

LESSON PLAN
FOR
THE SESSION 2026-2027(ODD SEM, AUGUST-DECEMBER)
DEPARTMENT OF CHEMISTRY

Gyanpeeth Degree college, Nikashi, Baksa, BTR

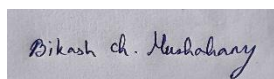
Name of Faculty: Dr. Swarna Kamal Dey

CLASS/SEMESTER: Sem-I

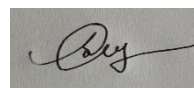
COURSE: MAJOR

PAPER CODE: CHEMMAJ1014 COURSE TITLE: Fundamentals of Chemistry-1

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Atomic Structure and Periodicity of Elements Atomic structure: Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Wave mechanics: de-Broglie equation, Heisenberg's Uncertainty Principle and its significance, Schrödinger's wave equation, significance of ψ and ψ^2 .	4
September	Quantum numbers and their significance. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions for hydrogen atom. Radial and angular distribution curves. Shapes of s, p, d and f orbitals. Contour boundary and probability diagrams. Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations, Variation of orbital energy with atomic number.	5
October	Periodicity of elements: s, p, d, f block elements, the long form of periodic table. Detailed discussion of the following properties of the elements, with reference to s and p-block. (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table. (b) Atomic radii (van der Waals) (c) Ionic and crystal radii. (d) Covalent radii (octahedral and tetrahedral)	3
November	(e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy. (f) Electron gain enthalpy, trends of electron gain enthalpy. (g) Electronegativity, Pauling's/ Mulliken's/ Allred Rachow's/ and Mulliken-Jaffé's electronegativity scales. Variation of electronegativity with bond order, partial charge, hybridization, group electronegativity. Sanderson's electron density ratio	3
December	Question Paper Solve, Revision and Class test	



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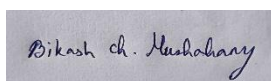
PAPER CODE: CHMMIN1014

PAPER TITLE: Chemistry-1

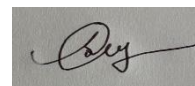
CLASS/SEMESTER: Sem-I

COURSE: MINOR

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Atomic Structure Review of: Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie's relation, Heisenberg Uncertainty principle. Hydrogen atom spectra. Need of a new approach to atomic structure.	3
September	Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom. Radial and angular parts of the hydrogenic wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).	4
October	Radial and angular nodes and their significance. Radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s, p and d atomic orbitals, nodal planes. Rules for filling electrons in various orbitals.	4
November	Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations.	4
December	Question Paper Solve, Revision and Class test	



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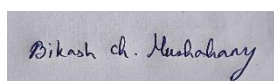
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CLASS/SEMESTER: Sem-I

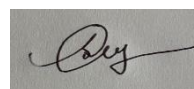
COURSE: SEC

PAPER CODE: **CHMSEC1013B**PAPER TITLE: **Basic Analytical Chemistry**

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Introduction to Analytical Chemistry and its interdisciplinary nature Concept of sampling. Importance of accuracy, precision.	2
September	Sources of error in analytical measurements (with problem-based examples).	2
October	Presentation of experimental data and results, from the point of view of significant figures.	2
November	Practical Knowledge of above topics.	2
December	Question Paper Solve Revision Class test	



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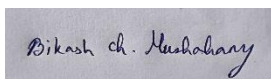


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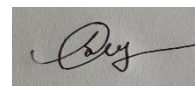
CLASS/SEMESTER: Sem-III
PAPER CODE: CHEMMAJ2014COURSE: MAJOR
COURSE TITLE: Inorganic Chemistry-1

