

DEPARTMENT OF CHEMISTRY

The College offers Undergraduate Honours and General Course in Chemistry. The outcomes of this course are as follows.

Students who complete the Chemistry Honours might come up the following knowledge and skills.

Course Outcomes

C-I (Inorganic chemistry-I)

- CO-1. Understand the Born Haber cycle to calculate lattices energy
- CO-2. Brief idea about Ionic bond, Covalent bond, Molecular orbital theory & VSEPR theory.
- CO-3. Study the structure of atom, Hund's rule, term symbol, calculation of microstate and selection rule.
- CO-4. Understand the periodicity of s, p, d, f block elements

C-II (Physical chemistry-II)

- CO-1. State and apply the laws of thermodynamics; perform calculations with ideal and real gases; design practical engines by using thermodynamic cycles; predict chemical equilibrium.
- CO-2. To apply the concepts of colloids and gels.
- CO-3. To learn depth knowledge about liquid states.

C-III (Organic chemistry-I)

- CO-1. The reactivity and stability of an organic molecule based on structure, including conformation and stereochemistry.
- CO-3. The prediction of mechanisms for organic reactions.
- CO-4. How to use their understanding of organic mechanisms to predict the outcome of reactions.
- CO-5. How to design syntheses of organic molecules.
- CO-6. Students are expected to apply their knowledge to problem-solve, deduce structures, and synthesize simple organic molecules using the studied reactions.

C-IV (Physical chemistry-II)

- CO-1. the application of mathematical tools to calculate thermodynamic and kinetic properties.
- CO-2.the relationship between microscopic properties of molecules with macroscopic thermodynamic observables.
- CO-3. the derivation of rate equations from mechanistic data.
- CO-4.the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics.
- CO-5.the limitations and uses of models for the solution of applied problems involving chemical thermodynamic and kinetics.

C-V (Inorganic Chemistry-II)

CO-1. Describe bonding models that can be applied to a consideration of the properties of transition metal compounds.

CO-2. The students familiar about the inorganic halogen compounds, coordination compounds and transition elements.

CO-3. They get well exposure about solids.

C-VI (Organic Chemistry-II)

Working through this course, students are expected to apply their knowledge to problem-solve, deduce structures, and synthesize simple organic molecules using the studied reactions. Relationships between organic chemistry and other disciplines are noted.

C-VII(Physical chemistry-III)

CO-1. The photoredox processes at the surface of solids. An introduction to the current theoretical models of electron transfer dynamics is provided.

CO-2. Current technological applications, as well as the most recent advances in the field are then detailed.

CO-3. Defines the importance of Phase Diagrams in the field of materials science and engineering

CO-4. Explains the basic definitions and terms in a phase diagram

CO-5. Defines phase, equilibrium, component, degree of freedom and phase rule concepts.

CO-6. Applies above mentioned concepts to the field of Materials Science and Engineering.

CO-7. define central parts of electrochemical cells and electrochemical equipment such as anode, cathode, membrane, diaphragm, liquid junction, reference electrode, and Potentiostat - define and relate mathematically basic physical and thermodynamic.

C-VIII (Inorganic chemistry-III)

CO-1. predicting geometries of simple molecules

CO-2. the fundamentals of the chemistry of the main group elements, and important real world applications of many of these species

CO-3. the use of group theory to recognize and assign symmetry characteristics to molecules and objects, and to predict the appearance of a molecule's vibrational spectra as a function of symmetry

CO-4. the bonding models, structures, reactivity's, and applications of coordination complexes, boron hydrides, metal carbonyls, and organometallics

CO-5. Apply the knowledge in biochemical reactions.

C-IX (Organic Chemistry-III)

CO-1. How to use their understanding of organic mechanisms to predict the outcome of reactions

CO-2. How to design syntheses of organic molecules

CO-3. How to determine the structure of organic molecules using IR and NMR spectroscopic techniques

- CO-4. Students will demonstrate an advanced level of knowledge in Organic photochemistry.
- CO-5. Improve their theoretical knowledge about chemical reactions which are carried out by light.
- CO-6. the use of nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy for organic structure elucidation
- CO-7. the fundamentals of electronic structure and bonding in conjugated and aromatic Systems

C-X (PHYSICAL CHEMISTRY-IV)

Brief idea about electrochemistry related terms (cell constant, conductance, degree of Dissociation)

C-XI (Organic chemistry-IV)

- CO-1. Applications of IR, UV, MASS & NMR Spectroscopy for identification of simple organic Molecules.
- CO-2. Elementary idea about Carbohydrates

C-XII (PHYSICAL CHEMISTRY-V)

Details about Physical spectroscopy (Rotational, Vibrational, Raman and Electronic).

C-XIII (INORGANIC CHEMISTRY-IV)

An idea about Reaction mechanism and application of Homogeneous and Heterogeneous catalyst

C-XIV (ORGANIC CHEMISTRY-V)

Discuss about Energy concept, Amino acids, Lipids, Pharmaceutical Compounds.

Programme Outcomes

Academic. Students may go for higher studies in different branches of science, also they may go for research in different fields. Students will be able to explain why science study is an integral activity for addressing social, Economical and Environmental problems.

Research. Students may go for research in the specific discipline and the allied Branches as well.

Application – Environmental, Social, Scientific:

It helps in developing scientific temper among the people of society.

It helps social awareness: how to prevent waterlogging, to disinfect in Water, to test P.H of soil etc.

Employability. Employment is more in science and science related sector. There is Scope for employment in different industries like soap, drug dyes, Cement, plastic etc.

- PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
- PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.

- PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
- PO-4. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
- PO-5. Find out the green route for chemical reaction for sustainable development.
- PO-6. To inculcate the scientific temperament in the students and outside the scientific community.
- PO-7. Determine molecular structure by using UV, IR and NMR.
- PO-8. Study of medicinal chemistry for lead compound.
- PO-9. Improve the Skill of student in organic research area.
- PO10. Synthesis of Natural products and drugs by using proper mechanisms.
- PO11. Study of Asymmetric synthesis.
- PO12. Determine the aromaticity of different compounds.
- PO13. Solve the reaction mechanisms and assign the final product.

Programme Specific Outcomes

- PSO-1. Gain the knowledge of Chemistry through theory and Practical.
- PSO-2. To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
- PSO-3. Identify chemical formulae and solve numerical problems.
- PSO-4. Use modern chemical tools, Models, Charts and equipment.
- PSO-5. Know structure-activity relationship.
- PSO-6. Understand good laboratory practices and safety.
- PSO-7. Develop research-oriented skills.
- PSO-8. make aware and handle the sophisticated instruments/ equipment
- PSO-9. Know the structure and bonding in molecules/ ions and predict the Structure of molecule/ions.
- PSO10. Understand and apply principles of Organic Chemistry for understanding the scientific phenomenon in Reaction mechanisms.
- PSO11. Learn the Familiar name reactions and their reaction mechanisms.
- PSO-12. Understand good laboratory practices and safety.
- PSO-13. Study of organometallic reactions.
- PSO-14. Study of free radical, bicyclic compound, conjugate addition of Enolates and pericyclic reactions.
- PSO-15. Study of biological mechanisms using amino acids.