

Department of Chemistry

Program Outcome:

After successful completion of the 3 year B.Sc programme (under CBCS) in Chemistry
PO1: Students will be able to acquire in depth understanding and gain broad knowledge on the fundamentals and applications of the major scientific theories in all branches of chemistry
PO2: Students will be able to learn different practical techniques & analytical procedures of chemical analysis, synthesis and monitoring of chemical reactions.
PO3: Students will be able to carry out scientific experiments and record, analyse the results of such experiments using the latest computer based tools and also will be able to convey the results of scientific experiments in oral, written and electronic formats.
PO4: Students will be able to understand the role of chemistry in solving key issues of our society related to energy, environment and health
PO5: Students will be able to develop skill in problem solving, critical thinking and analytical reasoning and they will be able to explore new areas of chemistry and allied fields of science and technology
PO-6: Students will be well prepared to work in interdisciplinary groups, related industries and also can pursue further higher education and research in academia

Course Outcome:

Course	SEMESTER-1
	After completion of the course students will be able to
CC1	<p style="text-align: center;">INORGANIC CHEMISTRY-1</p> <p>CO-1: Master Quantum Mechanics and gain Knowledge on atomic structure CO-2: Understand the principles and applications of acid-base chemistry to analyse chemical reactions and phenomena involving acids and bases. CO-3: Create understanding of the principles and applications of redox chemistry that enables to identify redox reactions, balance equations and analyse electrochemical cells</p> <p style="text-align: center;">ORGANIC CHEMISTRY-1A</p> <p>CO-4: Build understanding of the fundamental concepts of chemical bonding, molecular structure, and the physical characteristics of organic compounds. CO-5: Understand and analyse reaction mechanisms and gain insights into the factors influencing the rate, selectivity, and efficiency of chemical reactions. CO-6: Develop practical laboratory skills on conducting acid-base and redox titrations for quantitative analysis and learn to conduct experiments on the separation and purification of organic compounds.</p>
CC2	<p style="text-align: center;">PHYSICAL CHEMISTRY-1</p> <p>CO-1: Develop thorough understanding of the kinetic theory of gases and the behaviour of gases at both the macroscopic and molecular levels CO-2: Build solid foundation in understanding and applying transport properties like diffusion and viscosity CO-3: Understand and analyse chemical reactions on the basis of reaction mechanisms and kinetic data and also learn to apply kinetics principles to biological systems like enzyme catalysis</p> <p style="text-align: center;">ORGANIC CHEMISTRY-IB</p> <p>CO-4: Learn concept of chirality, symmetry and understand different methods used to represent the configuration of stereocenters and gain insight on optical activity CO-5: Build understanding of electronic structure, stability, and reactivity reactive intermediates like carbocations, carbanions, free radicals, carbenes and reactive species like electrophiles and nucleophiles CO-6: Develop skills on conducting of kinetics, viscosity, and solubility experiments and also learn to conduct experiments on boiling point determination of different liquids</p>
SEMESTER-2	

