

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

Gyanpeeth Degree college, Nikashi, Baksa, BTR

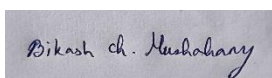
Name of Faculty: Dr. Bikash Ch. Mushahary

CLASS/SEMESTER: Sem-I

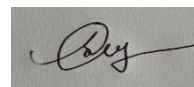
COURSE: MAJOR

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: Gaseous State Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path. Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities.	6
September	Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor, Z, and its variation with pressure for different gases. Causes of deviation from ideal behaviour. van der Waals equation of state, its derivation and application in explaining real gas behaviour, mention of other equations of state (Berthelot, Dietrici); virial equation of state; van der Waals equation expressed in virial form and calculation of Boyle temperature.	7
October	Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.	3
November	Question Paper Solve, Revision and Class test	
December	Question Paper Solve, Revision and Class test	



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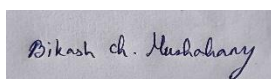
PAPER CODE: CHMMIN1014

PAPER TITLE: Chemistry-1

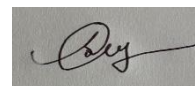
CLASS/SEMESTER: Sem-I

COURSE: MINOR

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 3: Chemical Thermodynamics Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics. First law: Concept of heat, q, work, w, internal energy, U, and statement of first law; enthalpy, H, relation between heat capacities, calculations of q, w, U and H for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions. Law of equipartition of energy, degrees of freedom and molecular basis of heat capacities.	6
September	Thermochemistry: Heats of reactions: standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions. Adiabatic flame temperature, explosion temperature.	5
October	Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes.	4
November	Question Paper Solve, Revision and Class test	
December	Question Paper Solve, Revision and Class test	



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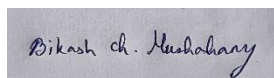
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CLASS/SEMESTER: Sem-I

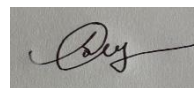
COURSE: SEC

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

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 3: Analysis of water Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.	5
September	(a) Determination of pH, acidity and alkalinity of a water sample. (b) Determination of dissolved oxygen (DO) of a water sample. Demonstration of 1. pH meter 2. Conductometer	5
October	Demonstration of 3. Potentiometer 4. DO meter 5. Flame photometer 6. UV-Vis spectrophotometer	2
November	Practical Knowledge of above topics.	2
December	Question Paper Solve Revision Class test	



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CLASS/SEMESTER: Sem-III
PAPER CODE: CHEMMAJ2014

COURSE: MAJOR
COURSE TITLE: Inorganic Chemistry-1

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 1: Chemical Thermodynamics 1 Definition of thermodynamic terms, closed, open and isolated system; surroundings, energy, heat, work, internal energy. The first law, calculation of work done during expansion of gas, thermodynamic reversibility, heat capacity, enthalpy and its significance, significance of heat and work. State functions and differentials; variation of internal energy and enthalpy with temperature, Joule-Thomson experiment and liquefaction of gases; relation between C_p and C_V ; Calculation of work done on adiabatic expansion; relation between P , V and T in adiabatic processes.	10
September	Thermochemistry- standard enthalpy changes, derivation of Hess's law and Kirchhoff's law. Relation of reaction enthalpy with changes in internal energy. Calculation of bond dissociation energies from thermochemical data.	5
September	Unit 2: Chemical Thermodynamics 2 The second law, entropy changes in reversible and irreversible processes.	2
October	Unit 2: Chemical Thermodynamics 2 Clausius inequality, calculation of entropy changes during various processes. Helmholtz function and Gibbs's function and the direction of spontaneous change. Thermodynamics of chemical reactions - Equilibrium constant of a reaction in terms of standard Gibbs's function, dependence of equilibrium constant of temperature and pressure. Standard entropy of a reaction and standard Gibbs function of formation. Maxwell's relations and derivation of thermodynamic equation of state; Gibbs's-Helmholtz equation, variation of Gibbs's function with pressure and temperature.	10
November	A brief idea of partial molar quantity, chemical potential, and Gibbs's-Duhem equation. Third law of thermodynamics – Nernst heat theorem.	3
December	Question Paper Solve, Revision and Class test	

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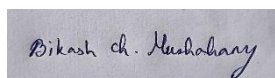
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PAPER TITLE: Chemistry-3

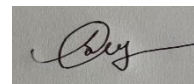
CLASS/SEMESTER: Sem-III

COURSE: MINOR

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 3:Liquids and Solids <i>Liquid state:</i> Physical properties of liquids; vapour pressure, surface tension and coefficient of viscosity, and their determination. Effect of addition of various solutes on surface tension and viscosity. Explanation of cleansing action of soap and detergents. Temperature variation of viscosity of liquids and comparison with that of gases. Qualitative discussion of structure of water.	6
September	Unit 3:Liquids and Solids <i>Solid state:</i> Nature of the solid state, classification of crystalline solid, crystal lattice and unit cell, Miller indices.	5
October	Seven crystal systems and fourteen Bravais lattices; closed packed structure and packing efficiency, X-ray diffraction, Bragg's law. Defects in crystalline solids.	4
November	Revision Class	
December	Question Paper Solve, Revision and Class test	



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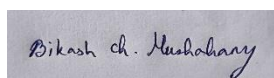
CLASS/SEMESTER: Sem-III

COURSE: SEC

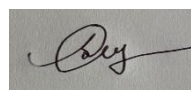
PAPERCODE:**CHMSEC2013**

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

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 2: Basic Electronic Equipment Conductometer, pH meter, potentiometer	13
September	polarimeter, magnetic stirrer, calorimeter, hot plate, hot air oven,	12
October	muffle furnace, DO meter.	5
November	Revision	
December	Question Paper Solve Revision Class test	



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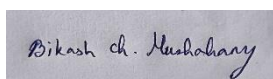


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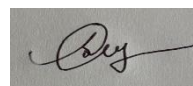
PAPER CODE: **CHMMIN3014**

PAPER TITLE: **Chemistry-5**

<i>Month</i>	<i>Planned topic to be taught</i>	<i>Lectures</i>
August	Unit 3: Equilibria 15 Lectures <i>K_p</i> , <i>K_c</i> and <i>K_x</i> for reactions involving ideal gases and their relations. Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Le Chatelier's principle and its application (Synthesis of ammonia as an example).	5
September	Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect.	5
October	Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts –applications of solubility product principle.	5
November	Revision Classes	
December	Question Paper Solve, Revision and Class test	



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