

**LESSON PLAN**  
**(From July 2022 to December 2022)**

**NAME: Dr. Urmila**

**CLASS: B.Sc. I (Physical Chemistry)**

Sr. No.	Week	Content
<b>Unit – 1</b>	22/08/2022 – 27/08/2022	<b>Gaseous States</b> Kinetic Molecular Theory of Gases Maxwell's distribution of velocities and energies (Derivation excluded)
	29/08/2022 – 03/09/2022	Calculation of root mean square velocity, average velocity and most probable velocity. Collision diameter, collision number
	05/09/2022 – 10/09/2022	Collision frequency and mean free path (Derivations excluded) Deviation of Real gases from ideal behaviour. Derivation of Vander Waal's Equation of State
	12/09/2022 – 17/09/2022	Its application in the calculation of Boyle's temperature (compression factor) Discussion and problems taken
<b>Unit – 2</b>	19/09/2022 – 24/09/2022	<b>Critical Phenomenon</b> Critical temperature, critical pressure, critical volume and their determination
	26/09/2022 – 1/10/2022	PV isotherms of real gases, Continuity of states. The isotherms of Vander Waal's equation Relationship between critical constants and Vander Waal's constants
	03/10/2022 – 08/10/2022	Critical compressibility factor. The Law of corresponding states
	10/10/2022 – 15/10/2022	Discussion and problems taken
<b>Unit – 3</b>	17/10/2022 – 19/10/2022	<b>Liquid States</b> Structure of liquids
	20/10/2022 – 26/10/2022	<b>Diwali Break</b>
	27/10/2022 – 29/10/2022	Properties of liquids – surface tension,
	31/10/2022 – 05/11/2022	Properties of liquids viscosity
	07/11/2022 – 12/11/2022	Properties of liquids vapour pressure Properties of liquids optical rotation

	14/11/2022 – 19/11/2022	Revision of chapter Class test
<b>Unit – 4</b>	21/11/2022 – 26/11/2022	<b>Solid State</b> Classification of solids, Law of constancy of interfacial angles, law of rational indices powder pattern method
	28/11/2022 – 03/12/2022	Miller indices, elementary ideas of symmetry and symmetry elements, Seven crystal systems and fourteen Bravais lattices, X-ray diffraction,
	5/12/2022 – 10/12/2022	Bragg's law, derivation of crystal structure of NaCl, KCl
	12/12/2022 – 17/12/2022	Revision of chapter
	19/12/2022 onwards	<b>Examination</b>
	23/12/2022 - 05/01/2023	<b>Winter Break</b>

Prepared by:  
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**LESSON PLAN**  
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**CLASS: B.Sc. II (Organic Chemistry)**

Sr. No.	Week	Content
<b>Unit – 1</b>	22/08/2022 – 27/08/2022	<b>Alcohols</b> Monohydric alcohols & Dihydric alcohols nomenclature, methods of formation by reduction of aldehydes, ketones, methods of formation by reduction of carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohols.
	29/08/2022 – 03/09/2022	Methods of formation, chemical reactions of vicinal glycols, Oxidative cleavage [Pb (OAc) <sub>4</sub> and HIO <sub>4</sub> ] Pinacol-pinacolone rearrangement Discussion and problems taken
	05/09/2022 – 10/09/2022	<b>Epoxides</b>

		Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides,
	2/09/2022 – 17/09/2022	Reactions of Grignard and organolithium reagents with epoxides orientation of epoxide ring opening Class test
<b>Unit – 2</b>	9/09/2022 – 24/09/2022	<b>Phenols</b> Nomenclature, structure and bonding. Preparation of phenols Physical properties and acidic character of phenols
	26/09/2022 – 1/10/2022	Comparative acidic strengths of alcohols and phenols Resonance stabilization of phenoxide ion.
	03/10/2022 – 08/10/2022	Reactions of phenols — electrophilic aromatic substitution Mechanisms of Fries rearrangement, Claisen rearrangement
	10/10/2022 – 15/10/2022	Reimer-Tiemann reaction, Kolbe's reaction Schotten and Baumann reactions Assignment Discussion and problems taken
<b>Unit – 3</b>	17/10/2022 – 19/10/2022	<b>Carboxylic Acids &amp; Acid Derivatives</b>  Nomenclature of Carboxylic acids, structure and bonding, physical properties
	20/10/2022 – 26/10/2022	<b>Diwali Break</b>
	27/10/2022 – 29/10/2022	Acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids
	31/10/2022 – 05/11/2022	Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation.
	07/11/2022 – 12/11/2022	Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.
	14/11/2022 – 19/11/2022	Mechanisms of esterification and hydrolysis (acidic and basic). Discussion and problems taken
<b>Unit – 4</b>	21/11/2022 – 26/11/2022	<b>Ultraviolet (UV) absorption spectroscopy</b> Absorption laws (Beer-Lambert law), molar absorptivity Presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation.