CC3	<p style="text-align: center;">ORGANIC CHEMISTRY-2</p> <p>CO-1: Develop solid understanding of stereochemistry, with a focus on chirality arising from stereoaxis, prostereoisomerism, and conformation.</p> <p>CO-2: Build understanding of reaction mechanisms on the basis of reaction thermodynamics, reaction kinetics, tautomerism, substitution, and elimination reactions.</p> <p>CO-3: Acquire practical skills and knowledge in organic synthesis and yield calculation.</p>
CC4	<p style="text-align: center;">INORGANIC CHEMISTRY-2</p> <p>CO-1: Gain insight on the fundamental principles of chemical bonding (VBT, VSEPR) with a focus on characteristics and properties of ionic and covalent bond</p> <p>CO-2: Learn the principles of MO theory to understand the formation and properties of chemical bond and understand how intermolecular forces affect physical properties</p> <p>CO-3: Gain knowledge of nuclear reactions, factors that influence nuclear stability, radioactive decay, decay kinetics, radiochemical methods, radiation hazards and safety</p> <p>CO-4: Acquire practical skills and knowledge in iodometric titration and its application in the estimation of metal content in samples.</p>
SEMESTER-3	
CC5	<p style="text-align: center;">PHYSICAL CHEMISTRY-2</p> <p>CO-1: Master the concept and principles of first law of thermodynamics and develop skills to analyse energy changes, enthalpy changes in chemical and physical processes</p> <p>CO-2: Understand second law of thermodynamics and the behaviour of energy, entropy and free energy in physical and chemical systems, gain familiarity with the thermodynamic relationships for systems with fixed and variable compositions</p> <p>CO-3: Understand the connection between thermodynamics and chemical equilibrium, create understanding of chemical equilibrium and the factors that influence it, the Nernst distribution law and its application to solvent extraction</p> <p>CO-4: Master concepts and principles of conductance, transport number, ionic equilibrium and electromotive force, develop skills to analyse electrochemical systems and apply electrochemical techniques in real-world problems</p> <p>CO-5: Acquire practical skills and knowledge of application of electrochemical techniques like conductometric titration, potentiometric titration in study of redox, acid-base, saponification and precipitation reactions</p>
CC6	<p style="text-align: center;">INORGANIC CHEMISTRY-3</p> <p>CO-1: Build understanding of periodic trends in the physical and chemical properties of elements, understand the relationship between periodic trends and the chemical reactivity of elements and type of chemical bond form between them, relativistic effect and inert pair effect</p> <p>CO-2: Create a comprehensive understanding on the chemistry of s and p block elements, learn about the chemistry of noble gases and inorganic polymer</p> <p>CO-3: Learn theories and models to explain coordinate bonding and gain knowledge on IUPAC nomenclature, isomerism and properties of coordination compounds</p> <p>CO-4: Acquire practical skills on complexometric and gravimetric estimation of</p>

	different ions, chromatographic separation of (i) Ni (II) and Cu (II) ions, (ii) Fe (III) and Al (III) ions
CC-7	<p style="text-align: center;">ORGANIC CHEMISTRY-3</p> <p>CO-1: Learn about the types of addition reactions including electrophilic addition, nucleophilic addition, and radical addition, understand the mechanisms, reactivity, regioselectivity and stereoselectivity of these reactions</p> <p>CO-2: Gain knowledge on the mechanism of electrophilic and nucleophilic aromatic substitution reactions, understand the behaviour of electrophiles or nucleophiles in such reactions and the factors that influence their reactivity and regioselectivity</p> <p>CO-3: Learn about the structure, bonding, and reactivity of carbonyl functional groups, understand the mechanisms and regiochemistry of nucleophilic addition to carbonyl compounds, including the α,β unsaturated compounds</p> <p>CO-4: Acquire knowledge on method of preparation, structure and bonding of organometallic compounds including Grignard reagents, organolithium compounds, and Gilman cuprates, their reactivity, and their applications in organic synthesis</p> <p>CO-5: Gain necessary knowledge and practical skills for qualitative detection and quantitative estimation of organic compounds</p>
SEC-A1	<p style="text-align: center;">MATHEMATICS AND STATISTICS FOR CHEMISTS</p> <p>CO-1: Build a strong foundation in calculus and its applications in chemistry.</p> <p>CO-2: Create solid understanding of differential equations and their applications.</p> <p>CO-3: Learn probability theory including permutation combination and principles of probability</p> <p>CO-4: Create understanding of vector operations, matrices algebra, and determinants and their applications in science</p> <p>CO-5: Gain understanding of sampling methods, data evaluation, error analysis, and statistical tests commonly used in chemical and analytical contexts.</p> <p>CO-6: Build foundation in descriptive statistics, statistical tests, and regression analysis, with a focus on applications in chemistry and data analysis</p>
SECA-2	<p style="text-align: center;">ANALYTICAL CLINICAL BIOCHEMISTRY</p> <p>CO-1: Gain insight of the biochemical aspects of carbohydrates, proteins, enzymes, lipids, and nucleic acids and understand the biological importance, structures, functions, and applications of these biomolecules.</p> <p>CO-2: Build strong foundation in the biochemical analysis of blood and urine for diagnostic purposes, interpret common laboratory tests, assess deviations from normal values and contribute to the diagnosis and monitoring of various diseases</p> <p>CO-3: Acquire practical skills in identifying and quantifying important biochemical compounds such as carbohydrates, lipids, cholesterol, proteins, and nucleic acids</p>
SEMESTER-4	
CC-8	<p style="text-align: center;">ORGANIC CHEMISTRY-4</p> <p>CO-1: Gain a solid understanding of the synthesis, separation, identification, and reactivity of nitrogen compounds such as amines, nitro compounds, alkyl nitriles, isonitriles, and diazonium salts</p> <p>CO-2: Build understanding of the mechanisms, stereochemical features, and conditions of various rearrangement reactions involving electron-deficient carbon, nitrogen, and oxygen, as well as aromatic systems</p>

