Lesson Plan

Name of the Faculty	:	**Dr. Vinod khatri**
Class	:	**B. Sc- I**
Semester	:	**First Semester (2025-26)**
Subject	:	**Chemistry-1**
Paper Code	:	**B-CHE-101**

Lectures	Topic (including assignment and test)
July & August 2023	Gaseous State: Kinetic theory of gases, Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity, and most probable velocity. Collision diameter, collision number, collision frequency and mean free path (Derivations excluded), Acid/Base titration: Determination of strength of NaOH using oxalic acid. Redox titrations: Determination of Fe 2+ions using KMn04.
September 2023	Deviation of Real gases from ideal behaviour, Derivation of Vander Waal's Equation of State, its application in the calculation of Boyle's temperature (compression factor) To determine the surface tension of given liquid using Stalagmometer by drop no. methods. Preparation of m-Dinitrobenzne from Nitrobenzene (use 1:2 conc. ~~HNO3~~-H2S04 mixture if fuming HNO_3 is not available). HNO_3
October 2023	Critical Phenomenon: Concept of Critical temperature, critical pressure, critical volume, relationship between critical constants and Van der Waal's constants (Derivation excluded). Preparation of p-Bromoacetanilide from Acetanilide
November & December 2023	Revision , Class Tests, Assignments and Exams

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Name of the Faculty	:	**Dr. Vinod Khatri**
Class	:	**B.Sc- II / B.A. II MDC**
Semester	:	**Third Semester (2025-26)**
Paper Code	:	**B-CHE-301, B-CHE-303**

Lectures	Topic (including assignment and test)
July & August 2025	Alkynes: Nomenclature and its structure. Methods of formation: using Calcium carbide, dehydrohalogenation, Kolbe's electrolysis. Chemical reactions: Mechanism of electrophilic and nucleophilic addition reactions, formation of metal acetylides, addition of bromine and alkaline KMn04, ozonolysis. Acidity of alkynes. Stereochemistry of Organic Compounds Concept of isomerism: Structural and Stereoisomerism. Symmetry elements, enantiomers, optical activity, properties of enantiomers, chiral and achiral molecules (up-to 2 asymmetric centres), diastereomers, threo- and erythro- nomenclature, meso-compounds, Relative and absolute configuration, sequence rules, R and S system of nomenclature. Cis- Trans isomerism, E & Z system of nomenclature, Conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds. Newman and Sawhorse projection formulae. Gravimetric Analysis: Estimation of Ni2+ as Ni-dimethylglyoxime and Al3 + as Alloxanate. Colorimetry: To verify Beer-Lambert law for KMn04/K2Cr 207 and determine the unknown concentration of the given solution ofKMn04 /K2Cr 207 solution. Determine the rate constant of hydrolysis of ethyl acetate. **MDC** Pollution and their types: Plastic and polyethene pollution, pollution sources, Recycling of plastic, greenhouse effect, ozone depletion. Energy: Energy sources, renewable and non-renewable sources, cells ahd batteries, fuel cell, solar cell, polymer cell To check the TDS of different samples. of water. Purify the given sample of water using different purification techniques.
September 2025	Benzene and its derivatives: Nomenclature, Aromatic nucleus and side chain, Huckels' rule of aromaticity. Aromatic electrophilic substitution, mechanism of nitration, halogenation, sulphonation, and Friedel- Crafts reaction. Energy profile diagrams. Activating, deactivating substituents and orientation Practicals: Preparation of Cuprous chloride, tetra ammine cupric sulphate. To determine the CST of phenol-water system.

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	To determine the Enthalpy of neutralisation of strong base Vs strong acid and weak acid/weak base Vs. strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base. **MDC** Water: Sources of drinking water and uses, water conservation, Permissible TDS, Techniques of purification of water, R.O. water purification process (Osmosis and Reverse Osmosis), wastewater management
October 2025	Alkyl halides: Nomenclature, methods of formation: from alkenes and alcohol, nucleophilic substitution reactions of alkyl halides, SN2 and SNI reactions with energy profile diagrams. Practicals: To prepare acidic and basic buffer solutions of pH 5 and 9 respectively. To determine the solubility of Benzoic acid at various temperatures and to determine the AH of the dissolution process. **MDC** Pesticides and Herbicides: General introduction and definition, biological control and chemical control: natural and synthetic pesticides, benefits and adverse effects of DDT, BHC, malathion
November & December 2025	Aryl halides: Methods of formation: halogenation, Sandmeyer reaction. The addition-elimination, and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl, and aryl halides. **MDC** Identify the pH of different samples of food items. Neutralize the given samples of the base using acids

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Name of the Faculty : Dr. Vinod Khatri
Class : B.Sc- III
Semester : Fifth Semester (2025-26)
Paper Code : CHE 301B

Lectures	Topic (including assignment and test)
July & August 2025	**Physical Chemistry:** Quantum Mechanics-I: Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics , quantum mechanical operator, commutation relations,
September 2025	Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics, To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance.
October 2025	**Physical Chemistry:** Physical Properties and Molecular Structure: Optical activity, polarization – (Clausius–Mossotti equation). Orientation of dipoles in an electric field, dipole moment, included dipole moment, measurement of dipole moment temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination
November & December 2025	Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetic substances. Spectroscopy : Rotational , Vibrational Spectroscopy Vibrational-rotation Spectroscopy , RAMAN Spectroscopy

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