

LESSON PLAN- B.Sc (H) 1st SEMESTER

Session: 2023-24

Name of teacher- **Dr. Anju Siwach**, Assistant Professor

Subject- Physical Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc (H) 1 st Semester	24-7-2023 to 29-7-2023	Gaseous State-I Elementary treatment of gas laws, Real and ideal gases, Boyle's temperature,
	1-8-2023 to 5-8-2023	gas constant R and its numerical values critical constants and their determination. Kinetic gas equation and its derivation, cause of deviation of gases from ideal behavior,
	7-8-2023 to 12-8-2023	Vander Waal's equation and its deviation under different pv isotherms of real gases, isotherms of carbon dioxide,
	14-8-2023 to 19-8-2023	continuity of states. Relationship between critical constants and Vander Waal's constants, law of corresponding states.
	21-8-2023 to 26-8-2023	Reduced equation of state, liquification of gases (based on Joule - Thomson effect.) degree of freedom of motion and principle of equipartition of energy.
	28-8-2023 to 2-9-2023	Gaseous State-II Maxwell's distribution law of velocities and energies. Root mean square velocity, average velocity and most probable velocity and their relationship.
	4-9-2023 to 9-9-2023	Mean free path and its derivation. Collision diameter. Collision number and collision frequency, viscosity of gases.
	10-9-2023 to 16-9-2023	Relationship between mean free path and coefficient of viscosity, calculation of molecular diameter from coefficient of viscosity,

	18-9-2023 to 23-9-2023	Surface Chemistry and Colloidal States: Adsorption, Absorption. Types of adsorptions, difference between them, adsorption isotherms and adsorption isobars.
	25-9-2023 to 30-9-2023	Langmuir adsorptions isotherms and Freundlich adsorption isotherms different isotherms, elementary idea of BET equation and its application.
	2-10-2023 to 7-10-2023	Gibb's adsorption equation and its application. Enzyme catalysis and mechanism of enzyme catalysis, Michaelis-Menton equation application of adsorption.
	9-10-2023 to 14-10-2023	Solid state: Crystalline and amorphous solids. Type of unit cells. Laws of crystallography, law of constancy of interfacial angles, law of rational indices, law of symmetry. Symmetry of elements in crystals. Seven crystal system,
	16-10-2023 to 21-10-2023	Bravis Lattice Bragg's equation and its determination X-ray diffraction of crystals.
	23-10-2023 to 28-10-2023	Determination of crystal structure of NaCl, KCl, CsCl by law's and panders method. Applications of liquid crystals.
	30-10-2023 to 4-11-2023	Liquid State Intermolecular forces, structure of liquids (qualitative description, structural differences between solids, liquids and gases, Liquid crystals. Differences between liquid, crystal solid and liquid,
	6-11-2023 to 9-11-2023	classification structure of nematic and chalastric phases, thermography and seven segment of cell, vapour pressure of liquids. Theory of liquids and entropy of vaporization, viscosity and surface tension of liquids.
	17-11-2023 to 24-11-2023	Assignments, Viva, Test, Revision
	25-11-2023 to 23-12-2023	MDU examination
	24-12-2023 to 31-12-2023	Winter break

LESSON PLAN- B.Sc (Hons.) 3rd SEMESTER
Session: 2023-24

Name of teacher- **Dr. Anju Siwach**, Assistant Professor

Subject- Inorganic Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc 3rd Semester	24-7-2023 to 29-7-2023 1-8-2023 to 5-8-2023 & 7-8-2023 to 12-8-2023 14-8-2023 to 19-8-2023	Co-ordination Compounds: Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds isomerism in coordination compounds, valence bond theory of transition metal complexes
	21-8-2023 to 26-8-2023 28-8-2023 to 2-9-2023 4-9-2023 to 9-9-2023 10-9-2023 to 16-9-2023	Oxidation and Reduction: Use of redox potential data - analysis of redox cycle, redox stability in water - Frost, Latimer and Pourbaix diagrams, Principles involved in the extraction of elements. Non-aqueous solvents Physical properties of solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH ₃ and liquid SO ₂ .