	<p>CO-3: Develop skills in synthetic analysis, retrosynthetic thinking, and the strategic planning of organic synthesis, learn principles of ring and asymmetric synthesis</p> <p>CO-4: Gain understanding of the principles and applications of UV, IR, and NMR spectroscopy in the identification and analysis of organic compounds</p> <p>CO-5: Acquire practical skills in qualitative analysis of solid organic compounds, identification of functional groups, determination of solubility behaviour, and interpretation of experimental data</p>
CC-9	<p style="text-align: center;">PHYSICAL CHEMISTRY 3</p> <p>CO-1: Build strong understanding of colligative properties, their thermodynamic basis and practical applications, predict and interpret colligative properties and understand the behaviour of solutions under different conditions</p> <p>CO-2: Gain insight on phase equilibrium, phase diagrams, phase transitions, and the behaviour of binary and three-component systems, analyse phase diagrams, and interpret the behaviour of solutions and mixtures under different conditions</p> <p>CO-3: Create foundation in quantum mechanics, including wave-particle duality, the wave function, operators and eigenfunctions, and develop the ability to apply quantum mechanical principles to model systems like particle in a box</p> <p>CO-4: Gain insight of crystallographic principles including the laws of crystallography, crystal planes, Bravais lattice, crystal packing, crystal structure determination, and learn the temperature dependent heat capacity of solids</p> <p>CO-5: Acquire practical skills and understanding of various experimental techniques and concepts such as kinetic studies, phase diagrams, partition coefficient determination, pH determination, and pH-metric titration</p>
CC-10	<p style="text-align: center;">INORGANIC CHEMISTRY-4</p> <p>CO-1: Build a comprehensive understanding of the fundamental concepts and theories in coordination chemistry, including Crystal Field Theory, magnetism, colour, metal-ligand bonding, and spectroscopy</p> <p>CO-2: Gain insight of the chemistry of transition elements, including the properties, electronic structure, coordination chemistry, and applications of d- and f-block elements</p> <p>CO-3: Understand inorganic reaction kinetics and mechanism, focusing on substitution reactions in square planar and octahedral complexes, differentiate thermodynamic and kinetic stability and its implication in reaction kinetics</p> <p>CO-4: Acquire practical knowledge and skills in the synthesis, characterization, and analysis of inorganic compounds, gain hands-on experience on the use of the instrumental techniques commonly used in inorganic chemistry research</p>
SEC-B3	<p style="text-align: center;">PHARMACEUTICALS CHEMISTRY</p> <p>CO-1: Build understanding of the process of drug discovery and the synthesis of representative drugs from different therapeutic classes, gain insight on design, development and basic retrosynthetic approach in preparation of these drugs</p> <p>CO-2: Gain insight of the specific fermentation pathways, microbial strains, and process conditions involved in the production of these products and their applications in industries, healthcare, and nutrition</p> <p>CO-3: Get hands-on experience in the preparation and analysis of pharmaceutically important substances such as Aspirin and magnesium bisilicate</p>
SEC-B4	PESTICIDE CHEMISTRY