	28/11/2022 – 03/12/2022	Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts.
	05/12/2022 – 10/12/2022	UV spectra of conjugated enes and enones, Woodward-Fieser rules Calculation of $\lambda_{\text{max}}$ of simple conjugated dienes and $\alpha, \beta$ unsaturated ketones.
	12/12/2022 – 17/12/2022	Applications of UV Spectroscopy in structure elucidation of simple organic compounds Discussion and problems taken
	19/12/2022 onwards	Examination
	23/12/2022 - 05/01/2023	Winter Break

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### LESSON PLAN

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CLASS: B.Sc. III(Physical Chemistry)

Sr. No.	Week	Content
Unit – 1	22/08/2022 – 27/08/2022	<b>Quantum Mechanics-I:</b> Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance,
	29/08/2022 – 03/09/2022	Postulates of quantum mechanics, to show quantum mechanically that position and momentum cannot be predicated simultaneously,
	05/09/2022 – 10/09/2022	Quantum mechanical operators, Commutation relations, Hamiltonian operator, Hermitian operator, Average value of square of Hermitian as a positive quantity,
	12/09/2022 – 17/09/2022	Role of operators in quantum mechanics, Determination of wave function & energy of a particle in one dimensional

		box. Back log of chapter if any, discussion and problems taken
Unit – 2	9/09/2022 – 24/09/2022	<b>Physical Properties and Molecular Structure</b> Optical activity, polarization – (Clausius – Mossotti equation derivation excluded), Orientation of dipoles in an electric field,
	26/09/2022 – 1/10/2022	Dipole moment, induced dipole moment, Measurement of dipole moment -temperature method and refractivity method, Dipole moment and structure of molecules
	03/10/2022 – 08/10/2022	Magnetic permeability, Magnetic susceptibility and its determination, Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetism.
	10/10/2022 – 15/10/2022	Back log of chapter if any, discussion and problems taken
Unit – 3	17/10/2022 – 19/10/2022	<b>Spectroscopy</b> Introduction: Electromagnetic radiation, regions of spectrum, Basic features of spectroscopy,
	20/10/2022 – 26/10/2022	<b>Diwali Break</b>
	27/10/2022 – 29/10/2022	Statement of Born-oppenheimer approximation, Degrees of freedom
	31/10/2022 – 05/11/2022	<b>Rotational Spectrum</b> Selection rules, Energy levels of rigid rotator (semi-classical principles) Rotational spectra of diatomic molecules,
	07/11/2022 – 12/11/2022	spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution)
	14/11/2022 – 19/11/2022	Determination of bond length and isotopic effect Discussion and problems take
Unit – 4	21/11/2022 – 26/11/2022	<b>Vibrational spectrum</b> Selection rules, Energy levels of simple harmonic oscillator, Pure vibrational spectrum of diatomic molecules, Determination of force constant and qualitative relation of force constant and bond energy, idea of vibrational frequencies of different functional groups. Idea of vibrational frequencies of different functional groups.

	28/11/2022 – 03/12/2022	<b>Raman Spectrum</b> Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra. Back log of chapter if any, discussion and problems taken
	05/12/2022 – 10/12/2022	<b>Revision of unit 1 and 2 (Assignment viva and test)</b>
	12/12/2022 – 17/12/2022	<b>Revision of unit 3 and 4 (Assignment viva and test)</b>
	19/12/2022 onwards	<b>Examination</b>
	23/12/2022 - 05/01/2023	<b>Winter break</b>

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