Department of Chemistry

Lucknow University

Lucknow

B.Sc Chemistry

University of Lucknow

Program outcome

PO-1- The program well demonstrate an acute understanding of the major thematic concepts underlying the discipline of chemistry, both individually as well as in group, via written assignment and viva.

PO-2- It will develop in the student scientific understanding of the subject , that he is able to design, conduct, record and analyse the result of chemistry experiments.

PO-3- It will prepare students for the upcoming employment challenges including pursuing higher records with an emphasis on encouraging entrepreneurial instinct.

PO-4- It would generate new scientific insight and their application towards enhancement of innovation in the national economy.

PO-5- It would encourage publication of innovative research in the leading publications across the word.

PO-6- The student will develop scientific temper and innovative analytical mindset that sets them apart from students in other comparable programmes across India.

Programme Specific Outcome

PSO-1 The chemistry of elements, coordination complexes, structure and properties of some well known compounds

PSO-2 Principles of organic chemistry which in turn forms the basis of organic syntheses, retrosynthetic pathways for structural elucidation. Pro-chiral and chiral syntheses protocols in brief.

PSO-3 Physical aspects of chemical sciences which when amalgamated with the understanding of inorganic and organic chemistry benefits the design, fabrication measurements and applications of the newly synthesized compounds meant for electrochemical, medicinal, optoelectronic and materials applications

PSO-4 Introduction of the α,β-unsturated carbonyl compound, and mechanism of various named condensation reactions of carbonyl compounds and their use in food and pharmaceuticals.

PSO-5 Basic practical aspects of inorganic, organic and physical chemistry

PSO-6 Basic organometallic, bioorganic and bioinorganic chemistry

B.Sc Chemistry semester I
Paper I Inorganic Chemistry
MM: 100 (80+20)

Course outcome

Students admitted in B.Sc. Chemistry semester program will gain precise insight into the

CO-1 structure of atoms and associated important rules, importance of chemistry of elements.

CO-2 Ionic, covalent and non-covalent bonding which always play pivotal role in deciding the chemistry and properties of any compound/material.

CO-3 Periodic properties of elements and several parameters associated with elements

CO-4 Solid state chemistry which forms the basis of the development of targeted crystalline solids inculcating varied defects which induces variety of materials properties viz. piezoelectricity.

CO-5 Chemistry of elements belonging to s-block, noble gases and main group.

B.Sc Chemistry semester I
Paper 2 Organic Chemistry
MM: 100 (80+20)

Course outcome

Upon successful completion of this course, the student will be able to

CO-1 Understand different organic compounds with respect to the functional group and thus capable to name the organic compounds as per IUPAC nomenclature.

CO-2 Understand the basics of chemical reactions i.e.Substrate and Reagent, types of Reagents, Electrophilic and Nucleophilic Homolytic and heterolytic fission. Electron mobility, Inductive effect etc.

CO-3 Recognize and draw constitutional isomers,stereoisomers, including enantiomers and diasteromers, racemic mixture and meso compounds.

CO-4. Understand fundamental principles of organic chemistry and predict outcomes and derive mechanism of various types of organic reactions.

CO-5 Understand various types of reactive intermediates and factors affecting their stability

CO-6 Understand the nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.

CO-7 Understand the concept of Aromaticity of benzenoids & non-benzenoids, the preparation, reactivity & structure of aromatic compounds.

CO-8 Learn the preprations , reactivity & stereochemistry of SN1 &SN2 reactions of Halogen compounds.

B.Sc Chemistry semester II
Paper 3 Physical Chemistry
MM: 100 (80+20)

Course outcome

CO-1- Students would gain knowledge regarding the basic of computers and mathematical concepts of log, permutation and combination, differential and integration of some relevant functions.

CO-2- Student would gain understanding of gaseous state, critical phenomenon, liquid state, solid state, colloidal state and liquid crystals.

CO-3- It would help students recognize the importance of chemical kinetics and catalysis.

B.Sc Chemistry semester III
Paper 4 Physical Chemistry
MM: 100 (80+20)

Course outcome

CO-1- After the completion of the semester, student will acquire knowledge of first law and second law of thermodynamics, thermochemistry, entropy enthalpy etc.

CO-2- It will also make them familiar with conductance, equivalent conductance, Kohlrausch's law, Ostwald dilution law, Deby-Huckel Onsagar equation, e.m.f. of cell, types of cell, liquid junction potential, p^H and p^{ka}, Henderson- Hazel equation etc.