	<p>CO-1: Gain Knowledge of classification, structure-activity relationship, synthesis, manufacturing and applications of pesticides, explore effectiveness, limitations, and environmental considerations associated with pesticide applications.</p> <p>CO-2: Perform acid-base titrations to evaluate acidity/alkalinity in pesticide formulations, ensuring compliance with quality standards, develop practical expertise in the synthesis of organophosphates, phosphonates, and thiophosphates</p>
SEMESTER-5	
CC-11	<p style="text-align: center;">PHYSICAL CHEMISTRY - 4</p> <p>CO-1: Develop understanding of quantum chemistry principles and mathematical formulations related to the Simple Harmonic Oscillator, Angular Momentum, Hydrogen Atom, and LCAO, apply these concepts to analyse and interpret the behaviour of quantum systems, particularly in the context of structure and bonding</p> <p>CO-2: Understand principles statistical thermodynamics and apply these concepts to analyse and predict thermodynamic behaviour, calculate thermodynamic properties of systems, gain insight on adiabatic demagnetization</p> <p>CO-3: Gain a solid understanding of numerical methods for finding roots, fitting curves, differentiating functions, and integrating functions, implement these techniques to solve mathematical and scientific problems</p> <p>CO-4: Gain hands-on training on computer programming languages to solve numerical problems, implement numerical methods for root finding, differentiation, and integration, apply these programs to analyse physical and chemical phenomena</p>
CC-12	<p style="text-align: center;">ORGANIC CHEMISTRY - 5</p> <p>CO-1: Develop a solid understanding of the synthesis, reactivity, and important reactions of polynuclear hydrocarbons, heterocyclic compounds, and benzo-fused rings, gain knowledge on retrosynthetic approaches and mechanistic details to the synthesis of various heterocycles</p> <p>CO-2: Gain Knowledge of cyclic stereochemistry, including the concept of I-strain, conformational analysis, and the reactivity of alicyclic compounds, analyse the stability and reactivity of different conformers, predict the stereochemical outcome of various reactions involving synthesis and manipulation of cyclic compounds</p> <p>CO-3: Develop familiarity with biomolecules, particularly amino acids, peptides, and nucleic acids, gain knowledge on the synthesis of amino acids, the formation of peptide bonds, and the structure and function of nucleic acids, determination of peptide sequence and principles underlying structure of DNA</p> <p>CO-4: Develop practical expertise of chromatographic separation techniques such as TLC, column chromatography, and paper chromatography, perform separations, analyse the separated compounds and identify functional groups by assigning peaks in spectroscopic data, specifically ¹H NMR and IR spectra</p>
DSE-A1	<p style="text-align: center;">MOLECULAR MODELLING & DRUG DESIGN</p> <p>CO-1: Learn to manipulate molecular structures using coordinate systems, analyse potential energy surfaces, and visualise structures using graphics software.</p> <p>CO-2: learn the role of bond stretching and angle bending, nonbonded interactions in molecular mechanics, force field models designed for simulating liquid water</p> <p>CO-3: Understand the concept of energy minimization, explore the energy landscape and analyse simulation results, calculate thermodynamic properties</p> <p>CO-4: Learn the principles of molecular dynamics and Monte carlo simulations and</p>

	<p>their application to simple model systems</p> <p>CO-5: Utilise various software tools like ChemSketch, ArgusLab, etc. in visualising molecular structures, orbitals, electron density, and potential maps, performing calculations and simulations to understand the properties and behaviour of molecules</p>
DSE-A2	<p style="text-align: center;">APPLICATIONS OF COMPUTERS IN CHEMISTRY</p> <p>CO-1: Learn the fundamental concepts and techniques of programming language such as variables, loops, decision-making, and functions, implement algorithms in FORTRAN language</p> <p>CO-2: Gain insight in using MS Excel to organise, analyse, and present data, learn how to perform calculations, create visual representations of data, and solve problems using Excel's built-in functions and tools</p> <p>CO-3: Develop solid understanding of statistical concepts and techniques, learn how to use Excel as a tool for data analysis, descriptive statistics, and statistical significance testing</p> <p>CO-4: Get hands-on experience with spreadsheet software (e.g., Excel) and apply it to various chemical applications and learn to analyse data, perform calculations, and interpret the results using computational tools available in the Excel software</p>
DSE-B1	<p style="text-align: center;">INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE</p> <p>CO-1: Learn about the properties and manufacturing processes of different types silicates like glasses, ceramics and cement, gain knowledge of their compositions, applications and setting processes</p> <p>CO-2: Gain insight of the manufacturing processes of fertilisers, including urea, ammonium nitrate, ammonium phosphates, polyphosphate, superphosphate etc.</p> <p>CO-3: Learn about the different types of paints, pigments and special paints used in coating applications, including their formulation, composition, and related properties Gain knowledge on various surface coating techniques</p> <p>CO-4: Learn the working principles of batteries, including lead-acid, lithium-ion, and solid-state electrolyte, gain insight on fuel cells, solar cells, and polymer cells, understand their basic principles and applications</p> <p>CO-5: Understand the manufacturing processes involved in steel production, explore the composition and properties of different types of steels, enabling them to learn the impact of alloying elements on steel characteristics</p> <p>CO-6: Learn the principles of homogeneous and heterogeneous catalysis, gain insight of deactivation and regeneration of catalysts, as well as the applications of phase transfer catalysts and zeolites</p> <p>CO-7: Build understanding of the properties and preparation methods of specific chemical explosives and the underlying principles that contribute to their explosive nature, learn about rocket propellants, function, types, and applications</p> <p>CO-8: Develop practical skills in chemical analysis and material characterization, learn various analytical techniques specific to the analysis of fertilisers, coatings, minerals, alloys, and other materials</p>
DSE-B2	<p style="text-align: center;">NOVEL INORGANIC SOLIDS</p> <p>CO-1: Learn theoretical models and principles related to different methods of synthesis and modification of inorganic solids</p> <p>CO-2: Understand theoretical concepts, synthesis methods, characterization</p>

