

LESSON PLAN

Session: 2024-25

Class: B.Sc. 1st Sem (NEP)

Subject: Unit-III Organic Chemistry

Paper Code: CHE- 101

Name of the faculty: Dr. Neena Goyal

Month	Week	Topics to be covered
July	22.07 .2024 to 27.07.2024	Introduction to organic Chemistry: Definition, Characteristics of carbon, classification of carbon atoms, Nature of covalent bond
	29.07 24-.31.07.24	Concept of Hybridization in detail.Sp ³ , Sp ² and Sp hybridization by taking the examples of ethane, ethane and ethyne.
August	1.08.24-03.08.24	Localised and delocalized bonds by taking suitable examples . What are the consequences of delocalized bonds.
	05.08.24-10.08.24	Vander Waals forces of Interactions: definition, how these are generated, characteristics of vander Waals interactions, how these effect the physical properties of the molecules
	12.08.24-17.08.24	. Vander Waals forces of repulsive interactions: vander Waals radii. Why chair confirmation of cyclohexane is more stable than boat form.
	19.08.24-24.08.24	Inductive effect: definition and explain I-Effect by taking suitable examples. Types of I-Effect +I and – I Effect . Applications of I-effect: Dipole moment of CCl ₄ , CHCl ₃ , CH ₂ Cl ₂ . O-dichlorobemzene, m-dichloro and p-dichloro benzene.
	26.08.24-2.09.24	Comparison pf acidic strengths of various carboxylic acids on the basis of I-Effect \$ Basicity of amines
September	04.09.24-09.09.24	Resonance: Explain the definition of resonance by taking suitable examples. Rules for writing resonance structures . Explain with the help of examples
	11.09.23-16.09.23	Resonance Energy, Resonance Effect : definition and its types by taking various examples. Applications of Resonance Effect: 1. Low reactivities of vinyl halide and aryl halides
	18.09.23-23.09.23	Applications of Resonance Effect: 2. High reactivities of Allyl halides and benzyl halides 3. Acidic nature of carboxylic acids 4. Comparison of basicities of Aryl amines and aliphatic amines.
	25.09.23-30.09.23	TEST

October	02.10.23-07-10.23	Hyperconjugation : define and explain . What is Baker Nathan effect? Why hyperconjugation is also called No bond resonance, What is the condition for hyperconjugation? Applications of hyperconjugation
	09.10.23-14.10.23	Chapter2: Reaction mechanism in organic chemistry: Definition, arrow notations, hemolytic and heterolytic fission, difference between substrate and reagent. What are Electrophiles definition, types with examples. why called Lewis Acid.
	16.10.23-21.10.23	What are Nucleophiles definition, types with examples.why called Lewis Base.Types of chemical reactions by taking suitable examples.
	23.10.23-28.10.23 26.10.24	What are reaction Intermediates . Carbocations, carbanions: Definition, generation, Structure, types and stability
	30.10.23-04.11.23	Free Radicals, Carbenes: Definition, generation, Structure, types and stability
	06.10.23-10.11.23	Revision of previous year question papers .
Vacations	27 .10.24 -03. 11.24	Diwali Vacations
2 nd Teaching term University exams	04.1 1.24 -22.11.24 23.11.24 to 20.12.24	Revision tests, revision of question papers. Classes for weak and advance learners.

