-30	Common Ion Effect and its Application	Diagrams of equilibrium shifts, example calculations	Explain the common ion effect and how it shifts equilibrium in a saturated solution; relate it to Le Chatelier's principle	Solve problems involving the common ion effect in precipitation and solubility	Apply, Analyze, Logical-Mathematical
31-40	Interrelation Between Ksp and the Common Ion Effect	Equilibrium calculations, concentration tables	Discuss how the presence of a common ion affects solubility by modifying the ion concentration and the solubility product	Analyze problems where the common ion effect alters the solubility equilibrium	Analyze, Apply, Logical-Mathematical
41-50	Practical Applications of Solubility Product and Common Ion Effect	Case studies in precipitation reactions and buffer solutions	Discuss real-world applications such as water treatment, drug formulation, and buffer solutions	Work through case studies where solubility and the common ion effect are relevant	Evaluate, Apply, Logical-Mathematical, Interpersonal
51-60	Summary and Recap of Key Concepts	Summary notes, problem-solving exercises	Recap the importance of solubility product, common ion effect, and the systematic analysis of cations and anions	Summarize the main principles and solve complex problems combining the topics	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-6-13

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to the 18-Electron Rule	Diagrams of molecular orbitals, metal-ligand bonding	Introduce the 18-electron rule, explaining its application to transition metals and their coordination complexes	Note-taking, discussing the significance of the 18-electron rule in complex stability	Remember, Understand, Logical-Mathematical, Visual-Spatial
11-20	Application of the 18-Electron Rule to Metal Carbonyls	Examples of metal carbonyl complexes (e.g., $Fe(CO)_5$, $Ni(CO)_4$)	Discuss how metal carbonyls obey the 18-electron rule; explain how carbon monoxide coordinates to metal centers	Solve problems involving the electron counting of metal carbonyls	Apply, Analyze, Logical-Mathematical, Visual-Spatial
21-30	Nitrosyls and the 18-Electron Rule	Examples of nitrosyl complexes (e.g., $Fe(NO)_5$, $Cr(NO)_6$)	Explain the bonding in nitrosyl complexes and how the 18-electron rule applies to these compounds	Classify and count electrons in nitrosyl metal complexes	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Cyanides and the 18-Electron Rule	Examples of metal cyanide complexes (e.g., $[Fe(CN)_6]^{4-}$)	Discuss how cyanide ions act as strong field ligands and how the 18-electron rule influences the stability of cyanide complexes	Discuss and solve problems involving the electron configuration of cyanide complexes	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Comparison of Metal Carbonyls, Nitrosyls, and Cyanides	Comparison tables of electron counting, bonding types	Compare the electron distribution and bonding in metal carbonyls, nitrosyls, and cyanides, highlighting the role of the 18-electron rule	Analyze and compare the stability and electronic structures of different complexes	Evaluate, Analyze, Logical-Mathematical, Visual-Spatial

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-6-13

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Applications in Organometallic Chemistry	Case studies in catalysis, industrial applications	Recap the 18-electron rule and its applications in metal carbonyls, nitrosyls, and cyanides; discuss real-world applications such as catalysis and material science	Summarize key applications, discuss the role of 18-electron rule in catalysis and organometallic chemistry	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-6-14

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Electromagnetic Radiation	Diagram of the electromagnetic spectrum	Introduce the electromagnetic spectrum and explain the different types of radiation interacting with molecules	Note-taking, identifying different regions of the electromagnetic spectrum	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Interaction of Electromagnetic Radiation with Molecules	Energy level diagrams, molecular orbitals	Explain how electromagnetic radiation interacts with molecules to cause transitions between different energy levels	Observe and discuss how different types of radiation affect molecular energy states	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Rotational Spectra and Molecular Rotation	Rotational energy level diagrams, examples of molecular rotation	Explain the concept of rotational spectra, how it relates to molecular rotation, and the types of transitions observed	Solve problems related to rotational transitions in diatomic and polyatomic molecules	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Vibrational Spectra and Molecular Vibration	Vibrational modes diagrams, IR spectra examples	Discuss vibrational spectra, the relationship between molecular vibrations and infrared radiation absorption, and selection rules for vibrational transitions	Interpret IR spectra and solve problems related to vibrational transitions	Apply, Analyze, Logical-Mathematical, Visual-Spatial

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-CC-6-14

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
41-50	Electronic Spectra and Molecular Electronic Transitions	UV-Vis absorption spectra, molecular orbital diagrams	Introduce electronic spectra and explain electronic transitions, how they relate to absorption of ultraviolet and visible radiation	Analyze UV-Vis spectra and determine electronic transitions in molecules	Apply, Analyze, Logical-Mathematical, Visual-Spatial
51-60	Summary and Practical Applications of Molecular Spectroscopy	Case studies (e.g., spectroscopy in chemical analysis, environmental monitoring)	Recap the types of spectra and their significance in molecular spectroscopy; discuss practical applications in analytical chemistry and industry	Summarize key concepts, discuss real-world applications like spectroscopy in chemical analysis or environmental science	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-6-14

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Photochemical Processes	Diagrams of photochemical reactions, light sources	Introduce the concept of photochemistry, explain how light interacts with matter to initiate chemical reactions	Note-taking, discussing examples of photochemical reactions in nature and industry	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Photochemical Reactions and Rate Laws	Reaction rate graphs, example reactions (e.g., photodissociation)	Discuss the rate of photochemical reactions, the role of light intensity, and the effect of temperature on the rate	Solve problems calculating reaction rates for photochemical processes	Apply, Analyze, Logical-Mathematical
21-30	Photochemical Equilibrium	Energy diagrams, reaction equilibrium charts	Define photochemical equilibrium, explain how equilibrium is established in photochemical reactions, and the role of light intensity	Discuss the concept of photochemical equilibrium, and solve related problems	Understand, Apply, Logical-Mathematical
31-40	Photostationary State and its Characteristics	Diagrams of energy states, reaction progress charts	Explain the photostationary state, where the rates of forward and reverse photochemical reactions are balanced	Work through examples of systems in photostationary states, calculate equilibrium concentrations	Apply, Analyze, Logical-Mathematical
41-50	Factors Affecting Photochemical Equilibrium	Examples of temperature, pressure, and light intensity effects	Discuss how different factors like pressure, temperature, and light intensity influence photochemical equilibrium and the photostationary state	Analyze how changes in external conditions affect photochemical equilibrium	Analyze, Apply, Logical-Mathematical, Visual-Spatial