	<p>techniques, and applications of inorganic solids of technological importance</p> <p>CO-3: Gain knowledge of synthetic methods and characterisation of different class of nanomaterials and their applications in different field of technological importance</p> <p>CO-4: Gain insight of the composition, mechanical properties, fabrication methods, and applications of various engineering materials, which helps material selection in mechanical construction</p> <p>CO-5: Build comprehensive understanding of composite materials, including their composition, classification, properties, manufacturing techniques, and applications, understand environmental effects on composites and their mechanical behaviour</p> <p>CO-6: Gain knowledge of specialty polymers, including their properties, synthesis methods, processing techniques, and their applications in various technological and industrial contexts.</p> <p>CO-7: Gain hands-on experience in working with novel inorganic solids and learn various experimental techniques, including synthesis methods and characterization techniques and analysis of results</p>
	<p>SEMESTER-6</p>
<p>CC-13</p>	<p style="text-align: center;">INORGANIC CHEMISTRY-5</p> <p>CO-1: Create theoretical foundations of qualitative analysis, including the principles governing the behaviour of cations and anions, understand separation techniques and the importance of eliminating interfering ions</p> <p>CO-2: Understand the role of metal ions, dioxygen in biological systems and their significance in various biochemical processes, gain knowledge about the essential elements for life, the transport of metal ions and the impact of metal ions on health</p> <p>CO-3: Learn about the classification and bonding in organometallic compounds, the rules that govern their stability, gain insight of synthesis and reactivity of various organometallic complexes including metal carbonyls, nitrosyls, cyanides etc.</p> <p>CO-4: Understand principles and applications of catalysis by organometallic compounds in various industrial processes, learn catalysis in the context of mechanism, selectivity and efficiency and design and properties of the catalysts used</p> <p>CO-5: Acquire practical experience in qualitative semimicro analysis, learn to perform various tests, reactions, and separations to identify cation and anion radicals as well as insoluble materials</p>

