

Department of Chemistry

Outcomes of the Chemistry Courses taught in the B Sc Programme

| Class | Course/ Paper | Course Outcome/ Objectives |
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| FYBSc | CH-101: Physical and Inorganic Chemistry | 1) To expose & develop interest in the field of chemistry. 2) To develop ability & to acquire the knowledge of terms, facts concept processes techniques & principles of subject. 3) To understand the fundamental principle and chemical analysis. |
| FYBSc | CH-102: Organic and Inorganic Chemistry | 1) To develop skills required in chemistry such as the proper handling of apparatus & chemical analysis. 2) To develop ability to apply the knowledge of contents of principles of chemistry |
| FYBSc | CH-201: Physical and Inorganic Chemistry | 1) To develop problem solving skills in students. 2) To develop proper aptitude towards the subject. 3) To develop ability to apply the knowledge of contents of principles of chemistry. |
| FYBSc | CH-202: Organic and Inorganic Chemistry | 1) Determine analyses and evaluate the interpretations involve in chemistry. 2) Develop thirst of chemical knowledge, become flexible and persistence learners and appreciate the need for lifelong learning. 3) Develop and understanding, interest of Hydrocarbon Chemistry |
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| SYBSc | CH-301: Physical and | 1) Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point |

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| | Inorganic Chemistry | <p>and osmotic pressure. Calculate molar and normal solution of various concentrations.</p> <p>2) Explains the application of colligative properties in determining molecular mass.</p> <p>3) Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure.</p> <p>4) Compares the general characteristics electronic configuration of lanthanides and actinides, uses of lanthanides and actinides</p> |
| SYBSc | CH-302: Organic and Inorganic Chemistry | <p>This course gives the quantitative ideas about the synthesis, properties and uses of such heterocyclic compounds like pyrole, pyridine quonolene, thiophene, furan etc.. Different methods for the preparation of important Hetero cycles and their important reactions. Aromaticity, Huckel's rule and its applications</p> <p>2) Explains the different types of structural and stereo isomers CO₂ Represent organic molecules by Fischer, Flying wedge, Sawhorse and Newman projection formulas , Conformational isomerism of ethane, n-butane, cyclohexane, Conformational analysis of 1,4 cis and trans disubstituted cyclohexane.</p> <p>3) Explains the theories of acids and bases. Different solvents and solubility. Hard and soft acids and bases: definitions, Pearson HSAB concept, theories of Hardness and softness, application and limitation of HSAB concepts</p> |
| SYBSc | CH-304: Basic Analytical Chemistry | <p>1) Develops accuracy and precision in doing experiments, understands the different errors and methods for minimizing errors. Explanation of MSDS. Explain significant figures, absolute error, relative error, mean, median, Give the theory behind the qualitative and quantitative analysis conducted in the laboratory. Study the importance of safety and security, responsibility types of hazards and risk in chemical laboratory. Understand the use of personal protective and other safety equipment's, handling of chemical in laboratory.</p> <p>2) Understand the route of explores for toxic chemicals. Learn good laboratory practices and its applications.</p> |

