PROGRAMME SPECIFIC OUTCOME

- To help students understand basic facts and concepts in chemistry.
- To enable students to apply the principles of chemistry.
- To equip students to appreciate the achievements in chemistry and to know the role of chemistry in everyday life
- To help students to familiarize with the emerging fields of chemistry and its relevance in future studies.
- To develop skills in the proper handling of laboratory instruments and chemicals.
- To understand the different processes and techniques used in industries and their applications.
- To create a sense of environmental awareness.

COURSE OUTCOME

SEMESTER: I CORE COURSE: I COURSE CODE: CHE1B01

THEORETICAL AND INORGANIC CHEMISTRY - I

Objective(s)

To give a basic understanding of groundwork for a research project. To familiarize with Laboratory Hygiene and Safety. Student will be able to analyze basic theory of acid base concept. To explore the fundamental part of Chemistry.

CO1	To apply the methods of a research project
CO2	To understand the basic chemical concepts
CO3	To get awareness of laboratory safety and also to know the volumetric titrations
CO4	To know more about the historical developments in Chemistry
CO5	To analyse the stability of different nuclei

SEMESTER: II Core Course: II Course Code: CHE2B02:

THEORETICAL AND INORGANIC CHEMISTRY - II

Objective(s)

Module I - The failures of classical physics theories in explaining many experiments and the emergence of quantum theory with which all of them could be satisfactorily explained. The basic postulates of quantum mechanics and how to solve the time-independent Schrödinger wave equation of different systems including H atom. Module II - To gain detailed knowledge about the

periodic properties of elements. Module III &IV - To provide the students a thorough knowledge about the theories behind chemical bonding.

CO1	To realize the importance and the impact of quantum revolution in science. To understand and apply the concept that the wave functions of hydrogen atom are nothing but atomic orbitals.
CO2	To analyse the characteristics of different elements
CO3	To understand the theories behind chemical bonding

SEMESTER III Core Course: III Course Code: CHE3B03

PHYSICAL CHEMISTRY– I

Objective(s)

To understand the concepts of chemical thermodynamics, equilibria and properties f liquid state and gaseous state.

CO1	To understand the properties of gaseous state and how it links to thermodynamic systems
CO2	To understand the concepts of thermodynamics- first law, second law and zeroth law
CO3	To understand the concepts of thermodynamics and it's relation to statistical thermodynamics
CO4	To understand the properties of liquid state and how it links to thermodynamic systems
CO5	To understand the concepts of chemical equilibria

SEMESTER :IV Core Course: III Course Code: CHE4B04

ORGANIC CHEMISTRY– I

Objective(s)

Students will be able to analyse basic theory and concepts of organic chemistry and understand different organic reaction mechanism and their stereochemistry.

CO1	To understand the basics of organic chemistry
CO2	To apply the concept of stereochemistry to different compounds
CO3	To analyse the mechanism of a chemical reaction
CO4	To understand more about aliphatic hydrocarbons
CO5	To study the concept of aromaticity and to know about aromatic hydrocarbons

SEMESTER: IV Core Course: V Course Code: CHE4B05(P)

INORGANIC CHEMISTRY PRACTICAL - I

Objective(s)

Development of skills in preparation of standard solutions and quantitative volumetric analysis.

CO1	To understand the principles behind quantitative analysis
CO2	To understand the principles of techniques of quantitative dilution
CO3	To analyze the strength of different solutions
CO4	To understand the principles of Redox Titrations
CO5	To understand the principles Precipitation Titration (using adsorption indicator)
CO6	To understand the principles Complexometric Titrations
CO7	To apply appropriate techniques of volumetric quantitative analysis in estimations

SEMESTER: V Core Course VI Course Code: CHE5B06

INORGANIC CHEMISTRY - III

Objective(s)

To gain detailed knowledge of the chemistry of different analytical principles and to develop concerns for environment. To gain detailed knowledge about the properties of *s* and *p* block elements. To give a basic understanding of interhalogen compound, solid waste management and inorganic polymers.

