Govt. College, Bherian (Pehowa)
Lesson Plan
2023-24 (Odd Semester)

B.Phy.Sc. Chemistry 1st Semester

Mr. Lalit Vats
Subject : Chemistry

Week 1
Introduction of bonding in organic compounds Localized and delocalized chemical bonds
Week 2
Van der Waal's interactions
Week 3
Resonance: conditions, resonance effect Applications of resonance effect
Week 4
Hyperconjugation Inductive effect
Week 5
Electromeric effect & their comparison
Week 6
Mechanism of organic reactions:- Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking
Week 7
Types of reagents – electrophiles and nucleophiles. Types of organic reactions
Week 8
Carbocations, Carbanions
Week 9
Free radicals, carbenes
Week 10
Structure of liquids, Properties of liquids – surface tension
Week 11
Refractive index, viscosity, vapour pressure and optical rotation. Class test
Week 12
Classification of solids, Law of constancy of interfacial angle, law of rational indices
Week 13
Miller indices, elementary ideas of symmetry and symmetry elements, seven crystal systems and fourteen Bravais lattices
Week 14
X-ray diffraction, Bragg's law, a simple account of Laue method, rotating crystal method and powder pattern method.

Week 15		
Numerical problems		
Week 16		
Revision		
Week 17		
Revision		

(Lalit)

Govt. College, Bherian (Pehowa)

Lesson Plan

2023-24 (Odd Semester)

B.Sc. Chemistry 3rd Semester

Mr. Lalit Vats

Subject : Chemistry

Week 1
Orientation Class   **Alcohols**:-Introduction of alcohols
Week 2
Monohydric alcohols:- Introduction and nomenclature   methods of formation by reduction of aldehydes, ketones   Methods of formation by carboxylic acids and esters
Week 3
Some other methods of formation of monohydric alcohols   Physical properties of monohydric alcohols and acidic nature   Chemical reactions of alcohols
Week 4
Revision   Distinctiom between primary, secondary and tertiary alcohols, and their interconversion   Dihydric alcohols:- Introduction and their nomenclature along with their physical properties
Week 5
Methods of formation and chemical reactions of Dihydric alcohols oxidative cleavage, Pinacol-Pinacolone reaarangement   **Phenols**:-Nomenclature, structure and bonding in phenols. Preparation of phenols and their physical properties
Week 6
Acidic nature of phenols, Chemical reactions of phenolic group   Electrophilic substitution reactions in phenols   Electrophilic substitution reactions in phenols continue
Week 7
Epoxides:-Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides   Orientation of epoxide ring opening, Reactions of Grignard and organolithium reagents with epoxides   **UV-Spectroscopy**:-Absorpt ion laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra
Week 8

Types of electronic transitions, effect of conjugation

Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts

UV spectra of conjugated enes and enones, Woodward- Fieser rules, calculation of λ max of simple conjugated dienes and α,β -unsaturated ketones

Week 9

Applications of UV Spectroscopy in structure elucidation of simple organic compounds

Carboxylic acid and their derivatives:- Nomenclature of Carboxylic acids, structure and bonding, physical properties

Acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids

Week 10

Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction
Reduction of carboxylic acids. Mechanism of decarboxylation
Relative stability of acyl derivatives

Week 11

Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution

Mechanisms of esterification and hydrolysis (acidic and basic)

Week 12

Definition of thermodynamic terms : system, surrounding etc. Type systems, intensive and extensive properties. State and path functions and their differentials
Thermodynamic process

Week 13

Thermodynamic equilibrium, Concept of heat and work.
First law of thermodynamics: statement, concepts of internal energy and enthalpy

Heat capacity, heat capacities at constant volume and pres sure and their relationship

Week 14

Joule-thomson coefficient for ideal gas and real ga s and inversion temperature

Numerical Problems

Week 15

Calculation of w,q, dU & dH for the expansion of ideal gases under isothermal conditions for reversible processes

Week 16

Calculation of w,q, dU & dH for the expansion of ideal gases under adiabatic conditions for reversible processes

Week 17

Revision

(Lalit)

Govt. College, Bherian (Pehowa)

Lesson Plan

2023-24 (Odd Semester)

B.Sc. Chemistry 5th Semester

Mr. Lalit Vats

Subject : Chemistry

Week 1
NMR spectroscopy:-Principle of nuclear magnetic resonance Positions of signals and chemical shift
Week 2
Shielding and deshielding of protons Peak areas, proton counting, splitting of signal Coupling constants, magnetic equivalance of protons
Week 3
PMR spectrum, number of signals Equivalent and non equivalent protons
Week 4
Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone Simple problems on PMR spectroscopy for structure determination of organic compounds
Week 5
Organometallic compounds:-Introduction to organometallic compounds Organomagnesium compounds:-formation and structure
Week 6
Chemical reactions of Grignard reagent Chemical reactions of Grignard reagent continue Organolithium compounds: formation and chemical reactions
Week 7
Organozinc compounds: formation and chemical reactions **Carbohydrates:**-Classification and nomenclature of Monosaccharides Mechanism of osazone formation, interconversion of glucose and fructose
Week 8
Chain lengthening and chain shortening of aldoses. Configuration of monosaccharides Erythro and threo diastereomers. Conversion of glucose into mannose, Formation of glycosides

Week 9
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

Week 10
An introduction to disaccharides
Maltose, sucrose and lactose
Starch and cellulose

Week 11
Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy
Statement of Born-oppenheimer approximation, Degrees of freedom

Week 12
Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules
Spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution)

Week 13
Determination of bond length and isotope effect
Introduction of vibrational spectroscopy, Selection rules, Energy levels of simple harmonic oscillator

Week 14
Pure vibrational spectrum of diatomic molecules, determination of force constant and qualitative relation of force constant and bond energy

Week 15
Idea of vibrational frequencies of different functional groups

Week 16
Introduction of Raman Spectroscopy, Concept of polarizibility
Pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules

Week 17
Quantum theory of Raman spectra
Revision

(Lalit)

Govt. College, Bherian (Pehowa)
Lesson Plan
2023-24 (Odd Semester)

Skill Enhancement Course (1st Semester)

Mr. Lalit Vats

Subject : Office and spreadsheet Tools Learning

Week 1
Operating System - Definition, Functions, Types of Operating System
Week 2
Basics of Popular Operating Systems, The User Interface, Exploring Computer, Icons, taskbar, desktop.
Week 3
Using Menu and Menu selection, managing files and folders, Control panel – display properties, add/remove software and hardware, Common utilities.
Week 4
Word Processing - Introduction to Word Processing, Menus, Creating, Editing & Formatting Document, Spell Checking, Printing, Views, Tables.
Week 5
Word Art, Mail Merge, Macros, Inserting hyperlinks, Searching for text, Modifying page setup
Week 6
Applying document themes, Applying document style sets, Inserting headers and footers
Week 7
Spread Sheet: Elements of Electronics Spread Sheet.
Week 8
Applications, Creating and Opening of Spread Sheet
Week 9
Menus, Manipulation of cells
Week 10
Enter texts numbers and dates, Cell Height and Widths, Copying of cells
Week 11
Mathematical, Statistical and Financial function,
Week 12
Drawing different types of charts, Sort and Filter Data.
Week 13
Presentation Software: Creating, Modifying and enhancing a presentation,
Week 14
Type of presentation views, Using sound, Animation
Week 15
Working with Objects, Printing

Week 16		
Hands on training		
Week 17		
Revision		

Keats
(Lalit)