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-CC-6-14

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Real-World Applications of Photochemical Processes	Case studies in photosynthesis, photodetectors, solar cells	Recap the principles of photochemical reactions, photochemical equilibrium, and photostationary state; discuss applications in biology and technology	Summarize key concepts, discuss real-world applications like photosynthesis, photochemical sensors, and solar energy	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Molecular Modelling	Presentation slides, simple molecular models	Define molecular modelling and its purpose in simulating molecular structures and interactions	Note-taking, discussing the definition and need for molecular modelling	Remember, Understand, Linguistic, Logical-Mathematical
11-20	History of Molecular Modelling	Timeline diagrams, milestones in molecular modelling	Discuss the evolution of molecular modelling, from early computational chemistry to modern techniques	Identify key milestones in molecular modelling and its development	Understand, Analyze, Logical-Mathematical, Visual-Spatial
21-30	Techniques in Molecular Modelling	Examples of techniques (e.g., molecular dynamics, quantum mechanics)	Provide an overview of various molecular modelling methods and their computational principles	Categorize methods and link them to specific types of molecular problems	Understand, Apply, Logical-Mathematical
31-40	Scope of Molecular Modelling	Diagrams of molecular systems (small molecules, proteins, materials)	Discuss the scope of molecular modelling in different fields such as chemistry, biology, materials science, and drug design	Explore potential uses of molecular modelling in their areas of interest	Apply, Analyze, Logical-Mathematical, Interpersonal
41-50	Real-World Applications of Molecular Modelling	Case studies (e.g., drug discovery, material design)	Highlight practical applications, including drug discovery, protein-ligand interactions, and nanomaterials development	Discuss case studies and evaluate how molecular modelling contributes to solving real-world problems	Evaluate, Apply, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Future Perspectives	Summary notes, recent advancements in modelling	Recap the principles, techniques, and applications; discuss emerging trends and the future of molecular modelling	Summarize the importance of molecular modelling and discuss its future potential	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-DSE-A-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Error Analysis	Presentation slides, error classification charts	Define error analysis, types of errors (systematic, random, truncation), and their impact on simulations	Note-taking, discussing the significance of error analysis in simulations	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Types and Sources of Errors in Simulations	Examples of simulation models with known errors	Explain common sources of errors in simulations, including numerical, experimental, and model-based errors	Identify sources of errors in sample simulation scenarios	Understand, Apply, Logical-Mathematical
21-30	Methods to Quantify Errors	Error calculation examples, statistical tools (e.g., standard deviation, confidence intervals)	Introduce methods to quantify errors using statistical measures and validation techniques	Solve problems calculating errors using statistical tools	Apply, Analyze, Logical-Mathematical
31-40	Mitigating Errors in Simulations	Flowcharts of error mitigation strategies	Discuss strategies to minimize errors, including refining algorithms, improving input data quality, and validation	Propose error mitigation approaches for sample simulation problems	Apply, Analyze, Logical-Mathematical, Interpersonal
41-50	Interpretation of Simulation Results	Case studies with annotated output data	Explain how to critically interpret results, assess reliability, and draw meaningful conclusions	Evaluate the accuracy and reliability of given simulation outputs	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Best Practices in Error Analysis	Summary notes, checklist for error reduction	Recap key principles of error analysis and result interpretation; provide a checklist for minimizing errors in future simulations	Summarize the key strategies for error analysis and simulation accuracy	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Programming	Presentation slides, basic programming flowcharts	Define programming and its importance in problem-solving; introduce key concepts like algorithms and logic	Note-taking, discussing examples of how programming is used in real-world applications	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Evolution of Programming Languages	Timeline of programming languages, key milestones	Discuss the history of programming languages, focusing on the progression from machine code to high-level languages	Identify the key features of different generations of programming languages	Understand, Analyze, Logical-Mathematical, Visual-Spatial
21-30	Overview of FORTRAN	Code snippets, sample program flow diagrams	Introduce the FORTRAN language, its history, and its primary uses in scientific computing	Analyze simple FORTRAN code examples	Apply, Understand, Linguistic, Logical-Mathematical
31-40	Basic Syntax and Structure in FORTRAN	Example programs, coding exercises	Explain the syntax of FORTRAN, including variable declaration, data types, and basic input/output operations	Write a simple FORTRAN program with basic syntax	Apply, Create, Logical-Mathematical, Linguistic
41-50	Applications of FORTRAN	Case studies in scientific and numerical problem-solving	Highlight the use of FORTRAN in computational fields like physics, chemistry, and engineering	Discuss case studies where FORTRAN is applied to solve scientific problems	Evaluate, Analyze, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Comparison with Modern Languages	Comparative charts of FORTRAN and modern languages	Summarize the key features of FORTRAN, comparing its strengths and limitations with modern programming languages	Discuss the role of FORTRAN in legacy systems versus modern alternatives	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-DSE-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Basics of Numerical Modelling	Diagrams of numerical vs analytical solutions, flowcharts	Define numerical modelling and its role in approximating solutions for complex scientific problems	Note-taking, discussing examples where numerical methods are necessary	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Types of Numerical Models	Charts categorizing models (e.g., deterministic, stochastic)	Discuss the classification of numerical models and the fields they are applied in (e.g., physics, biology)	Identify examples of each type of numerical model and their applications	Understand, Apply, Logical-Mathematical
21-30	Mathematical Foundations of Numerical Modelling	Equations used in numerical methods (e.g., finite difference, interpolation)	Explain the mathematical basis of numerical modelling techniques and their stepwise application	Solve basic mathematical problems relevant to numerical modelling	Apply, Analyze, Logical-Mathematical
31-40	Tools for Numerical Modelling	Demonstrations of modelling tools (e.g., MATLAB, Python libraries)	Introduce software and tools used in numerical modelling, with a focus on their strengths and limitations	Practice using basic commands in a numerical modelling tool	Apply, Create, Logical-Mathematical, Visual-Spatial
41-50	Applications of Numerical Modelling in Science	Case studies in climate modelling, fluid dynamics, and molecular simulations	Highlight the role of numerical modelling in solving real-world scientific problems	Discuss case studies and explore the impact of numerical modelling in different scientific domains	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Future Directions	Notes on recent advances and challenges in numerical modelling	Recap the principles, tools, and applications of numerical modelling; discuss emerging trends in the field	Summarize the potential of numerical modelling in science and suggest possible research directions	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Definition of Green Chemistry	Presentation slides, definition diagrams	Define green chemistry and explain its role in promoting sustainable chemical practices	Note-taking, discussing examples of green chemistry in daily life	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Historical Background and Evolution	Timeline of milestones in green chemistry	Discuss the origin and evolution of green chemistry as a response to environmental challenges	Identify key events and figures in the development of green chemistry	Understand, Analyze, Logical-Mathematical
21-30	Principles of Green Chemistry	Visual aids summarizing the 12 principles of green chemistry	Introduce the 12 principles of green chemistry with examples for each	Discuss and provide examples of each principle in practical contexts	Apply, Understand, Linguistic, Logical-Mathematical
31-40	Need for Green Chemistry	Case studies on environmental impacts of traditional chemistry	Explain the need for green chemistry in addressing issues like pollution, resource depletion, and health risks	Analyze environmental case studies to identify where green chemistry could be applied	Apply, Analyze, Logical-Mathematical, Interpersonal
41-50	Goals of Green Chemistry	Charts of sustainable practices and goals	Outline the goals of green chemistry, focusing on sustainability, waste reduction, and energy efficiency	Discuss and propose practical goals for implementing green chemistry in industries	Evaluate, Apply, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications in Industry	Case studies of successful green chemistry applications	Recap key concepts and showcase real-world applications in pharmaceuticals, energy, and materials science	Summarize how green chemistry contributes to sustainability and innovation	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (Honours)

Paper: CEMA-DSE-A-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Green Chemistry in Organic Reactions; Green Aldol Reaction	Presentation slides, reaction comparison charts, examples of solvent-free or catalyst-based reactions	Briefly review traditional organic reactions and introduce their green chemistry counterparts, explaining the principles behind the green version of Aldol reactions, focusing on solvent reduction and catalyst use	Note-taking, discussing why greener methods are needed; analyze reaction schemes and identify the benefits of the green approach	Remember, Understand, Apply, Analyze, Linguistic, Logical-Mathematical
11-20	Green Friedel-Crafts Reaction	Case studies of solid acid catalysts or ionic liquids	Discuss the replacement of traditional acid catalysts with greener alternatives like ionic liquids or solid acids	Discuss and propose green alternatives for Friedel-Crafts conditions	Apply, Analyze, Logical-Mathematical
21-30	Green Michael Reaction	Mechanistic diagrams of greener Michael additions	Explain modifications to Michael addition reactions, including enzyme or water-based catalysts	Evaluate reaction mechanisms and determine greener options	Analyze, Evaluate, Logical-Mathematical
31-40	Green Knoevenagel Reaction	Examples of base-catalyzed reactions in water or under solvent-free conditions	Discuss how Knoevenagel condensations are adapted to reduce solvent and energy usage	Work through reaction schemes to apply green principles	Apply, Create, Logical-Mathematical
41-50	Comparison of Green and Traditional Approaches	Summary tables of reaction efficiency and environmental impact	Compare traditional and green methods for Aldol, Friedel-Crafts, Michael, and Knoevenagel reactions	Summarize the environmental benefits and economic feasibility of green methods	Understand, Evaluate, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (Honours)

