

Department of Chemistry

PSOs (UG)

The B Sc programme with Major in Chemistry has been designed so as to acquaint the students with the basic concepts of the subject. The Course will prepare the students to pursue higher studies. Further the programme is expected to build up

- Scientific attitude
- Critical thinking
- Confidence to perform Chemistry laboratory works
- Interest for the subject so as to pursue higher studies
- Interest towards research activities

COs (UG)

- CO 101 : This course is dedicated to the thermodynamic concepts and laws. The feasibility of a reaction, rate and deduction of mechanism have also been dealt with.
- CO 102 : Through this course students will get the preliminary idea about mechanism of organic reactions. Students will also know about stereochemistry.
- CO 103 : This is a lab course through which the students are expected to learn about some experimental techniques.
- CO 201 : The students will learn about two states of matter – gaseous and liquid. The students will also learn about electrochemical principles and Galvanic cells.
- CO 202 : Through this course the students will know about the different types of organic compounds.
- CO 203 : This is a lab course dealing with the qualitative analysis of organic compounds.
- CO 301 : This course first deals with the quantum mechanical model of atom.
- CO 302 : Through this course the students will know about the different types of chemical bonding.
- CO 303 : This is again a lab course dealing with the qualitative analysis of inorganic compounds.
- CO 401 : The properties of inorganic compounds and non-transition elements have been covered in this course.
- CO 402 : Through this course the students will know about the properties of transition compounds and complexes.
- CO 403 : This is a lab course where the students learn about the synthesis of inorganic complexes along with some experiments related to water analysis.
- CO 501 : The Concepts of Quantum Chemistry have been included in this course. The students learn about the quantum mechanical principles, solution of Schrodinger equations related to different systems including H-atom and quantum mechanical treatment of chemical bonding.
- CO 502 : Through this course the students learn about molecular reaction dynamics, photochemistry, phase equilibria and surface chemistry.
- CO 503 : This is Organic Chemistry course where the students learn about the mechanisms of the different types of organic reactions including pericyclic reactions.
- CO 504 : Through this course the students will know about bonding in coordination, organometallic compounds and roles of different metal ions in living bodies.
- CO 505 : Here the students learn about the titrimetric, gravimetric and colorimetric estimation of metal ions in mixtures and chromatographic separation of metal ions by doing in the laboratory.

- CO 506 : This lab course deals with the synthesis of organic complexes along and estimation of glucose, saponification equivalent of ester and equivalent mass of acid.
- CO 601 : Through this course the students learn about the different spectroscopic methods – IR, UV-Vis, Raman, Electronic, NMR and ESR spectroscopy and mass spectrometry.
- CO 602 : This is Physical Chemistry course through which the students learn about solid state, macromolecules, colloids and statistical thermodynamics.
- CO 603 : Here the students learn about biochemistry, natural products, drugs, photochemistry, polymers, fibres.
- CO 604 : Through this course the students learn about spectra of inorganic compounds, metallo-proteins, toxicity due to metal ions, radioactivity, lanthanoids and actinoids.
- CO 605 : This is a lab course and the students perform different Physical Chemistry experiments.
- CO 606 : Through this course the students do some investigative (research) works on some topic of interest thereby get introduced to research activities.

The methods of measuring attainment of POs, PSOs and COs are as follows –

1. Home assignment
2. Continuous evaluation through periodic unit tests.
3. Departmental students seminar where the students give power point presentations on topics related to the syllabus
4. Question – answer discussion : In the classroom, the students are asked questions and they are encouraged to explain the answers using black board.
5. Invited lectures by eminent teachers and scientists

PSOs (PG)

The Choice Based Credit System (CBCS) for the PG programme (Chemistry) was introduced in 2016. This allows flexibility in curriculum design besides offering a broader scope of learning in higher education. This further enables a student to learn at his own pace to gain additional skills. The programme is expected to

- Lay sound foundation for future interdisciplinary research

COs (PG)

- CH 101 : Through this course the students will be able to explain/ critically examine the chemistry of transition metals, structure and bonding.
- CH 102 : By studying this course, the students will be able to explain the unique features of organic reaction mechanism, reaction intermediates and stereochemistry.
- CH 103 : Through this course the students will learn about the fundamentals of equilibrium and non-equilibrium thermodynamics, statistical thermodynamics and polymer chemistry.
- CH 104 : This course describes the quantum mechanical principles and approximate methods thereby allowing the students to learn about the theoretical basis of chemical principles.
- CH 105 : After studying this course the students will be able to explain the different spectroscopic techniques and their applications in analyzing the experimental data.
- CH 106 : This course will enable the students to rationalize the molecular structure and bonding using group theory.