LESSON PLAN

Session: 2024-25

Class: B.Sc. 5th Sem

Nomenclature of the paper: Organic Chemistry

Paper Code: CHE- 303

Name of the faculty: Dr. Neena Goyal

Month	Week	Topics to be covered
July	26.07.24-27.07.24	Unit-II Carbohydrates: Definition, Classification. Monosaccharides, Oligosaccharides and Polysaccharides on the basis of hydrolysis taking suitable examples. Sugars and Non sugars.
	29.7.24-03.8.24	What are reducing and non-reducing sugars. Glucose: Extraction, Chemical Properties due to C=O group, Osazone formation with mechanism. Why glucose and fructose form same osazone with -CHO group: Oxidation in presence of mild and strong oxidizing reagent. Reducing properties of Glucose.
August	05.08.24-10.08.24	Reducing Properties of Glucose: Reaction with mild and strong reducing reagent, with Alcohol, Conc. H ₂ SO ₄ , dil. NaOH (Lobry-de Bruyn Van Ekenstein rearrangement) Fructose is a ketohexose still reducing Explain?
	12.08.24-17.08.24	Open chain structure of D(+) Glucose. Fructose: Fruit sugar, extraction and isolation
	19.08.24-24.08.24	Chemical Properties of D(-) Fructose and its Structure
	26.08.24-31.08.24	Interconversions: Glucose-Fructose, Fructose – Glucose, Killani-Fisher Synthesis and Ruff degradation (Glucose to Arabinose) Wolff degradation, Epimerisation (Glucose – Mannose) Revision. Discussion of question papers.
September	02.09.24-07.09.24	Limitations of open chain structure of D(+) Glucose. How ring structure overcomes all the limitations.?
	09.09.24-14.09.24	Establish ring size of D+ Glucose
	16.09.24-21.09.24	Writing of Haworth Projection formula of α and β -D-Glucose, Fructose, D- Arabinose, 2-deoxyribose. Note on 1. Glucosides and Glycosides 2. Glucose ethers (Purdie and Haworth method) 3. Glucose pentaacetate.
	23.09.24-28.09.24	Diasaccharides: Structure and Haworth projection formulas of Maltose, Sucrose. What is Invert sugar why it is so called? Lactose. Structures of Starch and Cellulose. revision. Introduction of organometallic compounds. Synthesis of Grignard reagent.
October	30.09.24-05-10.24	Applications of Grignard reagent. Synthesis of organo zinc and organo lithium compounds and their synthetic applications.

		Revised Carbohydrates questions . Participation of students .
	07.10.24-12.10.24	UNIT-1 NMR Spectroscopy: Principal of NMR No of signals : Equivalent and Non equivalent protons, Isomer no. enantotopic and diastereotopic protons. Discuss by taking a no of examples.
	14.10.24-19.10.24	students problems related to no of signals.2. Position of the signals: Shielding and deshielding , Chemical shift, TMS , δ and τ scale . Numerical problems. Factors affecting chemical shift
	21.10.24-26.10.24	Standard values of chemical shift in delta scale. Intensity of signals, spin-spin coupling and problems relatd to it.
Vacations	27 .10.2024 to 03. 11 .2024	Diwali Vacations
2nd Teaching term Exams:	04.11.2024 to 22.11.2024 23.11.2024 to 20.12.2024	Coupling constant, magnetic equivalence of protons. Spectra of ultra pure Ethanol, Spectra of some organic compounds Revision tests, revision of question papers

LESSON PLAN

Session: 2024-25

Class: B.Sc. 3rd Sem

Subject: Unit-II Organic Chemistry

Paper Code: CHE- 203

Name of the faculty: Dr. Neena Goyal

Month	Week	Topics to be covered
July	22.07.24—27.07.24	Alkynes: Definition, classification and synthesis. Isomerism in alkynes. Physical Properties of Alkynes.
	29.07.24-.31.07.24	Acidic nature of acetylene and terminal alkynes. Low reactivity of Alkynes toward electrophilic substitution reactions.
August	1.08.24-03.08.24	Chemical Properties of alkynes: Reaction with X ₂ , H=X, HO-X, H ₂ O in presence of H ⁺ in presence of Hg ⁺⁺ ions.
	05.08.24-10.08.24	Nucleophilic addition reactions of Alkynes. Why alkynes undergoes nucleophilic addition reactions
	12.08.24-17.08.24	Hydroboration oxidation reaction, Ozonolysis. Oxidation reactions. Reaction with AsCl ₃
	19.08.24-24.08.24	Assignment1:
	26.08.24-31.08.24	Arenes: Definition, Types of aromatic compounds, Nomenclature, Structure of benzene,.
September	02.09.24-06.09.24	Aromaticity and Huckle rule. Examples of aromatic, non-aromatic and antiaromatic compounds.
	09.09.24-14.09.24	Electrophilic substitution reactions of benzene. Mechanisms of halogenation, sulphonation, nitration, Friedel craft alkylation and acylation, evidences in support, Limitations of F.C Alkylation reaction
	16.09.24-21.09.24	What are activating and deactivating groups in detail. Reactivity and orientation of benzene. Halogens are deactivating still o-p directing.
	23.09.24-28.09.24	Alkyl halides: Definition, classification and synthesis from alkenes (M.R. and Anti M.R.) and alcohols. Chemical Properties of alkyl halides
October	02.10.24-05.10.24	Nucleophilic substitution reactions of alkyl halides, SN ₁ and SN ₂ Mechanisms and their energy profile diagram. Aryl halides : Synthesis and mechanism of nucleophilic substitution reactions (SN ₂ and Elimination-Addition)
	07.10.24-12.10.24	Relative reactivities of Alkyl halides, aryl halides, vinyl halides. Unit-II Stereochemistry: Structural isomerism
	14.10.24-19.10.24	Conformational and configurational isomers, Optical isomerism in detail(Chirality, symmetry elements,