Paper: CEMA-DSE-A-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Industrial Applications	Case studies of industrial implementations of green reactions	Recap key green reaction modifications and their significance in industry (e.g., pharmaceuticals, polymers)	Discuss real-world examples of industries adopting green organic reactions	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-A-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Basics of Spectroscopy and Origin of Spectra	Presentation slides, illustrations of emission and absorption spectra	Define spectroscopy, discuss the origin of spectra due to electronic, vibrational, and rotational transitions	Note-taking, discussing examples of spectra formation	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Electromagnetic Radiation: Properties and Interaction	Diagrams of electromagnetic spectrum and energy levels	Explain the properties of electromagnetic radiation and its interaction with matter at different wavelengths	Explore the electromagnetic spectrum and identify regions of interest for analysis	Understand, Apply, Logical-Mathematical
21-30	Mechanisms of Radiation Interaction with Matter	Charts of excitation and relaxation processes, energy diagrams	Explain mechanisms like absorption, emission, scattering, and fluorescence	Analyze energy diagrams to understand the processes involved	Apply, Analyze, Logical-Mathematical
31-40	Types of Spectra: Absorption and Emission	Examples of UV-Vis and fluorescence spectra	Distinguish between absorption and emission spectra with practical examples	Interpret sample spectra and classify them as absorption or emission	Apply, Evaluate, Logical-Mathematical
41-50	Applications of Optical Methods in Analysis	Case studies in material and biological sample analysis	Highlight how optical methods like UV-Vis, IR, and fluorescence spectroscopy are used in analytical chemistry	Discuss case studies to explore real-world applications	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Future Trends	Summary notes, recent advancements in spectroscopy	Recap the fundamental principles and applications; discuss emerging optical techniques and instrumentation	Summarize key concepts and predict future applications of optical methods	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (Honours)

Paper: CEMA-DSE-A-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Solvent Extraction	Presentation slides, examples of extraction processes	Define solvent extraction, its importance, and basic overview of liquid-liquid extraction	Note-taking, discussing examples of solvent extraction in industries	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Classification of Solvent Extraction Methods	Diagrams showing batch, continuous, and counter-current extractions	Explain the types of solvent extraction methods with visual aids	Classify given processes into appropriate extraction types	Understand, Apply, Logical-Mathematical
21-30	Principles of Solvent Extraction	Partition coefficient equations and graphical representations	Discuss the distribution law, partition coefficient, and factors affecting solute transfer efficiency	Solve basic problems to calculate partition coefficients	Apply, Analyze, Logical-Mathematical
31-40	Efficiency of Solvent Extraction	Charts of efficiency vs. extraction parameters	Explain factors influencing extraction efficiency, including solvent selection, pH, and phase ratio	Analyze scenarios to suggest improvements for extraction efficiency	Apply, Evaluate, Logical-Mathematical
41-50	Industrial Applications of Solvent Extraction	Case studies in metallurgy, pharmaceuticals, and environmental science	Highlight practical applications, such as metal recovery and drug purification	Discuss case studies of solvent extraction in real-world contexts	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Challenges in Solvent Extraction	Summary notes, discussion on emerging green solvents	Recap principles and classifications; discuss challenges like solvent toxicity and green alternatives	Summarize the principles and propose solutions to common challenges in solvent extraction	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-B-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Silicates and Their Importance	Presentation slides, examples of silicate structures	Define silicates, their types, and roles in natural and industrial processes	Note-taking, discussing examples of silicates in everyday life	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Classification of Silicate Materials	Charts of silicate structures (e.g., layered, chain, network silicates)	Explain the structural classification and examples of each type	Classify materials based on their silicate structure	Understand, Apply, Logical-Mathematical
21-30	Key Processes in the Silicate Industry	Flow diagrams of manufacturing processes	Discuss manufacturing processes like glassmaking, cement production, and ceramics	Analyze process flow diagrams and identify key steps	Apply, Analyze, Logical-Mathematical
31-40	Significance in the Chemical Industry	Examples of industrial uses of silicates	Highlight applications of silicates in construction, electronics, and environmental technologies	Discuss the impact of silicates on various industries	Analyze, Evaluate, Logical-Mathematical, Interpersonal
41-50	Emerging Trends in Silicate Industries	Case studies on advancements (e.g., lightweight materials, optical fibers)	Discuss innovations and the development of sustainable silicate materials	Research and present recent advancements in silicate applications	Evaluate, Apply, Logical-Mathematical, Visual-Spatial
51-60	Summary and Future Directions	Recap of principles, challenges, and opportunities	Summarize the role of silicates in industry and discuss challenges like resource sustainability	Summarize the potential for future developments in silicate industries	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-DSE-B-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Types of Paints	Presentation slides, examples of paint types	Introduce the different types of paints and their historical and modern applications	Note-taking, class discussion on the various types of paints	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Oil Paints: Composition and Characteristics	Samples of oil paints, chemical structure diagrams	Explain the composition, properties, and uses of oil paints, including pigments and drying mechanisms	Experiment with mixing different oil paints and observe drying times	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Enamel Paints: Properties and Uses	Case studies of enamel applications	Discuss the properties of enamel paints (e.g., high gloss, durability), and where they are commonly used	Identify the uses of enamel paints in real-world scenarios	Understand, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Water-Based Paints: Characteristics and Benefits	Charts of water-based vs. oil-based paints	Explain the advantages of water-based paints, such as ease of cleaning and environmental benefits	Compare and contrast water-based paints with oil paints in terms of properties	Apply, Evaluate, Logical-Mathematical, Visual-Spatial
41-50	Additives in Paints: Types and Functions	Examples of paint additives (e.g., thickeners, preservatives)	Discuss common additives and their roles in modifying paint properties (e.g., texture, drying rate, stability)	Discuss the role of different additives in enhancing paint performance	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
51-60	Summary and Applications of Paint Types	Recap of paint types and examples of real-world applications	Summarize key points on oil paints, enamels, water-based paints, and additives; discuss environmental considerations	Discuss the future of paint technologies and eco-friendly alternatives	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-B-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Inorganic Solids	Presentation slides, examples of common inorganic solids	Define inorganic solids and provide examples of their types (oxides, nitrides, carbides)	Note-taking, discussion of real-world examples of inorganic solids	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Significance of Inorganic Solids in Chemistry	Case studies on industrial and technological applications	Explain the role of inorganic solids in industries like electronics, ceramics, and catalysis	Explore case studies and identify key applications of inorganic solids	Understand, Analyze, Logical-Mathematical
21-30	General Methods of Synthesis	Flowcharts and diagrams of synthesis techniques	Introduce key synthesis methods, including solid-state, sol-gel, and hydrothermal processes	Discuss and analyze the steps involved in different synthesis methods	Apply, Analyze, Logical-Mathematical
31-40	Solid-State Reactions: Principles and Examples	Visual aids showing diffusion and reaction mechanisms	Explain the principles of solid-state reactions with examples of oxides and sulfides synthesis	Work through reaction mechanisms and predict possible outcomes	Apply, Evaluate, Logical-Mathematical
41-50	Challenges and Innovations in Synthesis	Research papers or reports on advanced synthesis methods	Discuss challenges like temperature control and phase purity; highlight innovations like green synthesis	Research recent advancements in inorganic solid synthesis	Analyze, Evaluate, Logical-Mathematical, Intrapersonal
51-60	Summary and Future Directions	Summary slides and examples of futuristic materials	Recap the importance of inorganic solids, current challenges, and future research opportunities	Summarize the session and propose potential new applications	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-DSE-B-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Engineering Materials	Presentation slides, examples of materials like metals, polymers, ceramics, and composites	Define engineering materials and their categories, emphasizing their roles in mechanical construction	Note-taking, discussing examples of materials used in construction	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Properties of Engineering Materials	Charts of mechanical properties (e.g., tensile strength, hardness, ductility)	Explain the key properties of engineering materials relevant to construction applications	Analyze property charts and classify materials based on their suitability for construction	Understand, Apply, Logical-Mathematical
21-30	Metals and Alloys: Importance in Construction	Examples and case studies of steel, aluminum, and titanium alloys	Discuss the use of metals and alloys, focusing on their strength, durability, and cost-effectiveness	Compare different metals and alloys for specific mechanical applications	Apply, Evaluate, Logical-Mathematical, Visual-Spatial
31-40	Non-Metallic Materials: Polymers and Composites	Samples of polymers and composites with applications in construction	Highlight the properties and applications of non-metallic materials like polymers and fiber-reinforced composites	Explore case studies of non-metallic materials in real-world construction	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Importance of Material Selection in Engineering	Diagrams showing the material selection process	Explain factors influencing material selection, including environmental, economic, and performance considerations	Evaluate scenarios to select the most suitable materials for mechanical structures	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Future Trends in Engineering Materials	Summary notes, examples of emerging materials like smart materials and high-performance alloys	Recap the importance of engineering materials; discuss future trends and innovations in mechanical construction	Summarize the session and predict future material advancements	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-DSE-B-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Definition and Basic Concepts of Polymers	Presentation slides, examples of polymer structures	Define polymers and explain their basic building blocks (monomers) and classifications	Note-taking, discussing everyday examples of polymers	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Polymerization Processes: Addition and Condensation	Diagrams illustrating polymerization reactions	Explain the two main polymerization mechanisms with examples (e.g., polyethylene, nylon)	Analyze reaction schemes and identify the type of polymerization	Understand, Apply, Logical-Mathematical
21-30	Properties of Polymers	Charts of thermal, mechanical, and chemical properties	Discuss properties like elasticity, strength, and thermal resistance, linking them to applications	Compare properties of different polymers and predict their uses	Apply, Analyze, Logical-Mathematical
31-40	Applications of Polymers in Materials Science	Case studies of polymers in construction, electronics, and medicine	Highlight the roles of polymers in materials science, focusing on cutting-edge applications	Discuss and evaluate real-world case studies on polymer uses	Analyze, Evaluate, Logical-Mathematical, Interpersonal
41-50	Challenges and Innovations in Polymer Science	Articles or reports on recycling and biodegradable polymers	Discuss environmental challenges with conventional polymers and innovations like green and recyclable polymers	Propose solutions to mitigate challenges in polymer use	Evaluate, Create, Logical-Mathematical, Intrapersonal
51-60	Summary and Future of Polymers	Summary notes, examples of futuristic polymers like conducting polymers	Recap key concepts and discuss emerging trends in polymer research	Summarize session insights and predict future developments in polymer technology	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (Honours)