<p>CC-14</p>	<p style="text-align: center;">PHYSICAL CHEMISTRY-5</p> <p>CO-1: Understand the principles and theories behind the interaction of molecules with electromagnetic radiation, gain knowledge about different types of spectra and their interpretation to calculate molecular properties</p> <p>CO-2: Build understanding of photochemistry and the theory of reaction rates, learn the fundamental principles and laws governing photochemical processes, as well as the factors influencing reaction rate</p> <p>CO-3: Understand surface tension and energy, as well as the related phenomena and their applications, learn the fundamental principles underlying the behaviour of liquids at interfaces including capillary rise and other phenomena</p> <p>CO-4: Build Understanding of adsorption phenomena, including physical and chemical adsorption, adsorption isotherms, multilayer adsorption, and surface excess, learn about the applications of adsorption in heterogeneous catalysis</p> <p>CO-5: Create solid understanding of the principles of colloids formation, their types, stability, electrokinetic phenomena, and micelle formation</p> <p>CO-6: Develop a solid understanding of dipole moment, polarizability, dielectric properties, and the behaviour of polar and non-polar molecules in electric fields., gain knowledge of experimental techniques for determining dipole moments</p> <p>CO-7: Gain hands-on experience in conducting various spectroscopic measurements to calculate pH and kinetic properties, develop practical skills in conducting surface tension measurements to calculate CMC and surface tensions</p>
<p>DSE-A3</p>	<p style="text-align: center;">GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS</p> <p>CO-1: Develop a solid understanding of Green Chemistry, its significance in sustainable development and its potential to mitigate the environmental and health impacts of traditional chemical practices, recognise the limitations of implementing it</p> <p>CO-2: Understand the principles of Green Chemistry and their practical application in designing environmentally friendly chemical syntheses, analyse chemical reactions from a perspective of green chemistry and sustainability of chemical processes</p> <p>CO-3: Learn about various examples of green synthesis and explore alternative methods that reduce waste generation, enhance atom economy, and minimise the use of hazardous reagents</p> <p>CO-4: Equipped with knowledge of the latest trends and advancements in green chemistry, enabling them to contribute to the development and implementation of sustainable and environmentally friendly chemical processes</p> <p>CO-5: Acquire understanding of alkaloids, their natural occurrence, structural features, synthesis, medicinal properties, and their significance in drug discovery</p> <p>CO-6: Gain comprehensive understanding of terpenes, their occurrence, classification, structure elucidation, synthesis, and biological activities, recognize and analyse different types of terpenes</p> <p>CO-7: Develop practical skills in performing various green chemistry experiments, understand principles and importance of green chemistry in sustainable and</p>

	environmentally friendly synthesis
DSE-A4	<p style="text-align: center;">ANALYTICAL METHODS IN CHEMISTRY</p> <p>CO-1: Build solid understanding of various spectroscopic techniques and their applications in chemical analysis, gain insight of UV-Visible Spectrometry, Infrared Spectrometry, and Flame Atomic Absorption and Emission Spectrometry</p> <p>CO-2: Acquire theoretical knowledge on thermogravimetry and the quantitative estimation of Ca and Mg from their mixture</p> <p>CO-3: Build a strong foundation in electroanalytical methods, including pH metric measurements, potentiometric and conductometric titrations, and the determination of equivalence points and pKa values</p> <p>CO-4: Build understanding of separation techniques, including solvent extraction and chromatography, gain knowledge and skills necessary to perform qualitative and quantitative analyses using these techniques</p> <p>CO-5: Gain hands-on experience in various analytical methods commonly used in chemistry and environmental analysis that include chromatography, solvent extraction, Ion exchange, spectrophotometry etc.</p>
DSE-B3	<p style="text-align: center;">POLYMER CHEMISTRY</p> <p>CO-1: Gain knowledge on introduction and history of polymeric materials, understand the classification schemes for polymers, polymer nomenclature, and comprehend the molecular forces and chemical bonding in polymers</p> <p>CO-2: Grasp the criteria for synthetic polymer formation, the classification of polymerization processes, and the relationships between functionality, extent of reaction, and degree of polymerization</p> <p>CO-3: Understand the mechanisms and kinetics of step-growth, radical chain growth, ionic chain, and coordination polymerizations, gain familiarity with the mechanism and kinetics of copolymerization and others polymerization techniques</p> <p>CO-4: Gain solid understanding of crystallisation and crystallinity in polymers, comprehend the morphology of crystalline polymers and the factors that influence the crystalline melting point</p> <p>CO-5: Recognise the structure property relationship, analyse and predict the behaviour of polymers based on their molecular structures</p> <p>CO-6: Gain insight of various methods of molecular weight determination of polymers such as end group analysis, viscometry, light scattering, and osmotic pressure, and understand significance of molecular weight distribution and polydispersity index in characterising polymer samples</p> <p>CO-7: Understand the glass transition temperature (T_g) and its determination in polymer, gain familiarity with the free volume theory and the Williams-Landel-Ferry equation</p> <p>CO-8: Build understanding of the properties of polymers, including physical, thermal, flow, and mechanical properties, gain familiarity with different classes of polymers</p>

