

DEPARTMENT OF CHEMISTRY

A. PROGRAMME OUTCOME (PO)

- Evaluate the role of science, mathematics, and technology in addressing current issues facing local and global communities.
- Drives scientific and societal advancement through technological innovation and entrepreneurship.
- Acquire domain knowledge
- Strengthen critical thinking and reasoning skills
- Develop effective communication skills
- Imbibe human values, inclusiveness attitude and socio-cultural sensitivity
- Build up self-esteem and competence to face challenges
- Attain life-readiness through problem-solving skills and competencies
- Work effectively in groups to meet a shared goal with people whose disciplinary and cultural backgrounds differ from their own.
- Develop appropriate methods of research, investigation, and design, to solve problems in science, mathematics, and technology.

B. PROGRAMME SPECIFIC OUTCOMES (PSO)

- To build a functional knowledge of all basic areas of chemistry such as analytical, organic, physical, inorganic, and biochemistry.
- Able to employ critical thinking and scientific inquiry in the performance, design, interpretation and documentation of laboratory experiments.
- To equip students with skills and knowledge to excel in their future careers
- Able to integrate their knowledge for solving scientific problem.
- To understand the interdisciplinary nature of Chemistry and to be aware of the emerging fields in science.
- To develop critical thinking, emotional intelligence, effective communication skills and social responsibility.

C. COURSE OUTCOMES (CO)

D. Semester	Course Code	Title of the Course	Course Outcome
I	CH1CRT01	Core-General and Analytical Chemistry	CO1 - To have a broad outline of the methodology of science in general and chemistry in particular and to understand the concept of origin of chemistry CO2 - To study the long form of the periodic table and periodic properties of elements CO3 - Understanding qualitative and quantitative aspects of

			analysis and acquiring the knowledge of data analysis CO4 - To be able to apply various chromatographic techniques
II	CH2CRT02	Core-Theoretical and Inorganic Chemistry	CO1 - To study the various atom models and to understand the important features of the quantum mechanical model of the atom. CO2 - To understand the theories of chemical bonding and molecular structure. CO3 – To understand the periodicity of s and p block elements CO4 – To understand the periodicity of d and f block elements.
	CH2CRP01	Practical for I & II - Volumetric Analysis	CO1- -To enable the students to acquire quantitative skills in volumetric analysis.
III	CH3CRT03	Core-Organic Chemistry – I	CO1- To study the preparation, properties and reactions of phenols, alcohols, diols, ethers and epoxides CO2- To familiarize students with the addition, condensation, oxidation and reduction reactions of aldehydes and ketones CO3- To understand the properties of aliphatic and aromatic carboxylic acids and their derivatives with regard to its preparation and its acidic nature CO4- To learn the reactions of sulphonic acids and their derivatives and to compare their acidity with the carboxylic acid analogues.
IV	CH4CRT04	Core-Organic Chemistry – II	CO1-Know and recall the fundamental principles of organic chemistry that include different electron displacements, types of reagents, types of reactive intermediates etc CO2-To predict the R and S nomenclature for optically active compounds based on Cahn Ingold Prelog rules and to draw the conformations of cyclohexane CO3- To study the preparation and properties of alkanes, alkenes and alkynes CO4- Predict whether a compound is aromatic or aliphatic based on Huckel’s rule
	CH4CRP02	Qualitative Organic Analysis	To develop skills required for the qualitative analysis of organic compounds and determination of physical constants
V	CH5CRT05	Environmental Studies and Human Rights	CO1 - To learn about social issues and the environment CO2 - To have a deeper understanding about air, water and soil pollution CO3 - To give an idea about green chemistry and

			environmental aspects of nuclear chemistry CO4 -An introduction to human rights
	CH5CRT06	Organic Chemistry- III	CO1 - To gain an understanding on nitrogen containing compounds, heterocyclic compounds and active methylene compounds CO2 -To understand the chemical structure, reactions, properties, functions and uses of carbohydrates CO3 - To give an introduction to drugs and their classification CO4 - To introduce the chemistry of dyes and polymers
	CH5CRT07	Physical Chemistry - I	CO1- To understand the general characteristics of different states of matter. CO2- To understand the assumptions made in the kinetic-molecular theory of gases, van der Waals equation and Maxwell Boltzmann distribution laws CO3- To get an idea about structure of solids and defects in solids CO4- Understanding the surface phenomena like adsorption, its mechanism, adsorption isotherms and colloids
	CH5CRT08	Physical Chemistry - II	CO1 - To impart the students the concepts of the fundamentals of quantum mechanics CO2 – To apply the Schrodinger equation in simple systems and understanding the quantum mechanical concept of bonding theory CO3 – To apply quantum mechanics in the study of structure of atoms, bonding in molecules and molecular spectroscopy CO4 - To impart a thorough knowledge of the fundamentals of microwave, infra red, Raman, electronic and nuclear magnetic/electronic spin resonance spectroscopy
	CH5OPT01	Open course - Chemistry in Everyday Life	CO1 - To understand the chemistry underlying the properties and reactions of various food additives. CO2 - A general information of the chemistry behind drugs, cosmetics, plastics, paper and dyes CO3 - To learn the processes involved in the production of soaps, detergents and cosmetics. CO4 -To enlighten how chemistry is related to agriculture and give an introduction to nanomaterials.
VI	CH6CRT09	Inorganic Chemistry	CO1 - To understand the structure, bonding, spectral and magnetic properties of coordination compounds

