B.Sc. CHEMISTRY PROGRAMME

Program Specific Outcomes

PSO1 : Develop firm foundation in the fundamentals and application of current chemical and scientific theories.

PSO2 : Develop skills in the proper handling of apparatus and chemicals

PSO3 : Develop analytical, creative, cognitive skills with social responsibility and environmental consciousness.

PSO4 : Information Communication Technology to gather knowledge at will.

Course Outcome

Semester 1

CH1CRT01- General and Analytical Chemistry

CO1- Develop the scientific aptitude of students and critical thinking and equip them in pursuing chemistry as a career.

CO2- Learn fundamental idea regarding the elements of chemistry and periodic properties of atoms.

CO3- Develop scientific skills, observation and interpretation and evaluation of chemical analysis.

CO4- To have an insight on the separation, purification and isolation of compounds.

CO5- Enabling students to handle basic statistical tools for analyzing data.

Semester 2

CH2CRT02 – Theoretical and Inorganic Chemistry

CO1- Understand atomic structure, electronic configuration and various rules for the filling up of electrons.

CO2- Explain the formation of different types of bonds and the various atom models

CO3- Understand Molecular Orbital theory of bonding, hydrogen bonding and applications.

CO4- Study the periodic properties of s and p block elements.

CO5- Learn about the transition metals, lanthanides and their applications.

Semester 1 and 2 Core Practical

CH2CRP01- Volumetric Analysis

CO1- To prepare a standard solution.

CO2- To do neutralization titrations- acidimetry and alkalimetry.

CO2- To use complexometric titrations in volumetric analysis.

CO3- To do Redox titrations using $KMnO_4$, $K_2Cr_2O_7$ etc.

Semester 3

CH3CRT03- Organic Chemistry- I

CO1- Develop basic idea about organic chemistry including naming of organic compounds and other fundamental concepts.

CO2- Various electronic displacement effects, cleavage of bonds, reagents, reactive intermediates and types of organic reactions.

CO3- Learn to distinguish various organic molecules and predict their applications

CO4- Understand Optical isomerism and Geometrical isomerism with conformational analysis.

CO5- Learn the reactions of alkanes, alkenes, alkynes and alkyl halides

CO5- Fundamental concepts of aromaticity- benzene, naphthalene, anthracene and aryl halides.

CO6- Introduction to pericyclic reactions with example

Semester 4

CH4CRT04- Organic Chemistry- II

CO1- Learn the chemistry of alcohols, phenols, ethers, aldehydes, ketones, formaldehyde, acetaldehyde, acetone, benzaldehyde, benzophenone, carboxylic acids, sulphonic acids and their derivatives.

CO2- Study various name reactions.

Semester 3 and 4 - Core Practicals

CH4CRP02- Qualitative Organic Analysis

CO1- Develop skills required for the qualitative analysis of organic compounds

CO2- Learn the preparation of different organic compounds.

Semester 5

CH5CRT05- Environmental Studies and Human Rights

CO1- Understand the multifaceted nature of environmental studies and become aware of the various resources and how to handle them effectively.

CO2- Recognize the harmful effects of pollution, find solutions to the problems and to become a socially responsible person.

CO3-Enable to get an idea about population explosion, related problems and to understand various environmental movements.

CO4-Get awareness about ecological stress posed upon ecosystems by the presenceof chemicals.

CO5- Understand the very fact human rights system.

CO6- Understand the human rights advocacy

CH5CRT06- Organic Chemistry- III

CO1- Study the preparation and reactions of various nitrogen containing compounds like aromatic and aliphatic amines diazonium salts.

CO2- Learn the various heterocyclic compounds and their synthetic applications.

CO4- Learn preparation and reactions of active methylene compounds used in the synthesis of various industrially significant compounds.

CO5- Study the structure, reactivity and biological importance of carbohydrates.

CH5CRT07- Physical Chemistry- I

CO1- Derive kinetic theory of gases and application of kinetic gas equation.

CO2- Get basic idea about Maxwell distribution of molecular velocities

CO3- Study the intermolecular forces in gases, liquids and solids.

CO4- Students will be able to go deep in crystallography

CH5CRT08- Physical Chemistry- II

CO1- Learn fundamentals of classical and quantum mechanics.

CO2- Understand the applications of quantum mechanics to various systems

CO3- Study valence bond and molecular orbital theory

CO4- Study the principle and applications of microwave, IR, NMR, ESR and Raman spectroscopy.

CO5- Get the ability to identify organic compounds by analysis and interpretation of spectral data

CH5OPT01- Chemistry in Everyday Life

CO1- Understand the different classes of food additives like preservatives, flavours, sweetners, emulsifying agents, antioxidants and leavening agents.

CO2- Detailed study of Soaps and detergents, their differences in action and environmental impact

CO3- Study of cosmetics to get an awareness about the damages that cosmetics cando to human body.

CO4- Introduction about plastics, paper and dyes and the environmental aspects of their uses.

CO5- Detailed study of classificationof drugs, structure, their therapeutic uses, and mode of action and abuse.

Semester 6

CH6CRT09- Inorganic Chemistry

CO1- Understand the classification and structural aspects of coordination compounds.

CO2- Study Crystal field theory and enable the students to interpret the splitting pattern of tetrahedral and octahedral complexes.