Paper: CEMA-DSE-B-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Molecular Architecture of Polymers	Presentation slides, illustrations of linear, branched, and cross-linked polymers	Define molecular architecture and classify polymers based on their structure (e.g., linear, branched)	Note-taking and identifying polymer types from given examples	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Relationship Between Molecular Structure and Properties	Charts of polymer properties vs. structure	Explain how molecular weight, branching, and cross-linking influence properties like strength and flexibility	Analyze property charts and link them to structural features	Understand, Apply, Logical-Mathematical
21-30	Thermal Properties of Polymers	Diagrams of glass transition and melting points	Discuss how structure impacts thermal properties such as Tg and Tm	Analyze examples of polymers and predict their thermal behavior	Apply, Analyze, Logical-Mathematical
31-40	Mechanical Properties of Polymers	Examples of stress-strain curves for polymers	Explain the effects of structure on mechanical properties like elasticity, toughness, and tensile strength	Evaluate stress-strain data and classify polymer performance	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
41-50	Applications Based on Structure-Property Relationships	Case studies of polymers in various industries	Highlight how understanding structure-property relationships aids in designing polymers for specific uses	Discuss applications and suggest suitable polymers for given scenarios	Apply, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Future Directions	Recap of concepts, examples of advanced polymers	Summarize key points; discuss emerging polymers designed for specialized properties	Summarize session insights and predict trends in polymer design	Remember, Evaluate, Linguistic, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-SEC-A-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Functions and Their Representation	Graphs and equations of common functions	Define functions, domain, and range; explain representation through graphs and equations	Plot graphs of simple functions and identify key features	Remember, Understand, Logical-Mathematical, Visual-Spatial
11-20	Concept of Limits and Continuity	Interactive diagrams showing approaching behavior	Explain the mathematical definition of limits and continuity using visual examples	Solve limit problems and interpret graphical behavior	Understand, Apply, Logical-Mathematical
21-30	Introduction to Derivatives	Real-life examples like velocity and rate of change	Explain the concept of derivatives as a measure of rate of change and physical significance	Discuss real-world examples involving rates of change	Apply, Understand, Logical-Mathematical, Interpersonal
31-40	Rules of Differentiation: Sum, Product, and Quotient	Step-by-step problem-solving with visual aids	Teach the basic differentiation rules with examples and interactive solving	Practice differentiation problems using the rules learned	Apply, Analyze, Logical-Mathematical
41-50	Applications of Derivatives in Physics and Economics	Case studies of velocity, acceleration, and marginal cost	Explain practical applications of derivatives in different fields	Solve application-based problems in physics or economics	Analyze, Evaluate, Logical-Mathematical, Intrapersonal
51-60	Summary and Practice Problems	Recap notes and examples of challenging problems	Summarize key concepts; assign practice problems for different levels of difficulty	Work on assigned practice problems and clarify doubts	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (Honours)

Paper: CEMA-SEC-A-1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Differential Equations	Presentation slides, examples of real-world applications	Define differential equations, and distinguish between exact and linear first-order equations	Note-taking, discussing the significance of differential equations	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Recognizing and Solving Exact Equations	Worked-out examples, flowchart for solving steps	Explain the conditions for exactness and the method of solution using integration	Identify if a given equation is exact and solve step-by-step	Understand, Apply, Logical-Mathematical
21-30	Integrating Factor for Non-Exact Equations	Examples showing application of integrating factors	Introduce integrating factors to convert non-exact equations into exact ones	Apply integrating factors to solve non-exact equations	Apply, Analyze, Logical-Mathematical
31-40	Solving Linear First-Order Equations	Example equations with step-by-step solutions	Derive and explain the general form of linear first-order equations and their solutions	Practice solving linear differential equations	Apply, Analyze, Logical-Mathematical
41-50	Applications of Exact and Linear Equations	Case studies of physical and engineering problems	Demonstrate real-world applications like population dynamics and circuit analysis	Solve application-based differential equations	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Problem Solving	Recap notes and challenging problems for practice	Summarize the solving techniques and assign problems with varying difficulty	Work on assigned problems and discuss solutions in groups	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Carbohydrates and Their Biological Importance	Charts showing carbohydrate types (mono-, di-, polysaccharides)	Explain the structure, types, and functions of carbohydrates in biological systems	Note-taking, discussing examples of carbohydrate functions in the body	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Introduction to Metabolism and Its Importance	Diagrams of metabolic pathways	Define metabolism; explain the role of catabolic and anabolic pathways	Explore how carbohydrates contribute to energy metabolism	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Role of ATP as Cellular Energy Currency	ATP molecule diagram, animations of ATP hydrolysis	Explain the structure of ATP and its role in storing and transferring energy in cellular reactions	Analyze energy flow in metabolic reactions	Understand, Apply, Logical-Mathematical
31-40	Detailed Steps of Glycolysis	Step-by-step flowchart of glycolytic pathway	Break down each step of glycolysis, focusing on key enzymes and intermediates	Work through glycolysis diagrams and track energy transformations	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Glycolysis in Context: Energy Yield and Significance	Comparison of aerobic and anaerobic conditions	Discuss the ATP yield from glycolysis and its importance under aerobic and anaerobic conditions	Solve problems on ATP yield under different conditions	Analyze, Evaluate, Logical-Mathematical, Intrapersonal
51-60	Summary and Connections to Other Metabolic Pathways	Recap notes, integration with TCA and oxidative phosphorylation	Summarize glycolysis and its connection to broader metabolism; discuss its role in health and disease	Summarize key points and discuss links to diseases like diabetes	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (Honours)

