



PROGRAMME, PROGRAMME SPECIFIC & COURSE OUTCOMES 2016-17

B.Sc. (Chemistry)

Programme Outcomes (PO)

1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
2. Solve the problem and also think methodically, independently and draw a logical conclusion.
3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.

Programme Specific Outcomes (PSO)

1. Gain the knowledge of Chemistry through theory and practicals.
2. Identify chemical formulae and solve numerical problems.
3. Understand good laboratory practices and safety.
4. make aware and handle the sophisticated instruments/equipments.

Course Outcomes (CO)

| S.NO | SEM | NAME OF THE COURSE | OUTCOMES |
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| 1 | I | General Chemistry I | <ul style="list-style-type: none">• Have the Knowledge of Handling of Chemicals and apparatus.• Able to write electronic configuration of given atomic number.• Understand different principles for filling electrons. |
| 2 | | Allied Chemistry I | <ul style="list-style-type: none">• Learn about the Radioactivity and Nuclear Chemistry.• Know about the types in Chemical bonding.• Understand the Principles of Chromatography and their |

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| | | | applications. |
| 3 | II | General Chemistry II | <ul style="list-style-type: none"> • Know the formation of different types of bonds. • Predict the directional properties of covalent bonds. • Have the knowledge of Reaction mechanism I. |
| 4 | | Food and Nutrition | <ul style="list-style-type: none"> • Study about the sources and constituents of foods. • Know about the food preservation and its processing. 5Study about the minerals and vitamins. |
| 5 | | Volumetric Estimation and Inorganic Preparation Practical | <ul style="list-style-type: none"> • Able to facilitate the learner to make solutions of various molar concentrations. • Know the concept of the mole; • Converting moles to grams; Converting grams to moles; Defining concentration; • Dilution of Solutions; Making different molar concentrations |
| 6 | | Allied Chemistry II | <ul style="list-style-type: none"> • Understand the theories and concepts regarding Co-ordination Chemistry. • Know about the Classification and reactions for Carbohydrates. |
| 7 | | Volumetric Estimation and Organic salt analysis Practical | <ul style="list-style-type: none"> • Able to facilitate the learner to make solutions of various molar concentrations. • Know the concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations • Predict the outcome and mechanism of some simple organic reactions, using a basic understanding of the relative reactivity of functional groups. |
| 8 | III | General Chemistry III | <ul style="list-style-type: none"> • Able to draw structures of different ionic solids. • Understand the law of thermodynamics and thermochemistry. • Have the knowledge of Reaction mechanism II. |
| 9 | | Allied Chemistry I | <ul style="list-style-type: none"> • Learn about the Radioactivity and Nuclear Chemistry. • Know about the types in Chemical bonding. • Understand the Principles of Chromatography and their applications. |
| 10 | IV | General Chemistry IV | <ul style="list-style-type: none"> • Able to recognize the amine and amide functional groups. • Discuss the basic properties of heterocyclic compounds. |
| 11 | | Polymer Chemistry | <ul style="list-style-type: none"> • Know about the basic concepts of Polymers and macro molecules. • Study about the Plastics and resins. |
| 12 | | Inorganic Qualitative Analysis Practical | <ul style="list-style-type: none"> • Know the procedure for the analysis of inorganic salt mixture. |

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| | | | <ul style="list-style-type: none"> • Able to analysis acid and basic radicals. |
| 13 | | Allied Chemistry II | <ul style="list-style-type: none"> • Understand the theories and concepts regarding Co-ordination Chemistry. • Know about the Classification and reactions for Carbohydrates. |
| 14 | | Volumetric Estimation and Organic salt analysis Practical | <ul style="list-style-type: none"> • Able to facilitate the learner to make solutions of various molar concentrations. • Know the concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations • Predict the outcome and mechanism of some simple organic reactions, using a basic understanding of the relative reactivity of functional groups. |
| 15 | V | Inorganic Chemistry | <ul style="list-style-type: none"> • 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 |
| 16 | | Organic Chemistry | <ul style="list-style-type: none"> • Discuss kinetics, mechanism and stereochemistry of SN1 and SN2 reactions. • Compare between E1 and E2 reactions. • Understand the evidences, reactivity and mechanism of various elimination and substitution reactions. |
| 17 | | Physical Chemistry | <ul style="list-style-type: none"> • Understand the term specific volume, molar volume and molar refraction • Know the meaning of phase, component and degree of freedom |
| 18 | | Spectroscopy | <ul style="list-style-type: none"> • Know about the basic rules of spectroscopy • Understand the instrumental methods of spectroscopy. |
| 19 | | Dye Stuffs and Treatment of Effluents | <ul style="list-style-type: none"> • To understand the function of dyes, paints and pigments. • Study the manufacture of cement, dyes, Glass, Soap and Detergents by modern methods. |
| 20 | | Agriculture Chemistry | <ul style="list-style-type: none"> • Know the role of agriculture chemistry and its potential • Understand the basic concept of soil, properties of soil & its classification on the basis of pH. • Know the different plant nutrients, their functions and deficiency symptoms. • Have the knowledge of various pesticides, insecticides, fungicides and herbicides. |