			<p>CO2 - To give an awareness about the structure, synthesis and applications of organometallic compounds</p> <p>CO3 - To give an introduction to bioinorganic chemistry, focusing on the role of metal ions in biological processes</p> <p>CO4 - To give a basic idea about boron, inter-halogen and noble gas compounds</p>
CH6CRT10	Organic Chemistry-IV		<p>CO1 - To study the fundamentals of terpenoids, alkaloids, and lipids</p> <p>CO2 - To understand the classification, synthesis and structure of amino acids, peptides and proteins</p> <p>CO3 - To understand the structure and functions of Vitamins, Steroids and Hormones</p> <p>CO4 - To have an elementary idea of supramolecular chemistry and organic photochemistry</p>
CH6CRT11	Physical Chemistry - III		<p>CO1 - To understand the thermodynamic laws, principles of thermochemistry and chemical equilibrium</p> <p>CO2 - To understand the basic principles of chemical equilibrium</p> <p>CO3 - To study the phase diagrams of one and two component systems</p> <p>CO4 - To understand the theories of chemical kinetics and elementary idea of catalysis including enzyme catalysis.</p>
CH6CRT12	Physical Chemistry - IV		<p>CO1- To understand the properties of ideal and non-ideal solutions</p> <p>CO2- Basic concepts of electrochemistry and its applications</p> <p>CO3- To study ionic equilibria and electrical properties of ions in solution.</p> <p>CO4- To acquire knowledge about photochemistry and group theory</p>
CH6CBT02	Choice Based Course - Nanochemistry and Nanotechnology		<p>CO1- To understand the basic concepts and classification of nanomaterials</p> <p>CO2 – To give an idea about the characterization of nanomaterials using various microscopic techniques</p> <p>CO3 - To gain an understanding about electrical and optical properties of nanomaterials</p> <p>CO4 – To understand the application of nanomaterials in various fields including catalysis, medicine and sensors</p>
CH6CRP03	Qualitative Inorganic Analysis		<p>CO1- To enable the students to develop analytical skills in inorganic qualitative analysis</p>

			CO2 - To appreciate the various colored chemical reactions of metal ions
	CH6CRP04	Organic Preparations and Basic Laboratory Techniques	CO1- To develop basic skills in the techniques of crystallisation, distillation and solvent extraction CO2- To train students in various chromatographic techniques like TLC and column chromatography and in quantitative dilution CO3 - To develop skill in organic preparations
	CH6CRP05	Physical Chemistry Practical	CO1 – To learn the fundamentals of conductometric and potentiometric titrations CO2- To understand the method of determination of molecular weight by viscosity average method
	CH6CRP06	Gravimetric Analysis	To train the students in the quantitative analysis of metal ions and anions using gravimetric method
	CH6PR01	Project & Industrial visit and comprehensive viva-voce	CO1 - To introduce the concept of project based learning CO2 - To give an insight regarding the internal working of various industries

COMPLEMENTARY PROGRAMMES

Semester	Course Code	Title of the Course	Course Outcome
I	CH1CMT01	Basic Theoretical and Analytical Chemistry	CO1 - To understand the atomic structure, geometry and molecular orbitals of different molecules CO2 - To study the periodic properties of s, p, d and f-block elements CO3 - To understand the basic principles of analytical chemistry CO4 - To familiarize students with various chromatographic techniques
II	CH2CMT02	Basic Organic Chemistry	CO1 - To develop the fundamental concepts of organic chemistry CO2 - To understand the mechanism of organic reactions CO3 -To study the stereochemistry of organic reactions CO4 - To understand the fundamentals of various classes of synthetic and natural polymers, their biodegradability and environmental hazards

	CH2CMP01	Volumetric Analysis	To develop skills for quantitative estimation of acids, bases, salts, ions etc using different types of volumetric analysis like acidimetry, alkalimetry, permanganometry, dichrometry etc.
III	CH3CMT03	Physical Chemistry – I	CO1 - To understand the general characteristics of different states of matter CO2 - To get an idea about structure of solids and defects in solids CO3 - To understand the surface phenomena like adsorption, its mechanism, adsorption isotherms and colloids CO4 - To give a comprehensive introduction to phase equilibria
	CH3CMT04	Inorganic and Organic Chemistry	CO1 - To understand the basic concepts of nuclear chemistry CO2 - To familiarize students with basic principles of bioinorganic chemistry and to enlighten how chemistry is related to agriculture CO3 – To give an idea about heterocyclic compounds CO4 – To give an understanding regarding drugs, food additives and cosmetics
IV	CH4CMT05-	Physical Chemistry – II	CO1 - To impart a thorough knowledge of the fundamentals of uv-visible, infra red and rotational spectroscopy CO2 - To understand the basic concepts of nano chemistry CO3 - To give a basic idea regarding kinetics, catalysis and photochemistry CO4 – To gain an understanding in electrochemistry
	CH4CMT06	Advanced Bio-Organic Chemistry	CO1 - To study the fundamentals of terpenoids, alkaloids, and lipids CO2 - To understand the classification, synthesis and structure of amino acids, peptides and proteins CO3 – To give a basic idea regarding enzymes, nucleic acids and carbohydrates CO4 - To understand the structure and functions of vitamins, steroids and hormones
	CH4CMP02	Physical Chemistry Practicals	To develop skills in doing experiments like calorimetry, conductometric titration, critical solution temperature etc.

	CH4CMP03	Organic Chemistry Practicals	To develop skills required for the qualitative analysis of organic compounds, determination of physical constants etc.