CO3- Learn S_N1 and S_N2 reactions and their mechanisms.

CO4- Understand the classification, properties and applications of organometallic compounds

CH6CRT10- Organic Chemistry- IV

CO1- Learn in detail the chemistry of natural products like terpenoids and alkaloids

CO2- Study the chemistry and mode of action of soaps and detergents,

CO3- Study the fundamentals of fats and oils, vitamins, lipids , hormones and steroids

CO4- Understand the structure and functions of enzymes, aminoacids, proteins and nucleic acids.

CO5- Study the fundamentals of rotational, vibrational and mass spectrometry

CH6CRT11- Physical Chemistry- III

CO1-Understand basic concepts of thermodynamics
CO2- Learn first law, second law and third law in detail
CO3- Study Law of mass action and chemical equilibria

CO4- Equipped in predicting the direction of a chemical reaction

CO5- Detailed study of ionic equilibrium, Buffer solutions, its mode of action

CH6CRT12- Physical Chemistry- IV

CO1- Understand the mechanism of electrical conductance, theories of electrical conductance, and coductometric titrations

CO2- Design different types of electro chemical cell and able to calculate its potential.

CO3- Familiarise with electro analytical methods and corrosion of metals.

CO3- Understand basic principles of photochemistry and group theory.

CH6CBT01 - Polymer Chemistry

CO1- Classify polymers and explain the configuration of polymers and properties like glass transition temperature and melting point of polymers

CO2-Illustrate the preparation, properties and applications of polymers

CO3-Interpret the mechanism of polymerization

CO4-Acquaint various polymer processing technologies and explain thermal methods of analysis of polymers CO5-Know the recent advances in polymer chemistry

Semester V &VI Practicals

CH6CRP03- Qualitative Inorganic Analysis.

CO1-Apply the theoretical concepts while performing experiments.

CO2- Acquire practical skill to analyse the anions and cations qualitatively present in a mixture of inorganic salts

CO3-Able to design, carry out, record and analyze the results of chemical experiments

CO4-Learns the effective usage of chemicals

CH6CRP04- Organic Preparations and Laboratory Techniques.

CO1-Apply the theoretical concepts while performing experiments.

CO2- Acquire practical skill in preparing organic compounds and in their purification by crystallisation

CO3- Acquire the habit of working safely with the chemicals and handling of equipment

CO4-Chromatographic techniques will enable the students to develop the skills to purify impure organic compounds.

CH6CRP05- Physical Chemistry Practicals.

CO1- Acquire practical skill in physical chemistry experiments such as Cryoscopy, Transition Experiments, Phase Rule Experiments, Conductometric titrations , Potentiometric titrations , colorimetry and Chemical Kinetics

CO2- Able to carry out and record these experiments in a skillful manner

CH6CRP06- Gravimetric Analysis.

CO1- Make use of standardised procedures for the Gravimetric analysis

CO2- Learn the skills of Precipitation process, digestion, filtration, incineration etc.

CO3- Able to design, carry out, record and analyze the results of chemical experiments

COMPLEMENTARY COURSE IN CHEMISTRY

Semester 1

CH1CMT01- Basic Theoretical and Analytical Chemistry

CO1- State the fundamental assumptions of atomic theory and explain the quantum mechanical model of the atom

CO2- To study atomic structure and fundamental concepts in chemistry.

CO3- Understand chromatographic techniques which will enable the students to develop the skills to purify impure organic compounds.

CO4- Understand the fundamentals of principles of analytical chemistry.

Semester 2

CH2CMT02- Basic Organic Chemistry

CO1- Understand some fundamental aspects of organic chemistry.

CO2- Study mechanism of some organic reactions, classification ofpolymers, structure and uses of some commercial and natural polymers.

Semester 1 and 2 Complementary Chemistry Practicals

CH2CMP01- Volumetric Analysis

CO1- Enabling students to manage neutralization titrations- acidimetry and alkalimetry.

CO2-. Enabling students to manage oxidation reduction (Redox) titrations like permanganometry, dichrometry, iodimetry and iodometry.

Semester 3

CH3CMT04- Inorganic and Organic Chemistry

CO1- Promote understanding facts and concepts in inorganic and organicchemistry.

CO2- Basic understanding of nuclear chemistry and heterocycliccompounds and various types of food additives, cosmetics and drugs.

CO3- To study the surface chemistry of materials and phase equilibrium.

CH4CMT06- Advanced Bio organic Chemistry

CO1- An introduction to natural products like terpenoids and alkaloids.

CO2- Lipids are an important compound found in nature. Fats and oils, their properties soaps and detergents and their mode of action are also discussed here.

CO3- A brief study of vitamins, steroids and hormones are included here.

CO4- Classification of amino acids, peptides and proteins, their structure and reactions are also studied here.

CO5- Basic concepts of nucleic acids, living systems, enzymes and supramolecular systems are also discussed here.

Semester 3 and 4 Complementary Chemistry Practicals

CH4CMP03- Organic Chemistry Practicals

CO1- Equipping students for the qualitative analysis of organic compounds.

CO2- Indulging in experiments make the students more focused and oriented in both the theory and observation of the experiment.

CO3- Preparation of the derivatives of different compounds will make the students more competitive.