Paper: CEMA-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Enzymes and Their Importance	Presentation slides, examples of enzyme functions in biological systems	Define enzymes; explain their roles as biological catalysts and their impact on metabolic reactions	Note-taking, identifying examples of enzyme-driven processes	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Enzyme Nomenclature and Systematic Naming	Diagrams of enzyme-substrate complexes, EC classification chart	Explain the systematic naming convention by the Enzyme Commission (EC) based on reaction types	Classify given enzymes using EC numbers	Understand, Apply, Logical-Mathematical
21-30	Characteristics of Enzymes	Graphs of reaction rates, substrate specificity	Discuss properties like catalytic efficiency, specificity, temperature, and pH dependence	Analyze enzyme behavior under varying conditions	Analyze, Apply, Logical-Mathematical, Visual-Spatial
31-40	Introduction to Ribozymes and Their Roles	Case studies of ribozymes in RNA splicing	Define ribozymes, their discovery, and their function as RNA-based enzymes	Discuss the role of ribozymes in non-protein catalysis	Understand, Analyze, Logical-Mathematical, Interpersonal
41-50	Enzyme Classification: Six Major Classes	Flowcharts and examples for each class	Explain the six classes of enzymes: oxidoreductases, transferases, hydrolases, lyases, isomerases, ligases	Classify enzymes in examples and explain their catalytic mechanisms	Apply, Analyze, Logical-Mathematical, Visual-Spatial
51-60	Summary and Significance in Biochemistry	Recap notes, examples linking enzymes to metabolism	Summarize enzyme properties and classifications; discuss their role in diagnostics and industrial applications	Summarize key points and propose applications of enzyme classifications	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-SEC-B-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Drug Discovery and Development	Flowchart illustrating the stages of drug development	Introduce the drug discovery pipeline, including preclinical and clinical stages	Note-taking, discussing the overall process	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Target Identification and Validation	Diagrams of biological targets (e.g., enzymes, receptors)	Explain the role of identifying and validating biological targets for therapeutic intervention	Explore examples of targets in diseases	Understand, Apply, Logical-Mathematical
21-30	Lead Compound Identification and Optimization	Case studies on lead discovery methods (e.g., high-throughput screening, rational drug design)	Discuss strategies to find and optimize lead compounds for efficacy, selectivity, and safety	Analyze case studies and suggest optimization strategies	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Preclinical Studies	Examples of pharmacokinetics (ADME) and toxicity studies	Explain the importance of preclinical testing in animal models and in vitro systems	Examine data from mock preclinical studies and assess drug viability	Analyze, Evaluate, Logical-Mathematical, Interpersonal
41-50	Clinical Trials: Phases I–III	Charts explaining the goals and processes of each phase	Explain the three clinical trial phases, focusing on safety, efficacy, and population studies	Discuss challenges in clinical trials and suggest mitigation strategies	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Real-World Applications	Recap notes, success stories of drugs from lab to market	Summarize the drug discovery process and discuss real-world examples of successful drug developments	Summarize the process and link it to healthcare impacts	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya
Department of Chemistry
Session Plan of Class 11
Chemistry (Honours)
Paper: CEMA-SEC-B-3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Industrial Fermentation	Diagrams of fermentation setups	Explain the concept of industrial fermentation and its role in producing ethyl alcohol and citric acid	Note-taking and identifying fermentation-based products	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Industrial Production of Ethyl Alcohol	Flowchart of the molasses fermentation process	Discuss the steps in producing ethyl alcohol, including raw materials, fermentation, and distillation	Analyze the flowchart and identify critical control points	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Industrial Production of Citric Acid	Diagrams of citric acid production via Aspergillus niger	Explain the microbial production process, including substrate selection and fermentation conditions	Evaluate the role of fungi and suggest suitable substrates	Apply, Analyze, Logical-Mathematical, Interpersonal
31-40	Purification Techniques for Ethanol and Citric Acid	Process diagrams of distillation and crystallization	Discuss purification techniques to ensure product quality for pharmaceutical applications	Examine purification steps and assess their importance	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial
41-50	Applications in the Pharmaceutical Industry	Case studies on drug formulation and excipients	Highlight the use of ethyl alcohol as a solvent and citric acid as a pH regulator and stabilizer	Explore examples of formulations using ethyl alcohol and citric acid	Apply, Analyze, Logical-Mathematical, Intrapersonal
51-60	Summary and Industry Trends	Recap of processes, discussion on innovations	Summarize the production techniques and explore advancements like green fermentation methods	Discuss sustainable methods and their impact on the pharmaceutical sector	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (Honours)

Paper: CEMA-SEC-B-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Pesticides and Their Importance	Presentation slides, real-world examples	Introduce the concept of pesticides and their role in agriculture, public health, and environmental control	Note-taking, identifying types of pests and their impact	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Natural vs. Synthetic Pesticides	Diagrams comparing natural and synthetic pesticides	Explain the differences between natural and synthetic pesticides, including sources and modes of action	Compare and contrast natural and synthetic pesticides	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Development of Pesticides	Timeline showing the history of pesticide development	Discuss the historical development of pesticides, from early methods to modern chemical formulations	Explore historical cases where pesticides played a significant role	Analyze, Understand, Logical-Mathematical, Intrapersonal
31-40	Types of Pesticides: Insecticides, Herbicides, Fungicides	Case studies on specific pesticide classes	Break down the categories of pesticides and their specific applications in pest control	Categorize pesticides and discuss their specific applications	Apply, Analyze, Logical-Mathematical, Interpersonal
41-50	Environmental and Health Impacts of Pesticides	Charts on pesticide toxicity and environmental effects	Address the ecological and human health concerns associated with pesticide use	Analyze the risks and benefits of pesticide use in controlled settings	Evaluate, Analyze, Logical-Mathematical, Interpersonal
51-60	Current Trends and Future of Pesticide Use	Recap notes, discussion on sustainable practices	Summarize current trends in pesticide development, including integrated pest management and organic options	Discuss future challenges in pesticide use and explore sustainable solutions	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (Honours)

