Department of Chemistry

Programe outcomes (PO), Program Specific Outcomes (PSO) and Course Outcomes (CO)

Programme Outcomes	PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
	PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.
	PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
	PO-4. Create an awareness of the impact of Chemistry on the environment, society, and development outside the scientific community.
	PO-5. Find out the green route for chemical reaction for sustainable development.
	PO-6. To inculcate the scientific temperament in the students and outside the scientific community.
	PO-7. Use modern techniques, decent equipments and Chemistry software's.
Programme Specific Outcomes	PSO-1. Gain the knowledge of Chemistry through theory and practical's.
	PSO-2. To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
	PSO-3. Identify chemical formulae and solve numerical problems.
	PSO-4. Use modern chemical tools, Models, Chem-draw, Charts, and Equipments.
	PSO-5. Know the structure-activity relationship.
	PSO-6. Understand good laboratory practices and safety.
	PSO-7. Develop research oriented skills.
Course Outcomes (CO) (T.Y.B.Sc. Chemistry)	CO-1. Define basic terms in gravimetry, spectrophotometry, qualitative analysis and parameters in instrumental analysis. Such as: Gravimetry, precipitation, solubility product, ionic product, common ion effect, precipitating agent, washing of ppt., drying and ignition of ppt., linearity range, detection limit, precision, accuracy, Sensitivity, Selectivity, Robustness and Ruggedness, electromagnetic radiations, spectrophotometry, Beers law, absorbance, transmittance, molar absorptivity, monochromator, wavelength of maximum absorbance

	CO-2. The student will understanding of Cell types, Difference between a bacterial cell, Plant cell and animal cell. Biological composition and organization of cell membrane, structure and function of various cell organelles of plant and animal cell. Concepts of biomolecules, Bonds that link monomeric units to form macromolecules
	CO-3. Carbohydrates: The student will understand the types of carbohydrates and their biochemical significance in living organisms, structure of carbohydrates and reactions of carbohydrates with Glucose as example. Properties of carbohydrates. Lipids: The student needs to know the types of lipids with examples, structure of lipids, properties of lipids
	CO-4. Amino acids and proteins: The student will understand the structure and types of amino acids. Reactions of amino acids. Properties of amino acids. Peptide bond formation. Types of proteins. Structural features in proteins. Effect of pH on structure of amino acid, Determination of N and C terminus of peptide chain. Enzymes: The student should know the classes of enzymes with subclasses and examples. Enzyme specificity, Equations of enzyme kinetics Km and its significance, features of various types of enzyme inhibitions, industrial applications of enzymes.
	CO-5. Upon completion of the course the student shall be able to understand: 1. The basics of medicinal chemistry, biophysical properties, overview of basic concepts of traditional systems of medicine. 2. Over view of the overall process of drug discovery, and the role played by medicinal chemistry in this process. 3. Biological activity parameters and importance of stereochemistry of drugs and receptors. 4. Knowledge of mechanism of action of drugs belonging to the classes of infectious and non-infectious diseases. 5. Enhancement of practical skills in synthesis, purification and analysis.
	CO-6. Students should learn the basic concepts about these representation methods. 2. Students should understand the significance of different representation methods for their specific applications. 3. Students should able to identify these representation methods with understanding. 4. Students should able to read these representation methods for basic examples.

Course Outcomes (CO) (M.Sc. Organic Chemistry)	1. Chemical shift, factors influencing chemical shift, deshielding, chemical shift values and correlation for protons bonded to carbons and other nuclei.
	2. Chemical exchange, effect of deuteration, spin-spin coupling, (n+1) rule, complex spin-spin interaction between two, three, four and five nuclei (first order spectra), factors effecting coupling constant "J",
	3. Spin decoupling, Factors affecting coupling constant, simplification of complex spectra, nuclear magnetic double resonance spin decoupling, contact shift reagents, solvent effects, nuclear over hauser effect (NOE), resonance of other nuclei like 31P, 19F
	4. Instrumentation FT NMR, Types of ^{13}C NMR Spectra: un-decoupled, Proton decoupled, Off resonance, APT, INEPT, DEPT, chemical shift, calculations of chemical shifts of aliphatic, olefinic, alkyne, aromatic, hetero aromatic and carbonyl carbons. COSY NOSY & HETCOR (2D NMR)
	5. Students be able to understand Designing of organic synthesis, Protection and de-protection of hydroxyl, amino, carboxyl, ketone and aldehyde functions as illustrated in the synthesis of polypeptide and polynucleotide, enamines, Umpolung in organic synthesis, Reterosynthesis
	6. Students be able to understand Principles and applications of asymmetric synthesis, stereoselectivity in cyclic compounds, enantio-selectivity, diastereo-selectivity, enatiomeric and diastereomeric excess, stereoselective aldol reactions. Cram's rule, Felkin Anh rule, Cram's chelate model, Asymmetric synthesis, use of chiral auxiliaries, chiral reagents and catalysts, asymmetric hydrogenation, asymmetric epoxidation and asymmetric dihydroxylation.
Course Outcomes (CO) (M.Sc. Analytical Chemistry)	1. Students be able to understand principle, instrumentation and application of coulometry, be able to solve problems on this technique.
	2. Students be able to understand principle, instrumentation and application of polarography, hydrodynamic voltammetry, pulse polarography and cyclic voltametry, be able to solve problems on this technique.
	3. Students be able to understand principle, instrumentation and application of amperometry and their titrations.
	4. Students be able to understand principle, instrumentation and application of radio analytical techniques like activation analysis, isotope dilution analysis and radiometric titrations.
	5. Students be able to understand principle, instrumentation

	and application of thermal methods like TGA,DTA and DSC.
	6. Students be able to understand principle instrumentation and application of coulometry, be able to solve problems on this technique.
	7. Students be able to understand principle, instrumentation and application of polarography, hydrodynamic voltammetry, pulse polarography and cyclic voltametry, be able to solve problems on this technique.
	8. Students be able to understand principle, instrumentation and application of amperometry and their titrations.
	9. Students be able to understand principle, instrumentation and application of radio analytical techniques like activation analysis, isotope dilution analysis and radiometric titrations.