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
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August	Unit 1: Chemistry of <i>s</i> and <i>p</i> Block Elements Inert pair effect, Relative stability of different oxidation states, diagonal relationship and anomalous behaviour of first member of each group. Allotropy and catenation. Complex formation tendency of <i>s</i> and <i>p</i> block elements. Hydrides and their classification ionic, covalent and interstitial. Basic beryllium acetate and nitrate.	7
September	Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses. Boric acid and borates, boron nitrides, borohydrides (diborane) carboranes and graphitic compounds, silanes, Oxides and oxoacids of nitrogen, Phosphorus and chlorine. Peroxo acids of sulphur, interhalogen compounds, polyhalide ions, pseudohalogens and basic properties of halogens.	8
October	Unit 2: Acids and Bases Brönsted-Lowry concept of acid-base reactions, solvated proton, relative strength of acids, types of acid-base reactions, levelling solvents, Lewis acid-base concept, Classification of Lewis acids, Hard and Soft Acids and Bases (HSAB). Application of HSAB principle.	6
November	Unit 3: Noble Gases Occurrence and uses, rationalization of inertness of noble gases, Clathrates; preparation and properties of XeF ₂ , XeF ₄ and XeF ₆ ; Nature of bonding in noble gas compounds (Valence bond treatment and MO treatment for XeF ₂). Molecular shapes of noble gas compounds (VSEPR theory).	6
December	Question Paper Solve, Revision and Class test	



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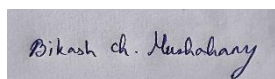
PAPER CODE: **CHMMIN2014**

PAPER TITLE: **Chemistry-3**

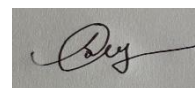
CLASS/SEMESTER: Sem-III

COURSE: MINOR

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Chemical Bonding Ionic bond: General characteristics, types of ions, size effects, radius ratio rule and its limitations. Lattice energy. Born-Haber cycle and its application, Solvation energy.	3
September	Unit 1: Chemical Bonding (ii) Covalent bond: Lewis structure, Valence Bond theory (Heitler-London approach). Types of hybridization (involving s, p and d orbitals). Resonance and resonance energy, Molecular orbital theory. Molecular orbital diagrams of diatomic and simple polyatomic molecules N ₂ , O ₂ , F ₂ , CO, and HCl. Formal charge.	4
October	Formal charge, Valence shell electron pair repulsion theory (VSEPR), shapes of simple molecules and ions containing lone pairs and bond pairs of electrons, multiple bonding (σ and π bond approach) and bond lengths.	4
November	Covalent character in ionic compounds, polarizing power and polarizability. Fagan's rules and consequences of polarization. Ionic character in covalent compounds: Bond moment and dipole moment. Percentage ionic character from dipole moment and electronegativity difference.	4
December	Question Paper Solve, Revision and Class test	



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CLASS/SEMESTER: Sem-III

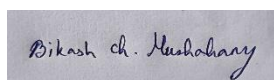
COURSE: SEC

PAPERCODE: **CHMSEC2013**

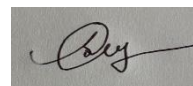
PAPER TITLE: **Basic Instrumental Techniques in Chemistry**

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
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August	Unit 1: Common Laboratory Equipment Melting point apparatus, electronic balance.	7
September	Viscometer, stalagmometer, pycnometer, separating funnel.	8
October	Distillation apparatus, soxhlet apparatus.	8
November	Kipps apparatus, centrifuge Machin, suction apparatus.	7
December	Question Paper Solve Revision Class test	



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PAPER CODE: **CHMMIN3014**

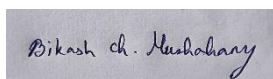
PAPER TITLE: **Chemistry-5**

CLASS/SEMESTER: Sem-V

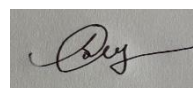
COURSE: MINOR

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Coordination Chemistry	3

	Study of transition elements (electronic configuration, characteristics and important compounds of transition elements). Werner's theory.	
September	IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers.	4
October	Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding.	4
November	Crystal field theory, measurement of $10 Dq (o)$, CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of $10 Dq$.	4
December	Question Paper Solve, Revision and Class test	



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