- CH 107 : Through this course the students will be able to perform qualitative and quantitative analysis of organic compounds and mixtures and implement multi-step organic synthesis.
- CH 201 : Here, the students will learn about the bonding, structure and reactivity of metal complexes and organometallic compounds.
- CH 202 : On the completion of this course the students will acquire the detailed knowledge of organic photochemical, pericyclic, oxidation and reduction reactions.
- CH 203 : This course will enable the students to describe/ examine the concepts and theories of chemical kinetics, electrochemistry, molecular reaction dynamics, fast reactions and energy storage.
- CH 204 : Through this course the students will learn the basic principles magnetic resonance spectroscopy, Mossbauer spectroscopy and mass spectrometry along with the applications of these techniques in structure elucidation.
- CH 205 : On completion of this course the students will be able to describe/ compare relationships between Green Chemistry and chemical laboratory and industry in the design of safer chemicals and processes.
- CH 206 : Here the students will acquire the techniques of synthesis and characterization of different inorganic materials.
- CH 301 : Through this course the students will learn about the chemical and physical processes that occur in living organisms.
- CH 302 : On the completion of this course the students will be able to demonstrate the applications of different analytical techniques in Chemistry.
- CH 303 : This course will enable the students to identify/ explain the concept of selectivity in organic reactions and describe the stages of planning in the synthesis of complex molecules.
- CH 304 : Through this course the students will acquire better communication and presentation skills.
- CH 305 : Through this course the students will understand Physical Chemistry by doing experiments.
- CH 306 : Here the students will examine/ differentiate between different materials and design/ plan novel materials for applications.
- CH 307 : Through this course the students will learn about X-ray crystallography and its use in structure determination.
- CH 308 : By studying this course the students will learn about the environmental chemistry.
- CH 309 : The students will learn about the material surfaces and their application particularly in catalysis from this course.
- CH 310 : Through this course the students will learn about the components of food and their energy / nutritional values.
- CH 401 : Through this course the students will learn about the different types of natural products, their extraction, synthesis and bio-synthesis.
- CH 402 : On the completion of this course the students will be able to design synthetic strategies and describe important methods of synthesizing complex molecules.
- CH 403 : This course will enable the students to explain/ compare and analyse the quantum mechanical approximate formalisms and their formulation for setting up basis set functions for predicting the properties of molecules..
- CH 404 : Through this course the students will be able to identify/ explain different types of catalysts, preparation methods, their activation/ deactivation including design of catalytic reactors.

- CH 405 : Through this course the students will be able to synthesize/ characterize different types of nanomaterials, their properties and applications.
- CH 406 : Here the students will learn the role of metal ions in functioning of biological systems..
- CH 407 : Through this course the students will be able to classify/ critically examine the supra-molecular systems, their catalytic activities and molecular devices.
- CH 408 : By studying this course the students will learn about the synthesis, structure and reactivity of organometallic compounds and their use in important reactions.
- CH 409 : The students will learn to compare and explain aspects related to drug design, drug action and SARs.
- CH 410 : Through this course the students will be able to apply/ interpret the NMR methods for structure elucidation of complex molecules.
- CH 411 : Through this course the students will be able to plan and strategize a scientific research problem and implement it within a reasonable time-frame. It is expected that after completing project dissertation a student will learn to work independently.

PG

The methods of measuring attainment of POs, PSOs and COs are as follows –

1. Home assignment
2. Continuous evaluation through periodic unit tests.
3. Students seminar (on every Saturday) where the students give power point presentations on topics related to the syllabus
4. Invited lectures by eminent teachers and scientists.