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| | | <p>3) Students are enabling to aware about PH, POH, derivation of Henderson's equation, Conduct acid base titrations, Different indicators used in titrations,</p> <p>4) complex metric titrations, Applications of titrations</p> |
| SYBSc | CH-303: Chemistry Practical | <p>1) Determine the miscibility temperature of phenol-water system</p> <p>2) Experimental demonstration of Conductometric and Potentiometric titrations of strong acid against strong base, weak acid against strong base.</p> <p>3) Simple Organic and Inorganic derivatives preparations</p> |
| SYBSc | CH-401: Physical and Inorganic Chemistry | <p>Free energy and equilibrium, Gibbs and Helmholtz energies, spontaneous and non spontaneous reactions, changes in enthalpy, Entropy and free energy of reactions, Derivations of Clausius and Celsius chaperon equations.</p> <p>2) Electrochemistry discussed electrical properties of ionic solutions. Different types of cells and their formulations, applications. Solve the cell reactions and calculate cell EMF.</p> <p>3) Therotical knowledge about metals, non-metals and semiconductors. Understand the p-type semiconductor and n-type semiconductor. Their preparations and uses.</p> |
| SYBSc | CH-402: Organic and Inorganic Chemistry | <p>1) Synthesis of organic reaction is itself involves a large part of organic chemistry. This is called synthetic organic chemistry. This chapter involves different synthetic reagents for synthesis of malonic ester and Acetoacetic ester.</p> <p>2) Organometallic compounds are very important in biological bodies like hemoglobin,</p> <p>3) chlorophylls, Vitamin B12 and also they can be used as chemical reagent. This course discussed about the synthesis and properties of these organometallics of Zinc, Magnesium, Lithium and Copper.</p> <p>4) to understand deferent theories like MOT, VBT, CFT, LCAO, Compare MO and VB theory, Know the meaning of various terms involved in coordination Chemistry ,To understand Werner's formulation of complexes and identify the types of valences, Know the limitations of VBT, Know the shapes of d-orbitals and degeneracy of d-orbitals, Explain MO Theory and draw the MO diagrams for H₂, He₂, B₂, N₂, O₂, CO and NO</p> |
| SYBSc | CH-404: Advanced Analytical | <p>1)To understand redox reaction</p> <p>2)Complexometric titrations & its applications</p> |

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| | Chemistry | 3) Introduction of gravimetric analysis |
| SYBSc | CH-403 :Chemistry Practical | <p>1) Experiments based on Gravimetric and Colorimetric analysis.</p> <p>2) Gravimetric estimation of Barium, Sulphate, Calcium using silica crucible</p> <p>3) Organic qualitative analysis in small quantity helps in type determination and reducing the consumption of chemicals.</p> <p>4) Determine the physical constants like boiling point and melting point of organic compounds.</p> <ul style="list-style-type: none"> • 5) Recrystallisation of organic compounds from alcohol and water. |
| TYBSc | CH-501: Principles of Physical Chemistry-I | <p>1) To orient and acquaint the students towards the basic concepts of Quantum Chemistry</p> <p>2) To acquire knowledge about rates of chemical reactions and distinguishing the reaction of different order and their characteristics.</p> <p>3) To understand the basic principles of phase rules and phase diagrams.</p> <p>4) To learn the underlying principles of electrode reactions, electrochemical cells and applications of EMF.</p> |
| TYBSc | CH-502: Inorganic Chemistry | <p>1) To describe the VSEPR theory to predict shape of molecules from electron pairs.</p> <p>2) To describe the bonding in simple compounds using VBT.</p> <p>3) To describe the principles of VBT to predict hybridization of orbitals.</p> <p>4) To understand how CFT explains electronic structure, colour and magnetic properties of co-ordination compounds.</p> <p>5) To introduce the basic principles of MOT and electronic geometry of molecules.</p> |
| TYBSc | CH-503 - Organic Reaction Mechanism | <p>1) To study different types of organic reactions. To understand the mechanisms of different types of reactions.</p> <p>2) To distinguish between types of substrates and types of reagents.</p> <p>3) To understand ways of attack of reagent, breaking</p> |