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| 21 | VI | Inorganic Chemistry | <ul style="list-style-type: none"> • Study the electronic configuration of lanthanides and actinides. • Get knowledge of Crystalline solid. • Understand the p-type semiconductor and n-type semiconductor. |
| 22 | | Organic Chemistry | <ul style="list-style-type: none"> • Discuss different types of rearrangement reactions. • Understand the difference between carbocation and carbanion. • To study alkaloids, Ephedrine, citral molecule with their properties and application. |
| 23 | | Physical Chemistry | <ul style="list-style-type: none"> • Know the Redox reaction. • Study the Crystal Field Theory. • Solve the cell reaction and calculate EMF.. • Understand De-Broglie hypothesis and Uncertainty principle |
| 24 | | Analytical Chemistry | <ul style="list-style-type: none"> • Know the different analytical techniques. • To understand different types of separation techniques. • To study principle, construction and working of GC and HPLC. |
| 25 | | Pharmaceutical Chemistry | <ul style="list-style-type: none"> • Know the various pharmaceutical drugs, their application and synthesis. • Gains the importance of medicinal chemistry • Acquires the usage of therapeutic agents |
| 26 | | Industrial Chemistry | <ul style="list-style-type: none"> • Know the importance of chemical industry • Study of Batteries |
| 27 | | Organic Salt analysis and Gravimetric estimation Practical | <ul style="list-style-type: none"> • Know to calculate a limiting reagent, yield, and percent yield • Have a knowledge of detailed scientific notebook • Able to evaluate data collected to determine the identity, purity, and yield of products. • Have the knowledge of findings in writing in a clear and concise manner |
| 28 | | Physical Practical | <ul style="list-style-type: none"> • An understanding of methods employed for problem solving in physical chemistry • Experience in some scientific methods employed in basic and applied physical chemistry • Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry • Developed skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments |

Abbreviations:

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| CAS | - | Career Advancement Scheme |
| CAT | - | Common Admission Test |
| CBCS | - | Choice Based Credit System |
| CE | - | Centre for Excellence |
| COP | - | Career Oriented Programme |
| CPE | - | College with Potential for Excellence |
| DPE | - | Department with Potential for Excellence |
| GATE | - | Graduate Aptitude Test |
| NET | - | National Eligibility Test |
| PEI | - | Physical Education Institution |
| SAP | - | Special Assistance Programme |
| SF | - | Self Financing |
| SLET | - | State Level Eligibility Test |
| TEI | - | Teacher Education Institution |

Programme Outcomes (PO)

1. Determine molecular structure by using UV, IR and NMR.
2. Improve the Skill of student in organic research area.
3. Determine the aromaticity of different compounds.
4. Solve the reaction mechanisms and assign the final product.

Programme Specific Outcomes (PSO)

1. Know the structure and bonding in molecules/ ions and predict the Structure of molecule/ions.
2. Understand the various type of aliphatic, aromatic, nucleophilic substitution reaction.
3. Study of organometallic reactions.
4. Study of free radical, bicyclic compound, conjugate addition of Enolates and pericyclic reactions.

Course Outcomes (CO)

| S.NO | SEM | NAME OF THE COURSE | OUTCOMES |
|------|-----|---------------------|--|
| 1 | I | Inorganic Chemistry | <ul style="list-style-type: none"> • Learn about geometry and shape of the molecule. • Known the preparation and properties of transition metal carbonyls • To understand the 18 electron rule and its application. |
| 2 | | Organic Chemistry | <ul style="list-style-type: none"> • Learn SN1, SN2 and SNi Mechanism and stereochemistry. • Solve the elimination problems. • Distinguish between type of addition, elimination and substitution reaction. |
| 3 | | Physical Chemistry | <ul style="list-style-type: none"> • Realize the terms ionic strength, activity coefficient, DHO equation. • Know the Eigen function, Eigen value, operator and postulates of quantum mechanics. |