CO1	To understand the principles behind qualitative and quantitative analysis
CO2	To understand the properties of *s* block elements, boron family and carbon family.
CO3	To understand the properties of nitrogen family, oxygen family, halogens and noble gases.
CO4	To understand the applications of different inorganic polymers
CO5	To analyse different polluting agents
CO6	To apply the principles of solid waste management

SEMESTER: V Core Course: VII Course Code: CHE5B07

ORGANIC CHEMISTRY– II

Objective(s)

To give the students a thorough knowledge about the chemistry of selected functional groups and their applications in organic preparations.

CO1	To understand the importance of halogen compounds organometallic compounds
CO2	To understand the difference between alcohols and phenols
CO3	To understand the importance of ethers and epoxides
CO4	To learn about carboxylic acids sulphonic acids
CO5	To know the importance of active methylene compounds in organic preparations and also about nitrogen compounds.

SEMESTER: V Core Course: VIII Course Code: CHE5B08

PHYSICAL CHEMISTRY - II

Objective(s)

To make the student understand the concept of kinetics, catalysis, colloids and photochemistry and to familiarize the applications of molecular spectroscopy, phase equilibrium and group theory.

CO1	To apply the concept of kinetics, catalysis to various chemical and physical processes
CO2	To apply the concept of photochemistry to various chemical and physical processes
CO3	To understand adsorption process and colloids
CO4	To understand various phase transitions and its applications
CO5	To understand principles and applications of various chromatographic techniques
CO6	To apply symmetry operations to categorize different molecules

SEMESTER: VI Core Course: Course Code: CHE6B09

INORGANIC CHEMISTRY – IV

Objective(s)

To gain detailed knowledge of the electronic configuration and properties of transition and inner transition elements and their role in biological systems.
To give a basic understanding of different metallurgical processes.

CO1	To understand basic processes of metallurgy and to analyse the merit of different alloys
CO2	To distinguish between lanthanides and actinides
CO3	To appreciate the importance of CFT and to distinguish geometries of coordination compounds
CO4	To understand the preparation, properties, bonding and applications of organometallic compounds.
CO5	To understand the importance of metals in living systems

SEMESTER:VI Core Course :X Course Code: CHE6B10

ORGANIC CHEMISTRY - III

Objective(s)

To gain detailed knowledge of the chemistry of different bio molecules.
To give a basic understanding of different spectral techniques and to apply them in simple molecules to differentiate diverse pericyclic reactions.

CO1	To elucidate structure of simple organic compounds using spectral techniques.
CO2	To understand the basic structure and tests for carbohydrates.
CO3	To understand the classifications, structure and properties of amino acids and proteins.
CO4	To understand the classification – structure and biological functions of various biomolecules such as lipids, steroids, vitamins & hormones.
CO5	To appreciate the importance of nucleic acids and to understand the basic structure and applications of alkaloids and terpenes.
CO6	To distinguish different pericyclic reactions.

SEMESTER:VI Core Course: XI Course Code: CHE6B11

PHYSICAL CHEMISTRY - III

Objective(s)

To get a thorough knowledge of electrochemistry, colligative properties and solid state.

CO1	To understand the basic concepts of electrochemistry
CO2	To understand the basic concepts of electrochemistry
CO3	To understand the basic concepts Ionic Equilibria
CO4	To realize the importance of colligative properties
CO5	To relate the properties of material/solids to the geometrical properties and chemical compositions

SEMESTER: VI Core Course: XII Course Code: PC6B01

POLYMER CHEMISTRY I

Objective(s)

To gain detailed knowledge about classification of polymers and various mechanisms and technology adopted for polymerization. To give a basic understanding of properties of polymers like glass transition temperature,

molecular weight and degradation of polymers. To give detailed idea about different commercial polymers.

