Name of the courses offered by Department: B.Sc. Chemistry

Programme Outcomes

Domain Specific (PSO)

At the end of the UG programme in Chemistry the students will be able to: -

PO1: Solving Ability

Read, understand and interpret chemical information-verbal, mathematical, physical and graphical. The students are equipped to think critically by asking questions on the fundamental concepts in chemistry.

PO2: Scientific Temper and Social Development

To create men and women free from superstitions with scientific vigilance. Make the students socially responsible by giving awareness regarding the role of chemistry in social development. Making them actively participating in discussions about the destructive possibilities of science.

PO3. Research Culture

Acquire a foundation of chemistry of sufficient breadth and depth in research methodology.

PO4.Analysis Ability

Perform experiments and interprets the results of observation. It will help the students to be efficiently participate in academic as well as industrial organizations.

PO5. Green Approach

To give the importance of green chemistry and educating them to utilize resources in a green method by limiting the use of organic solvents, hazardous chemicals etc.

Domain Independent Outcomes (PO)

PO6. Critical Thinking:

Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO7. Effective Communication

Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language and Communicate effectively on various activities with the community and with society at large, such as being able to comprehend and write effective reports and design documentation make effective presentations, and give and receive clear instructions.

PO8. Social Interaction:

Elicit views of others, mediate disagreements and help reach conclusions in group settings. and demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities.

PO9. Ethics

Understand and commit to professional ethics and responsibilities and norms of relevant to one's field of study, work and practice.

PO10. Environment and Sustainability

Understand the issues of environmental contexts and demonstrate knowledge of and need for sustainable development through mandatory environmental studies.

PO11 Effective Citizenship

Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering and awareness of human rights.

PO12. Self-directed and Life-long Learning

Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Course Outcomes (CO)

Name of Semester: Semester 1

Name of the Course: CH1CRT01- General and Analytical Chemistry

Name of the Programme : BSc Chemistry (Core)

At the end of the course on General and Analytical Chemistry, the students will be able to:

CO1.1- Develop the scientific aptitude of students and critical thinking.

CO1.2 Understand fundamental idea regarding the elements of chemistry and periodic properties of atoms.

CO1.3- Implement scientific skills, observation, interpretation and evaluation of chemical analysis.

CO1.4- Monitor the separation protocols, purification and isolation of compounds.

CO1.5- Equip students to handle basic statistical tools for analyzing data

Name of the Course: CH2CRT02 – Theoretical and Inorganic Chemistry

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 2**

CO2.1- Understand atomic structure, electronic configuration and their governing rules

CO2.2- Explain the formation of different types of bonds and the various hybridization types

CO2.3- Describe Molecular Orbital theory of bonding, hydrogen bonding and their applications

CO2.4- Recognize the periodic properties of s and p block elements.

CO2.5- Compare the properties and applications of transition metals and lanthanides

Name of the Course: Core Practical CH2CRP01- Volumetric Analysis

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 1 and 2**

COP1.1- Make standard solution.

COP1.2- Experiment neutralization titrations- acidimetry and alkalimetry.

CO P1.3- Compare complexometric titrations and redox titration.

CO P1.4- Interpret different end points in volumetric analysis

Name of the Course CH3CRT03- Organic Chemistry- I

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 3**

CO3.1- Understand the naming of organic compounds based on IUPAC system and develop an idea about fundamentals of Organic Chemistry.

CO3.2- Analyze Optical isomerism and Geometrical isomerism with conformational analysis.

CO3.3- Outline the reactions of alkanes, alkenes, alkynes, and alkyl halides.

CO3.4- Identify the aromaticity in benzenoid hydrocarbons and aryl halides.

CO3.5- Summarize basic idea of different pericyclic reactions.

Name of the Course CH4CRT04- Organic Chemistry- II

Name of the Programme : B.Sc Chemistry (Core)

Name of Semester: **Semester 4**

CO4.1-Understand the chemistry of alcohols, phenols, ethers, and epoxides.

CO4.2-Summerize the reactions and rearrangements of carbonyl compounds.

CO4.3-Describe the methods of preparation of Carboxylic Acids, Sulphonic Acids and their Derivatives and evaluate their reactions.

Name of the Course CH4CRP02- Qualitative Organic Analysis

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 3 and 4**

COP2.1- Create the skills for qualitative organic analysis.

COP2.2- Check the presence of nitrogen, halogens, sulphur, unsaturation, and aromatic character in organic compounds.

COP2.3- Prepare derivatives of different organic compounds.

COP2.4-Test the physical constants of organic solids and liquids.

Name of the Course CH5CRT05- Environment, Ecology and Human Rights

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 5**

CO5.1-Understand the fragility and sensitivity of environment in particular the biosphere and the importance of its protection.

CO5.2- Recognize the harmful effects of pollution, find solutions and foster a sense of social responsibility.

CO5.3-Evaluate population explosion, related problems and outline various environmental movements.

CO5.4- Hypothize the causes of ecological stress posed upon ecosystems by the presence of various chemicals and create an awareness of human rights.

Name of the Course CH5CRT06- Organic Chemistry- III

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 5**

CO5.5- Understand preparation and reactions of various nitrogen containing compounds like aromatic and aliphatic amines diazonium salts.

CO5.6- Compare various heterocyclic compounds and their synthetic applications.

CO5.7- Exemplify preparation and reactions of active methylene compounds used in the synthesis of various industrially significant compounds.

CO5.8- Study the structure, reactivity and biological importance of carbohydrates.