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| | | <p>and formation of bonds in different reaction mechanisms.</p> <p>4) To study kinetics, evidences and factors affecting different types of reactions.</p> <p>5) To study stereochemistry of different reactions.</p> <p>6) To understand role of different reagents in different reactions</p> |
| TYBSc | CH-504: Industrial Chemistry | <p>Student will understand</p> <p>1) basic requirements of Chemical Industry, different terms, operations and processes involved in chemical Industry.</p> <p>2) Describe Copy Right Act, Patent Act and Trade Marks, Bureau of Indian Standards (BIS) and International Organization for Standardization (ISO).</p> <p>3) Basic requirements, raw materials, different processes and operations involved in Sugar Industry and also different grades of sugar and uses of by-products of sugar industry.</p> <p>4) Importance of fermented products, basic requirements, theory and process of alcohol making, fractional distillation and various terms involved in Fermentation Industry.</p> <p>5) Understand Occurrence of Petroleum, theories of formation of Petroleum and different terms Viz. Knocking, Anti- Knock Compounds, Octane number, Cetane number, Gasohol and Power alcohol etc.</p> |
| TYBSc | CH-505: Analytical Instrumentation | <p>1) To develop an understanding of the range and uses of analytical methods in chemistry.</p> <p>2) To understand and establish the role of chemistry in quantitative analysis.</p> <p>3) To enhance the Analytical instrumental skill of the students.</p> |
| TYBSc | CH-506(A): Bio-Chemistry | <p>1) Students will study biomolecule like carbohydrates, amino acids, proteins, enzymes, lipids and nucleic acids.</p> <p>2) Students will understand definitions, classifications and examples of these biomolecule.</p> <p>3) Students will learn the detailed structure of these biomolecule along with types of bonds or linkages</p> |

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| | | <p>present in their molecules.</p> <p>4) Students will learn the chemical properties of these biomolecule and the action of some reagents on them in the form of reactions or graphical presentation.</p> |
| TYBSc | CH-601: Principles of Physical Chemistry-II | <p>1) To learn the basics of molecular spectroscopy and rotational spectra.</p> <p>2) To understand the basic principles and applications of nuclear chemistry.</p> <p>3) To learn the consequences of light absorption by atoms and molecules and photochemical reactions.</p> <p>4) To learn the laws of crystallography and basics of crystal structure</p> |
| TYBSc | CH-602: Inorganic Chemistry | <p>1) Learn about basic principles and synthesis of nanomaterials.</p> <p>2) Learn about classification, composition and processing of cement.</p> <p>3) Learn about classification and composition of alloys.</p> <p>4) Learn about types manufacture and applications of fertilizers</p> |
| TYBSc | CH-603: Spectroscopic Methods of Structure Determination | <p>1) To study principle of spectroscopy and to understand wave parameters and terms involved in spectroscopy.</p> <p>2) To study different types of spectroscopy.</p> <p>3) To understand principle, concept and the terms used in each type of spectroscopy.</p> <p>4) Interpretation of UV, IR, NMR spectra.</p> <p>5) Use of spectral data for determination of structure of unknown organic compounds.</p> <p>6) To study different applications of each type of spectroscopy.</p> |
| TYBSc | CH-604: Chemistry of Industrial Important Product | <p>The student will be able to understand....</p> <p>1) Describe the industrial production of a number of important organic and inorganic compounds / chemicals and products of end use.</p> <p>2) Gain comprehensive knowledge of cutting-edge developments in a field of different chemical industries.</p> <p>3) Importance of Cosmetics Industry and a general study including preparation and uses of the Hair dye, hair spray, shampoo, suntan lotions, lipsticks, talcum powder, nail enamel, creams (cold, and shaving creams).</p> |

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| | CH-605: Analytical Techniques | <p>1) To provide knowledge of instruments which are used in Chemical, Pharma, Petroleum, and insecticide and pesticide industry</p> <p>2) To increase student technical skill as per industry need.</p> <p>3) To develop an understanding of the range and uses of analytical methods in chemistry.</p> |
| TYBSc | CH-606(A): Polymer Chemistry | <p>1) Define terms like monomer, polymer, polymerization, polydispersity index, etc., classify polymers based on their origin, native backbone chain, and thermal response.</p> <p>2) Know glass transition temperature and its determination, various ways to express molecular weights of polymers and polydispersity index.</p> <p>3) Identify different mechanisms of polymerizations viz. Free radical, ionic, and condensation polymerizations.</p> <p>4) Distinguish techniques of polymerization based on physical conditions required for the preparation of polymers in laboratory or industry.</p> <p>5) Familiar with preparation, properties, and applications of industrially important selected polymers.</p> |