		enantiomerism, optical activity, properties of enantiomers.
	21.10.24-26.10.24	Diastereomerism, R/S configurations, Cis-trans isomerism, Z/E nomenclature. Conformational isomerism
Vacations	27.10.24 -03.11.24	Diwali Vacations
2 nd Teaching term November	04.11.24-9.11.24	Conformations of ethane, n-butane and cyclohexane. Equatorial and axial bonds.
	11.11.24-16.11.24	Revision of last year question papers.
	18-22.11.24	Preparatory holidays
University exams	23.11.24 -20.12.24	University Exams

LESSON PLAN

Session: 2024-25

Class: B.Sc. 1st Sem

Nomenclature of the paper: Chemistry-I

Paper Code: B23-CHE-101

Name of the faculty: Dr. Prabjot Kaur

Month	Week	Topics to be covered
July	25.07.24-27.07.24	Introduction to Chemistry: Introduction and Gaseous state: States of matter and difference between types of states
	29.07.24-31.07.24	Gas Laws, Kinetic Molecular Theory of Gases, Maxwell's distribution of velocities and energies, Effect of temperature on Maxwell's Distribution
August	01.08.24-03.08.24	Derivation of root mean square velocity and average velocity, Vander Waals forces of Interactions: definition, how these are generated, characteristics of Van der Waals interactions
	05.08.24-10.08.24	Numerical, Derivation of Most probable velocity. Collision diameter, collision number, collision frequency and mean free path
	12.08.24-17.08.24	Deviation of Real gases from ideal behavior. Their causes and effect on different Temp and Pressure, Derivation of Van der Waal's Equation of State
	19.08.24-24.08.24	Application in the calculation of Boyle's temperature with Numericals, Critical temperature, critical pressure, critical volume and their determination. Their effect on Temp. and Pressure
	26.08.24-31.09.24	PV isotherms of real gases, continuity of states, the isotherms of Van der Waal's equation. Relationship between critical constants and Van der Waal's constants
September	02.09.24-07.09.24	Numericals, Critical compressibility factor. The Law of corresponding states. Problems, Atomic Structure: Dual behavior of matter and radiation, de Broglie matter waves, Heisenberg's uncertainty principle, atomic orbitals
	09.09.23-14.09.23	Quantum numbers, radial and angular wave functions, normal and orthogonal wave functions, significance of Ψ and Ψ^2 , probability distribution curves, shapes of s, p, d, f orbitals, Aufbau and Pauli exclusion principles,

	16.09.24-21.09.24	Hund's multiplicity rules, Electronic configuration of elements, effective nuclear charge, Slater's rules. Periodic table and atomic properties Classification of periodic table into s, p, d, f blocks
	23.09.24-28.09.24	atomic and ionic radii, Ionisation energy, electron affinity and electronegativity definition, methods of determination or evaluation, trend in periodic table (in s and p-block elements)
October	30.09.24-05-10.24	Pauling, Mulliken, Allred Rachow and Mulliken Jaffe's electronegativity scale, Sanderson's electron density ratio
	07.10.24-12.10.24	Sessional
	14.10.24-19.10.24	Liquid State: Definition of Liquids, Types of force of attractions, Structure of liquids. Properties of liquids- Vapour Pressure Surface Tension, Viscosity
	21.10.23-26.10.23	Refractive Index Solids: Classification of solids, laws of crystallography
	27.10.24-3.11.24	Diwali vacations
November	04.11.24-09.11.24	laws of constancy of interfacial angles. X-ray diffraction, Bragg's law, a simple account of Laue method, Revision of previous year question papers
	11.10.24-16.11.24	Rotating crystal method Powder pattern method, law of rational indices, Miller indices and its numerical and revision