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| | | | <ul style="list-style-type: none"> Understand the adsorption of gases by solid type of isotherms |
| 4 | | Polymer Chemistry | <ul style="list-style-type: none"> Understands the classification of polymers Learns the chemical background of individual polymers Determines the various uses of polymers Analyses the different types of polymerization process Visualizes the methods of polymer degradation |
| 5 | II | Organic Chemistry | <ul style="list-style-type: none"> Study of carbanion-formation, stability and related name reaction, enemies and its applications. Learn the carbines and nitrenes. Study of oxidative coupling and SNAr reaction. |
| 6 | | Physical Chemistry | <ul style="list-style-type: none"> Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure. Know the statistical thermodynamics and various partition functions. Study the steady state approximation michaelis-menten mechanism, lindemann-hinshelwood mechanism, chain reaction, Rate determining stapes and consecutive elementary reactions. |
| 7 | | Coordination Chemistry | <ul style="list-style-type: none"> Study the Complex structures Understanding of Coordination Compounds Demonstrate an understanding of nomenclature and isomerism Interpret the stability of complexes. |
| 8 | | Inorganic Practical | <ul style="list-style-type: none"> Determines the procedure for semi micro analysis of inorganic salt mixture Understanding the procedure for semi micro qualitative analysis Estimates the accurate analytical procedure of analysis Appreciates the procedure for inorganic analysis Learns the steps involved in the complex formation process |
| 9 | | Organic Practical | <ul style="list-style-type: none"> Learns principle of organic estimation Gains the procedure for organic separation and derivation Understands the method of organic preparation Develops the various routes for recrystallization Identifies the way for identification of components |
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| 10 | II | Physical practical | <ul style="list-style-type: none"> • Gains the procedure for conductometric determination • Learns holistic method of surface adsorption • Experiments the kinetics of chemical reaction • Appreciates the importance of potentiometric methods • Understands the sensitivity of pH metric titration |
| 11 | III | Inorganic Chemistry | <ul style="list-style-type: none"> • Enlights the Knowledge about inner transition compounds. • Validates the inorganic molecular rearrangements. |
| 12 | | Organic Chemistry | <ul style="list-style-type: none"> • Study the various name reaction with examples. • Learn the mechanism of rearrangement reaction, use synthetic reagent of oxidation and reduction for solving the problems. |
| 13 | | Physical Chemistry | <ul style="list-style-type: none"> • Perceives the postulates of quantum chemistry • Applies the wave mechanics for determining atom structure. |
| 14 | | Electrochemistry and Photochemistry | <ul style="list-style-type: none"> • Advanced Concepts In Electrochemistry • Learn the basic Principles of Photochemistry |
| 15 | IV | Inorganic Chemistry | <ul style="list-style-type: none"> • Demonstrate basic Principles of organometallic compounds • Illustrate stereochemistry of organometallic compounds. |
| 16 | | Organic Spectra, Photochemistry and Pericyclic Reactions | <ul style="list-style-type: none"> • Study of photochemistry: Carbonyl compounds, alkenes, dienes, polyenes and aromatic compounds. • Learn Pericyclic reaction: Electro cyclic, Cycloaddition, and Ene Reaction, analysis by correlation diagram, FMO approach and ATS concept. • Study of heterocyclic chemistry: Five and six member heterocyclic with one or two hetero atoms. |
| 17 | IV | Inorganic Practical | <ul style="list-style-type: none"> • Determines the procedure for quantitative estimation of inorganic mixture • Estimates the analysis of ores and alloys • Appreciates the procedure for inorganic analysis • Learns the steps involved in the inorganic complex formation process |
| 18 | | Organic Practical | <ul style="list-style-type: none"> • Learn the principles for estimation and preparation • Identification of organic compounds involving |

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| | | | <p>two stages</p> <ul style="list-style-type: none"> • Understands the method of organic preparation • Develops the various routes for recrystallization |
| 19 | | Physical Practical | <ul style="list-style-type: none"> • Gains the procedure for standard potentials determination • Learns the pH and calculation of pKa • Experiments the solubility product of sparingly soluble salt and redox titrations • Appreciates the importance of potentiometric methods • Understands the sensitivity of pH metric titration and emf measurements |
| 20 | | Project | <ul style="list-style-type: none"> • Gains hands on various analytical instruments (research) • Learns the steps involved in solving a problem • Understands the formatting of table work |

Annexure I

Abbreviations:

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| CAS | - | Career Advancement Scheme |
| CAT | - | Common Admission Test |
| CBCS | - | Choice Based Credit System |
| CE | - | Centre for Excellence |
| COP | - | Career Oriented Programme |
| CPE | - | College with Potential for Excellence |
| DPE | - | Department with Potential for Excellence |
| GATE | - | Graduate Aptitude Test |
| NET | - | National Eligibility Test |
| PEI | - | Physical Education Institution |
| SAP | - | Special Assistance Programme |
| SF | - | Self Financing |
| SLET | - | State Level Eligibility Test |
| TEI | - | Teacher Education Institution |
