

MARKAZ ARTS AND SCIENCE COLLEGE

BSC CHEMISTRY

Program outcome

This curriculum has been prepared with the objective of giving sound knowledge and understanding of chemistry to undergraduate students. The goal of the syllabus is to make the study of chemistry stimulating, relevant and interesting. It has been prepared with a view to equip students with the potential to contribute to academic and industrial environments. This curriculum will expose students to various fields in chemistry and develop interest in related disciplines. Chemistry, being a border science to biology, physics and engineering, has a key role to play in the understanding of these disciplines. After completion of B.Sc degree in Chemistry, students gained the theoretical as well as experimental knowledge of handling chemicals and its application for specific purposes. The student could expand the knowledge in Science and opportunities related to chemistry in the government/ private services in the field of food safety, health inspector, pharmacist etc. The updated syllabus is based on an interdisciplinary approach to understand the application of the subject in daily life.

BROAD OBJECTIVES

To enable the students

- To understand basic facts and concepts in chemistry.
- To develop the ability for applying the principles of chemistry.
- To appreciate the achievements in chemistry and to know the role of chemistry in nature and in society.
- To familiarize the emerging areas of chemistry and their applications in various spheres of chemical sciences and to apprise the students of its relevance in future studies.
- To develop skills in the proper handling of instruments and chemicals.
- To be exposed to the different processes used in industries and their applications.
- To make the students eco-friendly by creating a sense of environmental awareness in them.
- To make the students aware of the applications of chemistry in day-to-day life.

Course outcome

SEMESTER 1

CHE1B01- Theoretical and inorganic chemistry - I

- ★ To apply the methods of a research project.
- ★ To understand the principles behind volumetry.
- ★ To analyse the characteristics of different elements.
- ★ To distinguish between different acid base concepts.
- ★ To analyse the stability of different nuclei.

SEMESTER 2

CHE2B02-Theoretical and Inorganic Chemistry- II

- ★ To understand 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.
- ★ To understand that chemical bonding is the mixing of wave functions of the two combining atoms.
- ★ To understand the concept of hybridization as linear combination of orbitals of the same atom.
- ★ To inculcate an atomic/molecular level philosophy in the mind.

SEMESTER 3

CHE3B03-PHYSICAL CHEMISTRY - I

- ★ To understand the properties of gaseous state and how it links to thermodynamic systems.
- ★ To understand the concepts of thermodynamics and its relation to statistical thermodynamics.
- ★ To apply symmetry operations to categorize different molecules.

SEMESTER 4

CHE4B04- ORGANIC CHEMISTRY– I

- ★ To apply the concept of stereochemistry to different compounds.
- ★ To understand the basic concepts of reaction mechanism.
- ★ To analyse the mechanism of a chemical reaction.
- ★ To analyse the stability of different aromatic systems.

CHE4B05(P)- INORGANIC CHEMISTRY PRACTICAL – I

- ★ To enable the students to develop skills in quantitative analysis and preparing inorganic complexes.
- ★ To understand the principles behind quantitative analysis.
- ★ To apply appropriate techniques of volumetric quantitative analysis in estimations.
- ★ To analyse the strength of different solutions.

SEMESTER 5

CHE5B06-INORGANIC CHEMISTRY – III

- ★ To understand the principles behind qualitative and quantitative analysis.
- ★ To understand basic processes of metallurgy and to analyse the merits of different alloys.
- ★ To understand the applications of different inorganic polymers.
- ★ To analyse different polluting agents.
- ★ To apply the principles of solid waste management.

CHE5B07-ORGANIC CHEMISTRY – II

- ★ To understand the difference between alcohols and phenols.
- ★ To understand the importance of ethers and epoxides.
- ★ To apply organometallic compounds in the preparation of different functional groups.
- ★ To apply different reagents for the inter conversion of aldehydes, carboxylic acids and acid derivatives.
- ★ To apply active methylene compounds in organic preparations.

CHE5B08 -PHYSICAL CHEMISTRY – II

- ★ To apply the concept of kinetics, catalysis and photochemistry to various chemical and physical processes.
- ★ To characterise different molecules using spectral methods.
- ★ To understand various phase transitions and its applications.

SEMESTER 6

CHE6B09:-INORGANIC CHEMISTRY – IV

- ★ To understand the principles behind different instrumental methods.
- ★ To distinguish between lanthanides and actinides.
- ★ To appreciate the importance of CFT.
- ★ To understand the importance of metals in living systems.
- ★ To distinguish geometries of coordination compounds.

CHE6B10-ORGANIC CHEMISTRY – III

- ★ To elucidate the structure of simple organic compounds using spectral techniques.
- ★ To understand the basic structure and tests for carbohydrates.
- ★ To understand the basic components and importance of DNA.
- ★ To understand the basic structure and applications of alkaloids and terpenes.
- ★ To distinguish different pericyclic reactions.

CHE6B11- PHYSICAL CHEMISTRY – III

- ★ To understand the basic concepts of electrochemistry.
- ★ To understand the importance of colligative properties.
- ★ To relate the properties of materials/solids to the geometrical properties and chemical compositions.

CHE6B12- Advanced and Applied Chemistry

- ★ To understand the importance of nanomaterials.
- ★ To appreciate the importance of green approach in chemistry.
- ★ To understand the uses and importance of computational calculations in molecular design.
- ★ To understand the role of chemistry in human happiness index and life expectancy.

CHE6B13(E2)- POLYMER CHEMISTRY

- ★ To understand various classification of polymers and types of polymerisation methods.
- ★ To understand the important characteristics of polymers such as average molecular weight, glass transition temperature, viscoelasticity and degradation.
- ★ To appreciate the importance of processing techniques.
- ★ To characterise different commercial polymers and to understand the significance of recycling.

CHE6B14(P)- PHYSICAL CHEMISTRY PRACTICAL

- ★ To enable the students to develop analytical skills in determining the physical properties (physical constants).
- ★ To develop skill in setting up an experimental method to determine the physical properties.
- ★ To understand the principles of Refractometry, Potentiometry and Conductometry.

CHE6B15(P)- ORGANIC CHEMISTRY PRACTICAL

- ★ To enable the students to develop analytical skills in organic qualitative analysis.
- ★ To develop talent in organic preparations to ensure maximum yield.
- ★ To apply the concept of melting or boiling points to check the purity of compounds.
- ★ To analyse and characterise simple organic functional groups.
- ★ To analyse individual amino acids from a mixture using chromatography.

CHE6B16(P) -INORGANIC CHEMISTRY PRACTCAL-II

- ★ To enable the students to develop analytical skills in inorganic quantitative analysis.
- ★ To understand the principles behind gravimetry and to apply it in quantitative analysis.
- ★ To understand the principles behind colorimetry and to apply it in quantitative analysis.

CHE6B17(P)- INORGANIC CHEMISTRY PRACTCAL-III

- ★ To enable the students to develop skills in inorganic quantitative analysis.
- ★ To understand the principles behind inorganic mixture analysis and to apply it in quantitative analysis.
- ★ To analyse systematically mixtures containing two cations and two anions.

CHE6B18(Pr)- PROJECT WORK

- ★ To understand the scientific methods of research project.
- ★ To apply the scientific method in life situations.
- ★ To analyse scientific problems systematically.