	<p>18-9-2023 to 23-9-2023</p> <p>25-9-2023 to 30-9-2023</p>	<p>Chemistry of Elements of First Transition Series-I Definition, characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry.</p>
	<p>2-10-2023 to 7-10-2023</p> <p>9-10-2023 to 14-10-2023</p> <p>16-10-2023 to 21-10-2023</p> <p>23-10-2023 to 28-10-2023</p> <p>30-10-2023 to 4-11-2023</p> <p>6-11-2023 to 9-11-2023</p>	<p>Chemistry of Elements of First Transition Series-II Chemistry of Ti, V, Cr, Mn, Fe and Co in various oxidation states. Titanium – oxides, oxyions, peroxides and halides Vanadium – halides, oxides, vanadates and vanadyl compounds Chromium – halides, oxides, chromates & oxyhalides Manganese – oxides, permanganates, halides & acetates Iron – oxides and iron compounds Cobalt – oxides, sulphates, halides and Co(III) complexes.</p>
	<p>17-11-2023 to 24-11-2023</p> <p>25-11-2023 to 23-12-2023</p> <p>24-12-2023 to 31-12-2023</p>	<p>Assignments, Viva, Test, Revision MDU examination Winter break</p>

LESSON PLAN- B.Sc 1st SEMESTER

Session: 2023-24

Name of teacher- **Dr. Anju Siwach**, Assistant Professor

Subject- Physical Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc 1 st Semester	24-7-2023 to 29-7-2023	Gaseous States Maxwell's distribution of velocities and energies (derivation excluded)
	1-8-2023 to 5-8-2023	Calculation of root mean square velocity, average velocity and most probable velocity.
	7-8-2023 to 12-8-2023	Collision diameter, collision number, collision frequency and mean free path.
	14-8-2023 to 19-8-2023	Deviation of Real gases from ideal behavior. Derivation of Vander Waal's Equation of State,
	21-8-2023 to 26-8-2023	its application in the calculation of Boyle's temperature (compression factor) Explanation of behavior of real gases using Vander Waal's equation.
	28-8-2023 to 2-9-2023	Critical Phenomenon: Critical temperature, Critical pressure, critical volume and their determination.
	4-9-2023 to 9-9-2023	PV isotherms of real gases, continuity of states, the isotherms of Vander Waal's equation,
	10-9-2023 to 16-9-2023	relationship between critical constants and Vander Waal's constants.
	18-9-2023 to 23-9-2023	Critical compressibility fac tor. The Law of corresponding states. Liquefaction of gases.

	25-9-2023 to 30-9-2023 2-10-2023 to 7-10-2023	Liquid States Structure of liquids, Properties of liquids – surface tension, viscosity, vapor pressure and optical rotations and their determination.
	9-10-2023 to 14-10-2023 16-10-2023 to 21-10-2023 23-10-2023 to 28-10-2023 30-10-2023 to 4-11-2023 6-11-2023 to 9-11-2023	Solid State Classification of solids, Laws of crystallography – (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements of crystals. Definition of unit cell & space lattice. Bravais lattices, crystal system. Xray diffraction by crystals. Derivation of Bragg equation. Determination of crystal structure of NaCl, KCl. Liquid crystals: Difference between solids, liquids and liquid crystals, types of liquid crystals. Applications of liquid crystals.
	17-11-2023 to 24-11-2023 25-11-2023 to 23-12-2023 24-12-2023 to 31-12-2023	Assignments, Viva, Test, Revision MDU examination Winter break

