

B.Sc.: Chemistry

Programme Specific Outcomes

At the time of graduation, the students will be able to-

PSO1: Understand the fundamental principles of Chemistry

PSO2: Develop skills in evaluation and interpretation of chemical information and data

PSO3: Identify and estimate organic and inorganic compounds using classical and modern laboratory methods

PSO4: Analyze various organic mixtures and individual compounds

PSO5: Develop skills in the safe-handling of chemical materials, taking into account of their physical and chemical properties including any specific hazards associated with their use

PSO6: Gain comprehensive knowledge about fundamental properties of elements

PSO7: Acquire knowledge regarding importance of various elements present in the periodic table, coordination chemistry, structure of molecules, properties of compounds and structural determination of complexes using theoretical and instrumental methods

PSO8: Perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable accurate conclusion

PSO9: Synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment and modern instrumentation

PSO10: Acquire problem solving skills in three basic areas of Chemistry, i.e., Inorganic, Organic and Physical Chemistry

Course Outcomes

F.Y. B.Sc. Semester I

Paper No. I (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

CO1: Predict atomic structure and explain various quantum numbers

CO2: Explain standardized names and symbols to represent atoms, molecules, ions and chemical reactions

CO3: Explain trends of periodic properties of elements in periodic table

CO4: Predict biological role of Alkali and Alkaline earth metals

Paper No. II (Organic Chemistry)

Upon completion of the course, the students will be able to-

CO1: Explain various effects, and properties of organic compounds, nature of bond

CO2: Discuss nature of bond breaking and mechanical phenomenon

CO3: Explain concept of isomerism and types of stereochemical configuration

CO4: Discuss mechanistic pathways of simple organic reaction

Semester II

Paper No. IV (Physical Chemistry)

Upon completion of the course, the students will be able to-

CO1: Differentiate colloids, liquid crystals and properties of solid, liquid and gas

CO2: Derive differential equations related to order of reactions

CO3: Explain and correlate various laws with respect to gaseous state

CO4: Categorize catalysis on the basis of phases

CO5: Identify areas of applications of colloids, enzyme catalysts in day to day life

Paper No. V (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

CO1: Demonstrate preparation, physical and chemical properties, structural properties, applications of various elements

CO2: Discuss chemical bonding, hybridization and molecular geometry on the basis of VBT

CO3: Differentiate types of indicators and correlate with appropriate titration method

CO4: Explain various aspects of radioactivity

Practicals (Lab course)

Upon completion of the course, the students will be able to-

CO1: Prepare and standardize various solutions

CO2: Determine basicity of given organic acid

CO3: Determine viscosity of given liquid

CO4: Identify acidic and basic radicals in given mixture

CO5: Identify types of organic compounds by chemical analysis method

S.Y. B.Sc. Semester III

Paper No. VII (Organic Chemistry)

Upon completion of the course, the students will be able to-

CO1: Give types of alcohol and its identification in simple organic compounds

CO2: Differentiate alcohol and phenols in simple and complex organic molecules

CO3: Explain the structure of carbonyl compounds and type of various name reaction involving carbonyl group

CO4: Analyse effect of substituent on acidity of carboxylic acid CO5: Analyse effect of basicity in various simple heterocycles

Paper No. VIII (Physical Chemistry)

Upon completion of the course, the students will be able to-

CO1: Distinguish isothermal, adiabatic, isochoric and other thermodynamic processes

CO2: Correlate law of mass action, equilibrium constant with free energy

CO3: Solve numerical problems related to efficiency, work done, heat change

CO4: State and explain postulates of laws of Thermodynamics

CO5: Interpret interrelations between Clapeyron, Clausius and other relevant equations

Semester IV

Paper No. X (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

CO1: Present in depth knowledge of abundance, position, preparation, properties and chemical behaviour of various d and f block elements from the periodic table

CO2: Identify co-ordination compounds and its applications

CO3: Differentiate aqueous and non aqueous solvents

Paper No. XI (Physical Chemistry)

Upon completion of the course, the students will be able to-

CO1: Explain different types of conductometric titrations

CO2: Solve mathematical problems on electro-chemistry

CO3: Explain phase diagrams of one component systems

CO4: Explain phase diagrams of two component systems

CO5: Classify electrochemical and electrolytic cells

Practicals (Lab course)

Upon completion of the course, the students will be able to-

CO1: Determine concentration values of sample solutions using instrumentation

CO2: Evaluate and interpret heat of neutralization reactions

CO3: Analyse quantitatively, specific elements by volumetric and gravimetric methods

CO4: Determine critical solution temperatures of heterogeneous phases

CO5: Determine the molar refractive index of given sample by refractometer

CO6: Prepare organic derivatives and determine physical constants

CO7: Estimate ester, amide and other organic molecule entities

T.Y. B.Sc. Semester V

Paper No. XIII (Physical Chemistry)

Upon completion of the course, the students will be able to-

- CO1: Explain synthesis of nanomaterials
- CO2: Solve mathematical problems on determination of bond length
- CO3: Derive Schrodinger wave equation of Hydrogen atom
- CO4: Explain basic features of different spectrometers
- CO5: Determine structure of molecules applying magnetic property

Paper No. XIV (Organic Chemistry)

Upon completion of the course, the students will be able to-

- CO1: Find out types of sets of proton in organic compound
- CO2: Solve simple PMR problems with given data
- CO3: Classify various organometallic compounds and activity in simple organic transformation
- CO4: Identify and classify various active Methylene compounds

Semester VI Paper No. XVI (Inorganic Chemistry)

Upon completion of the course, the students will be able to-

- CO1: Explain nature of metal-ligand bonding and illustrate splitting of d orbitals
- CO2: Demonstrate mechanism of sodium potassium cycle
- CO3: Describe essential and trace elements and their role in biological system
- CO4: Categorize chromatographic techniques with reference to adsorbents and other components

Paper No. XXII (Organic Chemistry)

Upon completion of the course, the students will be able to-

- CO1: Explain effect of aromaticity on strength of basicity of heterocyclic compound
- CO2: Classify carbohydrates and its utility in day to day life

CO3: Explain synthesis of paracetamol

CO4: Explain properties of good Drugs

Practicals (Lab course)

Upon completion of the course, the students will be able to-

CO1: Identify organic mixture0s by chemical analysis method

CO2: Analyse inorganic radicals by chemical analysis method

CO3: Identify and separate given mixtures by gravimetric and volumetric method

CO4: Analyse percent composition of acid mixture by Conductometric method

CO5: Identify empirical formula by potentiometric method