CO1	To understand various classification of polymers.
CO2	To understand various polymerization methods.
CO3	To understand the important characteristics of polymers such as average molecular weight, glass transition temperature, viscoelasticity and degradation.
CO4	To understand various polymerization techniques.
CO5	To familiarize different commercial polymers and to understand the significance of recycling.
CO6	To have an idea on Advances in Polymer industry

SEMESTER :VI Core Course: XIII Elective (E1) Course Code: PC6B02 (E1)

POLYMER PROCESSING &TECHNOLOGY

Objective(s)

To gain detailed knowledge about different natural polymers and their modified form. To give a basic understanding of plastic and rubber processing technologies. To give basic idea about characterization of polymers.

CO1	To get deep knowledge about different natural polymer like natural rubber and cellulose and their modified forms
CO2	To understand various rubber processing techniques
CO3	To acquire basic idea about important properties and standard organisations that is used to characterize polymers.
CO4	To understand commonly adopted plastic processing techniques.

SEMESTER: VI Core Course XIII: Elective (E2) Course Code: PC6B02 (E2)

POLYMER BLENDS AND COMPOSITES

Objective(s)

To gain detailed knowledge about different polymer blends and their modified form. To give a basic understanding of polymer composites.

CO1	To get deep knowledge about different polymer blends.
CO2	To understand composition and applications of different polymer blends.
CO3	To understand various types of polymer composites
CO4	To understand industrial importance of various polymer composites.
CO5	To understand commercial applications of different polymer blends.

SEMESTER: VI Core Course: XIV Course Code: CHE6B14(P)

PHYSICAL CHEMISTRY PRACTICAL

Objective(s)

The relation between physical properties and chemical composition is used for analysis. Get an idea of designing experimental methods to analyze the physical properties of molecules or materials.

CO1	To enable the students to develop analytical skills in determining the physical properties (Physical constants)
CO2	To develop skill in setting up experimental methods to determine the physical properties
CO3	To understand the principles of Refractometry, Potentiometry and Conductometry and pH analysis

SEMESTER: VI Core Course XV Course Code: CHE6B15(P)

ORGANIC CHEMISTRY PRACTICAL

Objective(s)

To empower the students to prepare different compounds without compromising yield. Characterization and analysis of different organic compounds based on functional groups. To develop skill in separation and purification of mixtures.

CO1	To enable the students to develop analytical skills in organic qualitative analysis
CO2	To develop talent in organic preparations to ensure maximum yield
CO3	To apply the concept of melting or boiling points to check the purity of compounds
CO4	To analyze and characterize simple organic functional groups
CO5	To analyse individual amino acids from a mixture using paper chromatography

SEMESTER:VI Core Course: XVI Course Code: CHE6B16(P)

INORGANIC CHEMISTRY PRACTCAL-II

Objective(s)

To develop skill in quantitative analysis using gravimetric and colorimetric methods.

CO1	To enable the students to develop analytical skills in inorganic quantitative analysis
CO2	To understand the principles behind gravimetry and to apply it in quantitative analysis
CO3	To understand the principles behind colorimetry and to apply it in quantitative analysis

SEMESTER VI Core Course XVII Course Code: CHE6B17(P)

INORGANIC CH EMISTRY PRACTCAL-III

Objective (s)

To develop skill in qualitative analysis of inorganic compounds

CO1	To enable the students to develop skills in inorganic qualitative analysis.
CO2	To understand the principles behind inorganic mixture analysis and to analyse systematically, mixtures containing two cations and two anions.
CO3	To know the preparation of some important inorganic compounds

OPEN COURSE

SEMESTER V Course Code: CHE5D01
Open Course 1: ENVIRONMENTAL CHEMISTRY

Course outcome

CO1	To Recall the technical/scientific terms involved in pollution.
CO2	To Understand the causes and effects of air pollution.
CO3	To Understand the sources, types and effects of water pollution and to Describe water quality parameters.
CO4	Know soil, noise, thermal and radioactive pollutions and their effects.
CO5	Study various pollution control measures

SEMESTER V Course Code: CHE5D02

Open Course 2: CHEMISTRY IN DAILY LIFE

Course outcome

CO1	Recognize the common classes of drugs in pharmaceutical industry and their application.
CO2	Describe food additives and food habits.