Paper: CEMA-SEC-B-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Parathion and Its Chemical Structure	Chemical structure diagrams, introductory slides	Introduce parathion as an organophosphate pesticide, discuss its chemical structure and properties	Note-taking, identifying key chemical components of parathion	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Technical Manufacture of Parathion	Flowchart of the synthesis process	Explain the industrial synthesis process of parathion, focusing on raw materials, reactions, and catalysts	Analyze the synthesis process and identify key steps	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Applications of Parathion in Pest Control	Case studies of parathion use in agriculture	Discuss the primary uses of parathion as an insecticide, including crop protection and pest management	Review real-world case studies of parathion's applications	Apply, Analyze, Logical-Mathematical, Interpersonal
31-40	Safety Considerations in Parathion Production and Use	Safety data sheets (SDS), toxicity graphs	Explain the health and environmental risks associated with parathion, including toxicity and exposure risks	Discuss safety measures in handling, storage, and disposal of parathion	Evaluate, Analyze, Logical-Mathematical, Interpersonal
41-50	Regulatory Standards and Environmental Impact	Regulatory guidelines, environmental impact studies	Introduce regulatory standards for pesticide use, including legal restrictions and environmental impact	Analyze pesticide regulations and propose safe usage practices	Understand, Evaluate, Logical-Mathematical, Interpersonal
51-60	Sustainable Alternatives and Innovations	Discussion on green chemistry, case examples of safer alternatives	Summarize current trends in reducing pesticide toxicity, such as developing safer alternatives to parathion	Brainstorm and discuss possible alternatives and innovations in pesticide use	Remember, Evaluate, Linguistic, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC1/GE1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Definition and Units of Pressure	Diagrams, pressure-measuring devices (e.g., barometer)	Explain the concept of pressure, units (Pa, atm, mmHg), and demonstrate pressure measurement methods	Observe demonstrations, note key points, ask questions	Remember, Understand, Linguistic, Logical-Mathematical
10	Factors Affecting Pressure	Visual aids, real-life examples (e.g., tires, dams)	Discuss how area and force influence pressure; present examples like tires and hydraulic systems	Participate in discussions, relate to everyday experiences	Understand, Apply, Logical-Mathematical, Visual-Spatial
10	Concept of Temperature and Units	Thermometers, temperature scales chart	Define temperature, its role in kinetic energy, and scales (Celsius, Fahrenheit, Kelvin); demonstrate measurement tools	Observe thermometer use, compare temperature scales	Remember, Understand, Linguistic, Logical-Mathematical
10	Relationship Between Pressure and Temperature	Interactive simulations, graphs	Explain the relationship using the ideal gas law and real-life scenarios like weather changes or cooking	Engage with simulations, interpret graphs	Apply, Analyze, Logical-Mathematical, Visual-Spatial
10	Applications of Pressure and Temperature Concepts	Case studies, industrial examples (e.g., steam engines)	Discuss their roles in engineering, weather, and human physiology (e.g., blood pressure)	Analyze case studies, discuss applications in groups	Analyze, Evaluate, Interpersonal, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC1/GE1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Summary and Key Takeaways	Summary notes, reflective questions	Recap key concepts, emphasize the practical importance of pressure and temperature, and clarify queries	Summarize in their own words, reflect on real-life relevance	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 23

Chemistry (General)

Paper: CEMG-CC1/GE1

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Concept of Atomic Spectra	PowerPoint slides, spectrometer visuals	Explain the concept of atomic spectra, emphasizing emission and absorption spectra with real-life examples	Observe visual examples, ask questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Introduction to Bohr's Model	Diagrams, animations of electron transitions	Explain postulates of Bohr's theory, the concept of quantized energy levels, and their relevance to hydrogen	Watch animations, note down key concepts	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Energy Levels and Orbits in Hydrogen Atom	Energy-level diagrams, mathematical derivations	Derive the formula for energy levels of hydrogen and discuss its implications for electron orbits	Solve energy-level calculations, participate in problem-solving	Apply, Analyze, Logical-Mathematical
31-40	Explanation of Spectral Lines	Visualizations of Balmer, Lyman series	Relate electron transitions to spectral line formation in hydrogen; demonstrate the series using visual aids	Interpret the Balmer and Lyman series diagrams	Analyze, Understand, Logical-Mathematical, Visual-Spatial
41-50	Applications of Bohr's Model	Case studies, historical developments	Discuss the success and limitations of Bohr's model in explaining spectra and its historical significance	Group discussions, relate concepts to real-world phenomena	Evaluate, Analyze, Interpersonal, Logical-Mathematical
51-60	Summary and Connections to Modern Theory	Summary notes, guided reflection	Summarize Bohr's contributions and how they connect to modern quantum mechanics	Summarize key takeaways, reflect on advances in atomic theory	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC2/GE2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Concept of Variables in Thermodynamics	Diagrams, real-life analogies	Define thermodynamic variables and distinguish between system properties (e.g., pressure, volume, temperature)	Note-taking, asking clarifying questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Intensive vs. Extensive Variables	Interactive examples (e.g., mass, density)	Explain and contrast intensive variables (independent of size, e.g., temperature) with extensive variables (dependent, e.g., volume)	Discuss examples, relate to physical systems	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Mathematical Representation of Variables	Sample problems, graphs	Demonstrate how intensive and extensive properties are used in thermodynamic equations and calculations	Solve practice problems, interpret graphs	Apply, Analyze, Logical-Mathematical
31-40	Concept of State Functions	Graphical representation (P-V diagram), animations	Define state functions (e.g., enthalpy, entropy), showing dependence only on initial and final states	Interpret diagrams, analyze examples	Understand, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Concept of Path Functions	Process examples (e.g., work, heat)	Explain path functions (dependent on the path taken, e.g., work done) and contrast with state functions	Compare state and path functions in small-group discussions	Evaluate, Analyze, Interpersonal, Logical-Mathematical

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC2/GE2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Applications	Summary notes, guided discussion	Summarize key differences and their significance in thermodynamics applications	Summarize key points, reflect on real-world connections	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (General)

Paper: CEMG-CC2/GE2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Raoult's Law	Diagrams, graphs, and equations	Recap Raoult's Law for ideal solutions and introduce the concept of vapor pressure in solutions	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Non-Ideal Solutions	Visual aids, examples of real systems	Explain the concept of non-ideal solutions and introduce positive and negative deviations from Raoult's Law	Observe visual aids, relate to practical examples (e.g., ethanol-water mixtures)	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Positive Deviations	Graphs, molecular interactions (diagrams)	Illustrate positive deviations (higher vapor pressure) with examples like ethanol-hexane mixtures	Analyze examples, discuss molecular interactions causing deviations	Apply, Analyze, Logical-Mathematical, Intrapersonal
31-40	Negative Deviations	Case studies, graphical analysis	Explain negative deviations (lower vapor pressure) with examples like chloroform-acetone mixtures	Interpret graphs, participate in case study discussions	Understand, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Factors Affecting Deviations	Comparative tables, interactive simulations	Discuss intermolecular forces (hydrogen bonding, dipole interactions) and their role in deviations	Compare factors in group discussions, engage with simulations	Evaluate, Analyze, Interpersonal, Logical-Mathematical
51-60	Applications and Summary	Summary notes, real-world examples	Summarize deviations and their practical applications (e.g., distillation, industrial solutions)	Summarize in their own words, relate to real-world systems	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC3/GE3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Overview of Chemical Bonding	PowerPoint slides, periodic table diagrams	Explain the importance of chemical bonding in compounds; introduce types of bonds (ionic, covalent, metallic)	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Ionic Bonding: Formation and Characteristics	Visual aids, animations of electron transfer	Demonstrate electron transfer between atoms, explain electrostatic forces, and characteristics of ionic bonds	Observe animations, identify ionic bond examples	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Lattice Energy: Concept and Importance	Energy diagrams, Born-Haber cycle illustration	Explain lattice energy, its calculation (using Born-Haber cycle), and its role in ionic compound stability	Solve simple lattice energy problems, analyze diagrams	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Solvation Energy: Concept and Role	Case studies, water solvation diagrams	Discuss solvation energy, focusing on hydration of ions, and its impact on dissolving ionic compounds	Relate solvation to real-world examples (e.g., salt dissolving in water)	Understand, Apply,Logical-Mathematical, Intrapersonal
41-50	Stability of Ionic Compounds	Comparative tables, real-world examples	Discuss factors affecting stability: lattice energy, size of ions, charge density, and solvation energy	Engage in group discussions, compare stability factors	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Real-World Applications	Summary notes, industrial examples	Recap key points; discuss applications in materials science, salts, and ionic crystals	Summarize in their own words, ask reflective questions	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (General)