CO5.9 – Generate awareness of Drugs dyes, Polymers and applications.

Name of the Course CH5CRT07- Physical Chemistry- I

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 5**

CO5.10- Understand kinetic theory of gases and application of kinetic gas equation.

CO5.11- Interpret basic idea about Maxwell distribution of molecular velocities

CO5.12- Compare the intermolecular forces in gases, liquids and solids.

CO5.13- Exemplify the basic concepts of crystallography

CO5.14 – Summarize different absorption theories and properties of collloids.

Name of the Course CH5CRT08- Physical Chemistry- II

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 5**

CO5.15- Compare fundamentals of classical and quantum mechanics.

CO5.16- Understand the applications of quantum mechanics to various systems

CO5.17- Exemplify valence bond and molecular orbital theory

CO5.18- Monitor the principle and applications of microwave, IR, NMR, ESR and Raman spectroscopy.

Name of the Course CH5OPT01- Chemistry in Everyday Life [Open Course]

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 5**

CO5.19- Understand the different classes of food additives like preservatives, flavours, sweetners, emulsifying agents, antioxidants and leavening agents.

CO5.20- Compare Soaps and detergents, their differences in action and environmental impact

CO5.21- List cosmetics to get an awareness about the damages that cosmetics can do to human body.

CO5.22- Summarize plastics, paper and dyes and the environmental aspects of their uses.

CO5.23- Exemplify drugs, structure, their therapeutic uses, and mode of action and abuse.

CO5.24 –Explain the effect of chemistry on agriculture.

CO5.25- Create awareness of nanomaterials among students.

Name of the Course CH6CRT09- Inorganic Chemistry

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 6**

CO6.1- Understand the classification, structural aspects and isomerization of coordination compounds.

CO6.2- Compare Valence bond theory and Crystal field theory and enable the students to interpret the splitting pattern of tetrahedral and octahedral complexes.

CO6.3- Interpret SN1 and SN2 reactions and their mechanisms.

CO6.4- Summarize the classification, properties and applications of organometallic compounds along with bioinorganic Chemistry.

CO6.5 – Exemplify Boron compounds, Interhalogen and noble gas compounds with their applications.

Name of the Course CH6CRT10- Organic Chemistry- IV

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 6**

CO6.6- Understand in detail the chemistry of natural products like terpenoids and alkaloids

CO6.7- Infer the chemistry and mode of action of soaps and detergents,

CO6.8- Compare the fundamentals of fats and oils, vitamins, lipids , hormones and steroids

CO6.9- Understand the structure and functions of enzymes, aminoacids, proteins and nucleic acids. CO6.10- Check the fundamentals of rotational, vibrational, NMR and mass spectrometry with suitable examples.

Name of the Course CH6CRT11- Physical Chemistry- III

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 6**

CO6.11-Understand basic concepts of thermodynamics

CO6.12- Compare first law, second law and third law of thermodynamics in detail

CO6.13 – Explain the Law of mass action and differentiate between chemical equilibria, Ionic equilibria and phase equilibria.

CO6.14- Evaluate the direction of a chemical reaction

Name of the Course CH6CRT12- Physical Chemistry- IV

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 6**

CO6.15- Understand the mechanism of electrical conductance, theories of electrical conductance, and conductometric titrations

CO6.16- Design different types of electro chemical cell and able to calculate its potential.

CO6.17- Interpret with electro analytical methods and corrosion of metals.

CO6.18- Understand basic principles of photochemistry and group theory.

Name of the Course CH6CBT01 - Polymer Chemistry [Elective]

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester 6**

CO6.19- Exemplify polymers and explain the configuration of polymers and properties like glass transition temperature and melting point of polymers

CO6.20-Understand the preparation, properties and applications of polymers

CO6.21-Interpret the mechanism of polymerization

CO6.22-Find various polymer processing technologies and explain thermal methods of analysis of polymers

CO6.23- Create the recent advances in polymer chemistry

Name of the Course Practicals CH6CRP03- Qualitative Inorganic Analysis.

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester V &VI**

COP3.1 Apply the theoretical concepts while performing experiments.

COP3.2- Carrying out practical skill to analyse the anions and cations qualitatively present in a mixture of inorganic salts

COP3.3-Execute to design, carry out, record and analyze the results of chemical experiments

COP3.4-Judge the effective usage of chemicals among students.

Name of the Course CH6CRP04- Organic Preparations and Laboratory Techniques
Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester V &VI**

COP4.1-Apply the theoretical concepts while performing experiments.

COP4.2- Experimenting practical skill in preparing organic compounds and in their purification by crystallisation

COP4.3- Create the habit of working safely with the chemicals and handling of equipment

COP4.4- Execute Chromatographic techniques that will enable the students to develop the skills to purify impure organic compounds.

Name of the Course CH6CRP05- Physical Chemistry Practicals

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester V &VI**

COP5.1- Generate practical skill in physical chemistry experiments such as Cryoscopy, Transition

Experiments, Phase Rule Experiments, Conductometric titrations, Potentiometric titrations, colorimetry and Chemical Kinetics

COP5.2- Able to carry out and record these experiments in a skillful manner

Name of the Course CH6CRP06- Gravimetric Analysis.

Name of the Programme : BSc Chemistry (Core)

Name of Semester: **Semester V &VI**

COP6.1- Execute standardized procedures for the Gravimetric analysis

COP6.2- Retrieve the skills of Precipitation process, digestion, filtration, incineration etc.

COP6.3- Able to design, carry out, record and analyze the results of chemical experiments