LESSON PLAN

Session: 2024-25

Class: B.Sc. 3rd Sem

Nomenclature of the paper: Chemistry-III

Paper code: B23-CHE- 301

Name of the faculty: Dr. Prabjot Kaur

Month	Week	Topics to be covered
July	25.07.24-27.07.24	Electrochemistry: Introduction to electrochemistry, electrolytic and metallic conduction and its difference, Factors affecting electrolytic conduction, Specific conductance
	29.07.24-31.07.24	Arrhenius equation with numericals. Derivation of Unimolecular collision theory, Molar conductance, equivalent conductance and relation between them
August	01.08.24-03.08.24	The variation of conductance with concentration, Arrhenius theory of ionization, Ostwald's Dilution Law, Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution, Applications of conductivity measurements:
	05.08.24-10.08.24	Determination of degree of dissociation, Determination of K_a of acids, Determination of solubility product of sparingly soluble salts,
	12.08.24-17.08.24	Conductometric titrations, Concepts of pH and pK_a , Buffer solution, numerical problems based on them.
	19.08.24-24.08.24	Buffer action, Henderson – Hazel equation, Buffer mechanism of buffer action with numericals
	26.08.24-31.09.24	Introduction to electrochemistry, galvanic cell, electrolytic cell and difference between them
September	02.09.24-07.09.24	Representation of a galvanic cell Reversible and irreversible cells, Electrode potential, EMF of cell and its measurement
	09.09.23-14.09.23	Reversible electrodes and its types: metal-metal ion, gas electrode, metal –insoluble salt-anion and redox electrodes
	16.09.24-21.09.24	Standard hydrogen electrode and measurement of electrode potential and calomel electrodes Measurement of electrode potential, electrochemical series, applications of electrochemical series and numericals Standard state, Nernst equation

	23.09.24-28.09.24	EMF of a cell and numerical based on them Nernst equation for electrode potential and its numericals Concentration cells with and without transference with numerical Liquid junction potential and its measurement with numerical. Applications of EMF measurement in solubility product Potentiometric titrations using glass electrode, Calculation of thermodynamic quantities of cell reaction. Numericals
October	30.09.24-05-10.24	S-block elements hydrides, oxides, halides, hydroxides
	07.10.24-12.10.24	Sessional
	14.10.24-19.10.24	P block elements Diborane and Borzine
	21.10.23-26.10.23	Catenation, carbides, fluorocarbons, silicates
	27.10.24-3.11.24	Diwali vacations
November	04.11.24-09.11.24	Oxyacids of Nitrozen, Phosphourous, Sulphur and chlorine and comparision of their acidic strength
	11.10.24-16.11.24	Noble gases, chemistry of xenon, structure and flourides, oxides and oxyflourides of xenon