Paper: CEMG-CC3/GE3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Lanthanides	Periodic table, electronic configuration charts	Explain the position of lanthanides in the periodic table, their electronic configurations, and similar chemical properties	Note-taking, asking clarifying questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Challenges in Separating Lanthanides	Visual examples, real-world industrial problems	Discuss the chemical similarity of lanthanides due to the lanthanide contraction and the need for advanced separation techniques	Relate challenges to real-world applications (e.g., rare earth metals in electronics)	Understand, Apply, Logical-Mathematical, Intrapersonal
21-30	Principle of Ion-Exchange Method	Diagrams, animations of ion exchange columns	Explain the ion-exchange process: selective adsorption of lanthanide ions on a resin, elution with reagents	Observe diagrams and animations, note key principles	Understand, Apply, Logical-Mathematical, Visual-Spatial
31-40	Procedure of Ion-Exchange Method	Flowchart, step-by-step experimental setup	Demonstrate the process: preparing the resin, loading the sample, elution, and analysis of separated lanthanides	Analyze flowcharts, participate in group discussions	Apply, Analyze, Logical-Mathematical, Visual-Spatial
41-50	Advantages and Limitations of the Method	Comparative tables, examples of alternative methods	Compare ion-exchange with other methods (e.g., solvent extraction), highlighting efficiency and limitations	Engage in comparative analysis, discuss in groups	Analyze, Evaluate, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (General)

Paper: CEMG-CC3/GE3

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Applications and Summary	Summary notes, industrial and scientific examples	Summarize key concepts; discuss the application of separated lanthanides in industries like electronics, catalysts, and phosphors	Summarize in their own words, ask questions about applications	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-CC4/GE4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Alcohols	Molecular structure diagrams, periodic table	Define primary alcohols, discuss their structure, and explain their importance in organic chemistry	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Grignard Reagent: Preparation and Properties	Reaction schemes, chemical structure models	Explain the preparation of Grignard reagents (RMgX), their properties, and role as nucleophiles	Observe reaction mechanisms, relate to examples	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Preparation of Primary Alcohols using Grignard Reagent	Step-by-step mechanism visuals, flowcharts	Demonstrate the reaction of Grignard reagents with formaldehyde to form primary alcohols	Analyze the reaction mechanism, solve related chemical equations	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Reduction of Aldehydes to Primary Alcohols	Diagrams, reduction agent examples (LiAlH4, NaBH4)	Explain the reduction process of aldehydes using reducing agents; demonstrate reaction mechanisms	Solve example reactions, compare different reducing agents	Understand, Apply, Logical-Mathematical
41-50	Comparison of Methods and Applications	Comparative tables, real-life examples	Compare Grignard reagent reactions and aldehyde reduction; discuss applications in synthesis of compounds	Engage in group discussions, compare methods	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Practical Relevance	Summary notes, industrial examples	Recap key points and discuss the applications in pharmaceuticals, flavor compounds, and materials science	Summarize in their own words, reflect on industrial applications	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (General)

Paper: CEMG-CC4/GE4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Amines	PowerPoint slides, molecular structure diagrams	Define amines, classify them (primary, secondary, tertiary), and provide examples of aliphatic and aromatic amines	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Preparation of Aliphatic Amines	Reaction mechanisms, flowcharts	Explain preparation methods (e.g., alkylation of ammonia, reduction of nitriles, Gabriel synthesis)	Observe reaction mechanisms, solve related equations	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Preparation of Aromatic Amines	Diagrams, chemical equations	Discuss the preparation of aromatic amines (e.g., aniline via reduction of nitrobenzene) with mechanisms	Solve reaction equations, relate to industrial processes	Apply, Analyze, Logical-Mathematical
31-40	Hofmann Degradation: Concept and Mechanism	Step-by-step reaction mechanism visuals	Explain Hofmann degradation: conversion of amides to amines with one fewer carbon atom using Br_2 and NaOH	Analyze the mechanism, solve example problems	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Comparison and Applications	Comparative tables, practical examples	Compare aliphatic and aromatic amine preparations; highlight Hofmann degradation applications	Engage in group discussions, compare methods	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Industrial Relevance	Summary notes, industrial examples	Recap key methods and reactions; discuss applications in pharmaceuticals, dyes, and polymers	Summarize in their own words, ask questions about practical uses	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-DSE-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to the Glassy State	Diagrams, molecular structure animations	Define the glassy state; explain its amorphous structure and contrast it with crystalline solids	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Properties of Glassy Materials	Visual aids, property charts (e.g., hardness, transparency)	Discuss key properties like amorphous structure, isotropy, brittleness, and thermal resistance	Observe charts and examples, participate in discussions	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Silicate Glasses: Types and Composition	Molecular models, silicate network diagrams	Explain silicate glasses (e.g., soda-lime, borosilicate) focusing on composition, formation, and uses	Analyze diagrams, discuss real-life examples like window glass	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Non-Silicate Glasses: Types and Composition	Comparative tables, examples (e.g., metallic glass, chalcogenide glass)	Discuss non-silicate glasses, their composition, formation, and specialized applications	Compare silicate and non-silicate examples, engage in discussions	Analyze, Evaluate, Logical-Mathematical, Interpersonal
41-50	Applications of Glasses	Case studies, real-world examples	Highlight applications of silicate glasses (construction, cookware) and non-silicate glasses (optics, electronics)	Relate properties to applications in technology and daily life	Understand, Apply, Logical-Mathematical, Intrapersonal
51-60	Summary and Future Prospects	Summary notes, interactive Q&A	Recap key points, emphasize advancements in glass technology, such as smart glasses and bioactive glasses	Summarize key ideas, ask reflective questions	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 22

Chemistry (General)

Paper: CEMG-DSE-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Batteries	Visual aids (battery images, flowcharts)	Define batteries, explain their role in energy storage, and introduce the concepts of primary and secondary batteries	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Components of Batteries	Diagrams, cross-sectional views of batteries	Describe key components: anode, cathode, electrolyte, separator, and external circuit	Observe and label battery diagrams, ask clarifying questions	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Primary Batteries: Examples and Characteristics	Visual examples (e.g., zinc-carbon, alkaline batteries)	Explain primary batteries: non-rechargeable, single-use applications; discuss examples and performance characteristics	Analyze examples, solve simple questions on primary battery reactions	Apply, Analyze, Logical-Mathematical
31-40	Secondary Batteries: Examples and Characteristics	Diagrams, rechargeable battery visuals	Discuss secondary batteries: rechargeable nature, examples (lead-acid, lithium-ion); explain charge-discharge cycles	Participate in discussions, solve examples on energy efficiency	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Comparison of Primary and Secondary Batteries	Comparative tables, practical scenarios	Highlight differences in design, reusability, cost, and applications; provide real-world scenarios	Compare properties in small groups, relate to common applications	Analyze, Evaluate, Logical-Mathematical, Interpersonal
51-60	Summary and Applications	Summary notes, industrial examples	Recap key concepts; discuss applications in electronics, transportation, and renewable energy storage	Summarize in their own words, reflect on industrial relevance	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersona

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-DSE-B-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Inroduction to light as an electromagnetic wave	Brainstorming and Pictures Presentation	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic
10	Quantum chemical description of a molecule	Case Study Group Discussions	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Interpersonal Intrapersonal Verbal-linguistic
10	Discussion on semi-classical approach	Demonstration Discussions	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Interaction of light with matter	Demonstration Discussions	Facilitates Explains	Listens Participates Discusses	Analyzing Intrapersonal Logical Linguistic
10	Transition moment integral and its significance	Demonstration Discussions	Case-study	Explains	Analyzing Intrapersonal Logical Linguistic
10	Recapitulation	Brainstorming	Facilitates Explains	Listens Participates Discusses	Remembering Understanding Verbal-linguistic

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 21

Chemistry (General)