CO3	Understand the basics of polymer chemistry
CO4	Understand the basic concepts and processes in petroleum industry.
CO5	Explain the uses of pesticides and fertilizers and their impacts on the environment.
CO6	Understand advantages and disadvantages of cleansing agents and cosmetics.
CO7	To get basic idea about nanotechnology and conducting polymers

SEMESTER V Course Code: CHE5D03

Open Course 3: FOOD SCIENCE AND MEDICINAL CHEMISTRY

Course outcome

CO1	Understand food adulteration and preservation methods.
CO2	Describe food additives and food habits. To Compare modern food with natural food.
CO3	Exhibit a broad and coherent body of knowledge on the biomolecules, vitamins, enzymes, hormones and nucleic acids and to Recognize the uses of Indian medicinal plants and plant extracts.
CO4	Recall the chemical, generic and trade names of drugs and their uses. CO 8: Describe the treatment methods used in medical field. CO 9: Illustrate first aids and the safety steps to be taken for common illnesses.

COMPLIMENTARY COURSE

Semester I Course Code: CHE1C01

Complementary Course I: GENERAL CHEMISTRY

Objective(s)

To provide the students a thorough knowledge about the chemistry of quantitative and qualitative analysis and the theories behind chemical bonding. It will also impart the ideas behind atomic nucleus and the importance of metals in biological systems.

CO1	To understand the origin of modern chemistry.
CO2	To understand and to apply the theories behind quantitative and qualitative analysis.
CO3	To understand the theories behind chemical bonding
CO4	To appreciate the uses of radioactive isotopes
CO5	To understand the importance of metals in biological systems

Semester II Course Code: CHE2C02

Complementary Course II: PHYSICAL CHEMISTRY

Objective(s)

To provide the students a thorough knowledge about different terminologies in thermodynamics and the continuity between different states of matter. It will also impart an idea behind basic principles of electrochemistry.

CO1	To understand the importance of free energy in defining spontaneity
CO2	To realize the theories behind different states of matter and their implication
CO3	To understand the basic principles of electrochemistry

Semester III Course Code: CHE3C03

Complementary Course III: Organic Chemistry

Objective(s)

To provide the students a thorough knowledge about basic theory and concepts of organic chemistry.

CO1	To understand the basic concepts behind reaction intermediates
CO2	To realize the importance of optical activity and chirality
CO3	To understand the basic concepts of aromatic compounds
CO4	To appreciate the importance of functional groups and their reactivity.
CO5	To understand the basic structure and importance of carbohydrates, nucleic acids, alkaloids and terpenes

Semester IV Course Code: CHE4C04

Complementary Course IV: PHYSICAL AND APPLIED CHEMISTRY

Objective(s)

To provide the students a thorough knowledge about colloidal chemistry, Nano-chemistry and the importance of chemistry in daily life. It also provides a basic idea behind separation and spectral techniques. It also imparts the idea of green processes with an importance for environment.

CO1	To understand the basic concepts behind colloidal
CO2	To understand the basic concepts of chemical kinetics and catalysis
CO3&4	To appreciate the importance of different separation methods and spectral techniques

CO5	To understand the classification, structure and applications of polymers.
CO5	To realize the importance of green chemistry and pollution prevention CO4
CO7	To realize the extent of chemistry in daily life

Semester:IV Course Code: CHE4C04

Complementary Course IV: PHYSICAL AND APPLIED CHEMISTRY

Objective(s)

Develop proficiency in quantitative and qualitative analysis and expertise in organic preparation and determination of physical constants.

CO1	To understand the basic concepts behind inter group separation
CO2	To enable the students to develop analytical and preparation skills