LESSON PLAN

Session: 2024-25

Class: BSc. 5th Sem

Nomenclature of the paper: Physical Chemistry

Paper code: CHE -302

Name of the faculty: Dr. Prabjot Kaur

Month	Week	Topics to be covered
July	25.07.24-27.07.24	Introduction to Classical and Quantum Mechanics, Black-body radiation, Plank's radiation law, photoelectric effect
	29.07.24-31.07.24	De-Broglie hypothesis, Bohr model, Heisenberg's Principle, Compton effect
August	01.08.24-03.08.24	Significance of wave function, Schrodinger wave equation, postulates of quantum mechanics
	05.08.24-10.08.24	mechanical operators, commutation relations, Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics
	12.08.24-17.08.24	Numericals related to operators
	19.08.24-24.08.24	Determination of wave function & energy of a particle in one dimensional box.
	26.08.24-31.09.24	Optical activity, polarization – (Clausius – Mossotti equation - derivation.
September	02.09.24-07.09.24	Orientation of dipoles in an electric field, dipole moment, induced dipole moment.
	09.09.23-14.09.23	Measurement of dipole moment -temperature method and refractivity method, dipole moment and structure of molecules.
	16.09.24-21.09.24	Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility,
	23.09.24-28.09.24	magnetic properties – paramagnetism, diamagnetism and ferromagnetism,
October	30.09.24-05-10.24	Spectroscopy-Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born -oppenheimer approximation,
	07.10.24-12.10.24	Sessional
	14.10.24-19.10.24	Degrees of freedom, Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), Determination of bond length and isotopic effect.

	21.10.23-26.10.23	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
	27.10.24-3.11.24	Diwali Vacations
	04.11.24-09.11.24	Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.
	11.10.24-16.11.24	Spectra of Raman Lines, Stoke and Anti-stoke lines, comparison of spectroscopy, Numerical on spectroscopy and Revision

LESSON PLAN

Session: 2024-25

Class: B Sc. 5th Sem

Nomenclature of the paper: Inorganic Chemistry

Paper code: 301

Name of the faculty: Dr. Prabjot Kaur

Month	Week	Topics to be covered
July	25.07.24-27.07.24	Introduction to Transition metals
	29.07.24-31.07.24	Magnetic properties of Transition metal complexes Types of magnetic materials
August	01.08.24-03.08.24	Magnetic susceptibility
	05.08.24-10.08.24	method of determining magnetic susceptibility
	12.08.24-17.08.24	spin only formula, L-S coupling
	19.08.24-24.08.24	correlation of μ_s and μ_{eff} values
	26.08.24-31.09.24	orbital contribution to magnetic moments
September	02.09.24-07.09.24	application of magnetic moment data for 3d metal complexes.
	09.09.23-14.09.23	Selection rules for d-d transition, spectroscopic ground states
	16.09.24-21.09.24	spectrochemical series
	23.09.24-28.09.24	Orgel energy level diagram for d1 and d9 states,
October	30.09.24-05-10.24	discussion of electronic spectrum of $[Ti(H_2O)_6]^{+3}$ complex ion.
	07.10.24-12.10.24	Sessional
	14.10.24-19.10.24	A brief outline of thermodynamic stability of metal complexes and factors affecting the stability
	21.10.23-26.10.23	Irving William Series
	27.10.24-3.11.24	Diwali Vacations
November	04.11.24-09.11.24	substitution reactions of square planer complexes of Pt [II],
	11.10.24-16.11.24	Trans effect.

LESSON PLAN

Session: 2024-25

Class: B.Sc. 1st Sem Minor

Nomenclature of the paper: Minor Chemistry I

Paper code: B23-CHE-103

Name of the faculty: Dr. Prabjot Kaur

Month	Week	Topics to be covered
July	25.07.24-27.07.24	Introduction to chemical kinetics
	29.07.24-31.07.24	Rate of reaction, Rate equation, its types and measurements
August	01.08.24-03.08.24	factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst
	05.08.24-10.08.24	Order of a reaction and molecularity of reaction
	12.08.24-17.08.24	difference between them, half-life period,
	19.08.24-24.08.24	Integrated rate expression for zero order, its characteristics,
	26.08.24-31.09.24	half-life period and units of rate constant.
September	02.09.24-07.09.24	Integrated rate expression for first order, its characteristics, its half-life period and units of rate constant
	09.09.23-14.09.23	test rate of reaction and its factors
	16.09.24-21.09.24	Metallic Bonding Introduction
	23.09.24-28.09.24	Test of factors affecting the rate of reaction and order reaction
October	30.09.24-05-10.24	Test of First order reaction
	07.10.24-12.10.24	Sessional
	14.10.24-19.10.24	Band theory
	21.10.23-26.10.23	Conductors
	27.10.24-3.11.24	Diwali vacations
	04.11.24-09.11.24	Semiconductors
11.10.24-16.11.24	Insulators	