LESSON PLAN- B.Sc 3rd SEMESTER
Session: 2023-24

Name of teacher- **Dr. Anju Siwach**, Assistant Professor

Subject- Inorganic Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc 3 rd Semester	24-7-2023 to 29-7-2023 1-8-2023 to 5-8-2023 & 7-8-2023 to 12-8-2023 14-8-2023 to 19-8-2023 21-8-2023 to 26-8-2023	Chemistry of Elements of Ist transition series: Definition of transition elements, position in the periodic table, General characteristics & properties of Ist transition elements, Structures & properties of some compounds of transition elements – TiO ₂ , VOCl ₂ , FeCl ₃ , CuCl ₂ and Ni (CO) ₄
	28-8-2023 to 2-9-2023 4-9-2023 to 9-9-2023 10-9-2023 to 16-9-2023	Chemistry of Elements of IInd & IIIrd transition series General characteristics and properties of the II nd and III rd transition elements Comparison of properties of 3d elements with 4d & 5d elements with reference only to ionic radii, oxidation state, magnetic and Spectral properties and stereochemistry

	<p>18-9-2023 to 23-9-2023</p> <p>25-9-2023 to 30-9-2023</p> <p>2-10-2023 to 7-10-2023</p> <p>9-10-2023 to 14-10-2023</p>	<p>Coordination Compounds Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes</p>
	<p>16-10-2023 to 21-10-2023</p> <p>23-10-2023 to 28-10-2023</p> <p>30-10-2023 to 4-11-2023</p> <p>6-11-2023 to 9-11-2023</p>	<p>Non-aqueous Solvents Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 reactions in non-aqueous solvents with reference to liquid SO_2</p>
	<p>17-11-2023 to 24-11-2023</p> <p>25-11-2023 to 23-12-2023</p> <p>24-12-2023 to 31-12-2023</p>	<p>Assignments, Viva, Test, Revision MDU examination</p> <p>Winter break</p>

LESSON PLAN- B.Sc 5th SEMESTER**Session: 2023-24**Name of teacher- **Dr. Anju Siwach**, Assistant Professor

Subject- Organic Chemistry

CLASS	WEEKS	SYLLABUS
B.Sc 5 th Semester	24-7-2023 to 29-7-2023	Carbohydrates-I Classification and nomenclature. Monosaccharides,
	1-8-2023 to 5-8-2023	mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses.
	7-8-2023 to 12-8-2023	Configuration of monosaccharides. Erythro and threo diastereomers.
	14-8-2023 to 19-8-2023	Conversion of glucose into mannose. Formation of glycosides, ethers and esters.
	21-8-2023 to 26-8-2023 28-8-2023 to 2-9-2023	Determination of ring size of glucose and fructose. Open chain and cyclic structure of D(+)-glucose & D(-) fructose. Mechanism of mutarotation. Structures of ribose and deoxyribose.
	4-9-2023 to 9-9-2023 10-9-2023 to 16-9-2023	Carbohydrates-II An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.
	18-9-2023 to 23-9-2023	Organometallic Compounds Organomagnesium compounds: the Grignard reagents-formation, structure and chemical reactions.
	25-9-2023 to 30-9-2023	Organozinc compounds: formation and chemical reactions.
	2-10-2023 to 7-10-2023	Organolithium compounds: formation and chemical reactions.

	9-10-2023 to 14-10-2023	NMR Spectroscopy-I Principle of nuclear magnetic resonance, the PMR spectrum, number of signals, peak areas, equivalent and nonequivalent protons positions of signals and
	16-10-2023 to 21-10-2023	chemical shift, shielding and deshielding of protons, proton counting, splitting of signals and coupling constants, magnetic equivalence of protons.
	23-10-2023 to 28-10-2023 30-10-2023 to 4-11-2023 6-11-2023 to 9-11-2023	NMR Spectroscopy-II Discuss ion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone. Simple problems on PMR spectroscopy for structure determination of organic compounds.
	17-11-2023 to 24-11-2023 25-11-2023 to 23-12-2023 24-12-2023 to 31-12-2023	Assignments, Viva, Test, Revision MDU examination Winter break