B.Sc Chemistry semester IV
Paper 5 Inorganic Chemistry
MM: 100 (80+20)

Course outcome

CO-1 Chemistry of transition and inner-transition elements. These insights are important as they help in the rational selection of the cations of these elements for tailor-made syntheses of newer complexes

CO-2 Concepts of coordination chemistry and their applications

CO-3 Importance of different acid-base concepts which forms the basis of rational ligand designing and coordination complex formation for specific bio-inorganic, materials and optoelectronic applications.

CO-4 Importance and different chemical aspects of non-aqueous solvents which now-a-days are gaining importance in varied targeted syntheses of drugs and materials for technological applications

B.Sc Chemistry semester IV
Paper 6 Organic Chemistry
MM: 100 (80+20)

Course outcome

The completion of this course enables the student to understand the subject initially

CO-1 The preparation and chemical reactions of Alcohols and Epoxides -Alcohols Dihydric alcohols: (Ethylene Glycol) Trihydricalcohols : (Glycerol)

CO-2 Understanding the order of reactivity of different carboxylic acid derivatves and the reactivity of different carboxylic acid derivatives.

CO-3 Able to recognize structures of acid halides, esters, amides, acid anhydrides.

CO-4 Able to write down structure of phenol and phenoxide ion and chemical reactions of phenols.

CO-5 Know the mechanism of named reactions of carbonyl compounds and condensation reactions as well as their use in food and pharmaceuticals.

B.Sc Chemistry semester V
Paper 7 Organic Chemistry
MM: 100 (80+20)

Course outcome

Students on completion of the course will develop a comprehensive knowledge of

CO-1 The organometallic compounds such as Grignard reagent which have been widely used on both laboratory and commercial scale and is one of the most common organometallic **reagents** used for the formation of carbon–carbon bonds.Organosulphur compounds which have therapeutic use and pharmacology

CO-3 Carbohydrate ,its classification and use in the food industry etc.

CO-4 Protein, aminoacid and peptides. Chemical structure of RNA and DNA.

CO-5 Determination of saponification value ,acid value and iodine value of oil. Synthetic detergent.

CO-6 Various polymers, their method of polymerization and their use in industry

B.Sc Chemistry semester V
Paper 8 Physical Chemistry
MM: 100 (80+20)

Course outcome

CO-1- After the completion of the semester student will acquire knowledge of introductory quantum mechanics, dipole moment and photochemistry. He will also be get familiar with dilute solutions, colligative properties and experimental methods of determining various colligative properties. He will learn the third law of thermodynamics, distribution law, phase rule and their derivation.

B.Sc Chemistry semester VI
Paper 9 Inorganic Chemistry
MM: 100 (80+20)

Course outcome

After the completion of the semester student will acquire knowledge

CO-1 Semi-modern concepts of metal ligand bonding in coordination complexes

CO-2 Theories of electronic absorption and magnetic properties of coordination complexes The fine tuning these two very important parameter lead to the design and fabrication of compound, metal-organic frameworks, coordination polymers for optoelectronic and single-molecular magnets (SMM).

B.Sc Chemistry semester VI
Paper 10 Inorganic Chemistry
MM: 100 (80+20)

Course outcome

CO-1 Inorganic polymers viz. silicones which find applications in materials pharmaceutical industries and surgery too. Phosphazenes which in last couple of years had witnessed significant development as emerging smart materials.

CO-2 Class-a and class-b donor-acceptors, symbiotic relationship

CO-3 Organometallic and bioinorganic concepts which in any of the previous semesters have not been accounted.

B.Sc Chemistry semester VI
Paper 11 Organic &Physical Chemistry
MM: 100 (80+20)

Course outcome

This course provides students with a detailed knowledge of the fundamental aspects of the subject spectroscopy such as

CO-1 Infrared spectroscopy in which characteristic absorptions of various functional groups.

CO-2 Ultraviolet absorption spectroscopy ,Beer Lambert Law, types of electronic transitions and the effect of conjugation and concept of chromophore and auxochrome.

CO-3 Nuclear magnetic resonance, interpretation of nmr spectra of simple organic molecule.

CO-4 Quantum mechanics as well as of spectroscopy. They will have comprehensive understanding of valence bond model and molecular orbital model.