Paper: CEMG-DSE-B-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction to Electroanalytical Methods: Overview and Importance	PowerPoint slides, chalkboard/whiteboard	Present a brief overview with examples of electroanalytical applications in industries and research	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
10	Classification: pH metric Methods	Visual demonstration of pH meter, diagrams	Explain the working of a pH meter and its importance; show a sample pH titration graph	Observe demonstrations, discuss and compare the pH measurement process	Understand, Apply, Logical-Mathematical, Visual-Spatial
10	Potentiometric Methods	Short video/animations, sample graphs	Describe electrodes, EMF measurement, and applications with real-life examples	Analyze the working mechanism; answer posed scenario-based questions	Understand, Analyze, Logical-Mathematical, Intrapersonal
10	Conductometric Titrations	Hands-on setup demo, interactive handouts	Showcase conductometric titration process; discuss conductivity changes during titration	Observe titration, interpret provided sample data	Apply, Analyze, Logical-Mathematical, Bodily-Kinesthetic
10	Comparative Analysis of Methods	Group discussion, tabular comparative chart	Facilitate discussions on pros and cons of each method in specific applications	Group work to prepare a comparative chart	Evaluate, Analyze, Interpersonal, Logical-Mathematical
10	Summary and Q&A Session	Summary notes, Q&A	Review key points from the session; answer student queries	Summarize in their own words, ask clarifying questions	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Carbohydrates	Molecular structure diagrams, examples of simple sugars	Define carbohydrates, classify them (monosaccharides, disaccharides, polysaccharides), and discuss their structure	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Functions of Carbohydrates in Biology	Visual aids (energy cycle, structural roles)	Explain the biological roles of carbohydrates: energy storage, structural support, and cell signaling	Discuss examples in biological systems (e.g., glucose in energy metabolism)	Understand, Apply, Logical-Mathematical, Intrapersonal
21-30	Carbohydrate Metabolism Overview	Flowcharts of metabolic pathways (glycolysis, TCA cycle)	Introduce the key metabolic pathways that utilize carbohydrates: glycolysis, the citric acid cycle, and gluconeogenesis	Interpret flowcharts, identify key enzymes in metabolic pathways	Apply, Analyze, Logical-Mathematical, Visual-Spatial
31-40	Glycolysis and Gluconeogenesis	Step-by-step reaction diagrams, animations	Explain the processes of glycolysis and gluconeogenesis, emphasizing energy production and glucose synthesis	Solve pathway-related questions, discuss the role of enzymes	Understand, Apply, Logical-Mathematical, Visual-Spatial
41-50	Role of Carbohydrates in Energy Production	Energy cycle diagrams, ATP production flowcharts	Discuss how carbohydrates contribute to ATP production through glycolysis and oxidative phosphorylation	Solve ATP production problems, interpret energy flow charts	Analyze, Evaluate, Logical-Mathematical, Visual-Spatial

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Disorders in Carbohydrate Metabolism	Case studies, diagrams of disorders like diabetes	Discuss disorders like diabetes, explaining the impact of carbohydrate metabolism defects	Discuss case studies, relate to real-world health problems	Understand, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (General)

Paper: CEMG-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
0-10	Introduction to Lipid Membranes	Diagrams of lipid bilayers, fluid mosaic model	Define lipid membranes, explain their structure (phospholipid bilayer), and the fluid mosaic model of membrane organization	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
11-20	Functions of Lipid Membranes	Animated diagrams, real-world examples	Explain the functions of lipid membranes: selective permeability, cell communication, and compartmentalization	Discuss examples of membrane function in cells (e.g., ion transport, signal transduction)	Understand, Apply, Logical-Mathematical, Visual-Spatial
21-30	Liposomes: Structure and Formation	Microscopic images, illustrations of liposome formation	Define liposomes, discuss their formation, and explain their structure (single-layer vs. multi-layer vesicles)	Observe diagrams, compare with biological membranes	Understand, Apply, Logical-Mathematical, Visual-Spatial
31-40	Liposomes in Drug Delivery	Case studies, diagrams of drug encapsulation	Explain the use of liposomes in drug delivery, including the advantages of targeted delivery and controlled release	Discuss examples of liposomal drug delivery systems, solve case studies	Analyze, Evaluate, Logical-Mathematical, Interpersonal
41-50	Applications of Lipid Membranes	Examples from biotechnology, medicine, cosmetics	Discuss the applications of lipid membranes in various fields: biotechnology (cell culture), medicine (drug delivery), and cosmetics (skin care)	Research specific liposome-based products, present findings	Apply, Analyze, Logical-Mathematical, Intrapersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 11

Chemistry (General)

Paper: CEMG-SEC-A-2

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
51-60	Summary and Emerging Research	Summary notes, recent articles on lipid membrane technologies	Recap key concepts and discuss cutting-edge research in lipid membranes and liposome technology (e.g., gene therapy)	Summarize key points, reflect on current and future research trends	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 01

Chemistry (General)

Paper: CEMG-DSE-B-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Overview of Pesticides	PowerPoint slides, videos, chalkboard	Introduce the definition, importance, and historical background of pesticides	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
10	Classification of Pesticides	Flowcharts, visual aids, handouts	Explain the types of pesticides (insecticides, herbicides, fungicides) and their applications	Discuss and classify pesticides based on examples	Understand, Apply, Logical-Mathematical, Visual-Spatial
10	Natural Pesticides	Case studies, interactive discussion	Highlight examples of natural pesticides (e.g., neem, pyrethrin) and their advantages and limitations	Group discussion on benefits and challenges of natural pesticides	Understand, Analyze, Logical-Mathematical, Intrapersonal
10	Synthetic Pesticides	Diagrams, chemical structures, role-play	Explain the development, types, and environmental impacts of synthetic pesticides	Observe and analyze chemical structures; participate in discussions	Apply, Analyze, Logical-Mathematical, Visual-Spatial
10	Comparative Analysis: Natural vs. Synthetic	Tabular comparison, group activities	Facilitate group activity to compare and contrast the properties, effectiveness, and safety of both types	Work collaboratively on a comparative table	Evaluate, Analyze, Interpersonal, Logical-Mathematical
10	Summary and Reflection	Summary notes, guided reflections	Summarize session highlights, emphasizing key takeaways and encouraging reflective insights	Summarize in their own words, reflect on learnings	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 10

Chemistry (General)

Paper: CEMG-DSE-B-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Introduction to Anilides	PowerPoint slides, chalkboard, examples	Define anilides and their significance in agriculture, focusing on their chemical structure and	Note-taking, asking introductory questions	Remember, Understand, Linguistic, Logical-Mathematical
10	Alachlor: Structure and Function	Chemical diagrams, interactive visuals	Explain Alachlor's mode of action as a pre-emergence herbicide, its target crops, and weed control spectrum	Analyze chemical structures, discuss applications	Understand, Apply, Logical-Mathematical, Visual-Spatial
10	Alachlor: Uses and Benefits	Case studies, real-life examples	Discuss specific examples of Alachlor in controlling weeds in crops like maize and soybean	Reflect on case studies, relate to agricultural scenarios	Apply, Analyze, Logical-Mathematical, Intrapersonal
10	Butachlor: Structure and Function	Charts, molecular models	Describe Butachlor's role as a selective herbicide, focusing on paddy fields and its mechanism of action	Observe and interpret diagrams, engage in group discussions	Understand, Analyze, Logical-Mathematical, Visual-Spatial
10	Butachlor: Uses and Benefits	Practical examples, comparison tables	Highlight its widespread use in rice farming and discuss safety and environmental considerations	Compare usage scenarios, engage in classroom dialogue	Apply, Evaluate, Logical-Mathematical, Interpersonal

Shyampur Siddheswari Mahavidyalaya

Department of Chemistry

Session Plan of Class 10

Chemistry (General)

Paper: CEMG-DSE-B-4

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	Summary and Applications in Context	Summary notes, guided discussion	Summarize the applications of Alachlor and Butachlor, focusing on their economic and agricultural impact	Summarize in their own words, reflect on pesticide roles	Remember, Evaluate, Linguistic, Logical-Mathematical, Interpersonal