	<p>and their applications</p> <p>CO-9: Get hands-on experience in polymer synthesis, characterization, and analysis, gain practical skills in polymerization techniques and understand the principles of molecular weight determination, mechanical testing, and analysis of polymers using instrumental methods</p>
DSE-B4	<p style="text-align: center;">DISSERTATION</p> <p>CO-1: Develop proficiency in conducting independent research, including gathering relevant literature, critically analysing information, and synthesising knowledge on the assigned topic</p> <p>CO-2: Gain a comprehensive understanding of the chosen research topic, including its background, significance, current state of knowledge, and potential implications.</p> <p>CO-3: Demonstrate the ability to organise and synthesise research findings, theories, and concepts related to the assigned topic.</p> <p>CO-4: Prepare a project report and digital presentation and convey their research findings, arguments, and conclusions to a target audience</p> <p>CO-5: Develop effective presentation skills to deliver a clear and concise digital presentation of their research findings, use appropriate visual aids and engage the audience through effective communication techniques</p>

Course	SEMESTER-1
GE-1	<p>CO-1: Learn about Kinetic Theory of Gases; Liquids and Chemical kinetics</p> <p>CO-2: Understand the basic concept, terms and equations of Atomic Structure; Chemical Periodicity and Acids and Bases</p> <p>CO-3: Gain Knowledge about the Fundamentals of Organic Chemistry; Stereochemistry; Types, Mechanism and Examples of Nucleophilic Substitution Reaction and Elimination Reaction</p> <p>CO-4: learn practical skill in conducting the quantitative estimation of ions in a solution by using iodometric titration, permanganate titration and dichromate titration.</p> <p>CO-5: Acquire practical skills to estimate sodium carbonate and sodium hydrogen carbonate present in a mixture and estimate water of crystallisation in Mohr's salt by titrating with KMnO_4.</p> <p>CO-6: Learn practical expertise in the estimation of oxalic acid by titrating it with KMnO_4</p>
SEMESTER-2	
GE-2	<p>CO-1: Understand detail about Chemical thermodynamics, Chemical equilibrium, Solutions, Phase Equilibrium and Solids.</p>

	<p>CO-2: Learn about synthesis, properties and reactions of Aliphatic Hydrocarbons</p> <p>CO-3: Gain knowledge about Error analysis and Computer applications</p> <p>CO-4: Build basic knowledge on types and applications Redox Reactions</p> <p>CO-5: Gain practical expertise on conduction of the kinetics of acid-catalysed hydrolysis of methyl acetate and decomposition of H_2O_2 (Clock Reaction)</p> <p>CO-6: Determine the viscosity of unknown liquid (glycerol, sugar) with respect to water surface tension of a liquid using Stalagmometer and the solubility of sparingly soluble salt in water</p> <p>CO-7: Prepare buffer solutions and find the pH of an unknown buffer solution by colour matching method.</p>
SEMESTER-3	
GE-3	<p>CO-1: Learn Chemical bonding and Molecular structure, Comparative study of p-block elements, Transition Elements and Coordination Chemistry</p> <p>CO-2: Gain knowledge on the basic concept, terms, equations and applications of Electrochemistry</p> <p>CO-3: Understand synthesis, properties, chemical reactions and mechanisms of Aromatic Hydrocarbons, Organometallic Compounds and Aryl Halides</p> <p>CO-4: Gain practical skills in conducting the qualitative detection of known and unknown radicals in a mixture</p>
SEMESTER-4	
GE-4	<p>CO-1: Learn about the preparation, properties, chemical reactions and mechanisms of Alcohol, Phenol, Ethers, Aldehydes, Ketones, Carboxylic acids, Esters, Amides, Amines, Diazonium salts, Amino-acids and Carbohydrates.</p> <p>CO-2: Gain knowledge I about Crystal Field Theory.</p> <p>CO-3: Develop understanding the fundamental concepts of Quantum Chemistry and Spectroscopy.</p> <p>CO-4: Learn experimentally the qualitative analysis of single known and unknown solid organic compounds and also the identification of pure solid and liquid organic compounds.</p>