

MSc Chemistry

Programme Outcome

- PO 1- Provides a fundamental insight into the changes taking place in and around our fascinating nature.
- PO 2 -Understand the issues of environmental contexts and sustainable development
- PO 3-Through lectures, laboratory work, exercises, project work, and its independent master's thesis, students will gain knowledge about relevant working methods for research, industry, administration, and education.
- PO4 -Lays the foundation for doctoral programs in Chemistry.
- PO 5- Acquire the ability to engage in independent and lifelong learning in the broadest context

Programme Specific Outcome

- PSO 1 Acquires ability to synthesise , separate and characterise compounds using laboratory and instrumentation techniques
- PSO 2 Develops analytical skills and problem solving skills requiring application of chemical principles
- PSO 3 Know and predict the structure and bonding in molecules/ions
- PSO4 Understand theoretical concepts of instruments that are commonly used in most chemistry fields as well as interpret and use data generated in instrumental chemical analysis
- PSO 5 Develop an understanding of eco friendly chemical processes and impact of chemistry on health and environment

Course Outcome

Semester I

CH500101: ORGANOMETALLICS AND NUCLEAR CHEMISTRY

CO1	To understand the structure, bonding and reactivity of organometallic compounds
CO2	To apply and analyze the methods of synthesis and mechanism of organometallic compounds
CO3	To familiarize about the functions of metal ions in biological systems.
CO4	To learn about applications of radioactive isotopes in various fields

CH500101 : STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY

C01	To recollect and familiarize the basic concepts in organic chemistry
C02	To develop a deep knowledge about the physical organic chemistry
C03	To have a well defined idea on organic photochemistry
C04	To have an authenticated idea of stereochemistry of organic compounds
C05	To know and understand the conformational analysis of organic compounds

CH500103 QUANTUM CHEMISTRY AND GROUP THEORY

C01	Students will be able to revise and update the fundamental ideas, mathematical concepts and application of group theory to molecular systems
C02	Expertise in categorising common molecules into various point groups and applying GOT to derive the character tables of various point groups
C03	Understand and solve particle in a box model, harmonic oscillator model, particle on a ring and gain a deep understanding in the application of tunnelling effect

CH500104: THERMODYNAMICS, KINETIC THEORY AND STATISTICAL THERMODYNAMICS

CO 1	To apply the principles and laws of equilibrium thermodynamics to multi component systems.
CO 2	To calculate thermodynamic properties of ideal gases and real gases using principles and techniques of statistical thermodynamics.
CO 3	To familiarize with the properties and theories of gases.

Semester II

CH500201: COORDINATION CHEMISTRY

CO 1	To acquire deep knowledge in coordination compounds
CO 2	To understand the kinetics and mechanism of reactions of metal complexes
CO 3	To know about the stereochemistry of coordination compounds
CO 4	To familiarize about the coordination chemistry of Lanthanoids and Actinoids

CH 500202: ORGANIC REACTION MECHANISM

CO 1	To have a review of organic reaction mechanisms
CO 2	To learn and understand the involvement of carbanions in organic reactions, their structure and reactivity through various organic reactions
CO 3	To learn and understand the involvement of carbocations in organic reactions, their structure and reactivity through various organic reactions
CO 4	To learn and understand the involvement of carbenes, carbenoids, nitrenes and arynes in organic reactions, their structure and reactivity through various organic reactions
CO 5	To learn and understand the involvement of free radicals in organic reactions, their structure and reactivity through various organic reactions
CO 6	To know and understand the reactions of carbonyl compounds and the mechanisms involved.
CO 7	To have a detailed idea on the concerted reactions

CH500203: CHEMICAL BONDING AND COMPUTATIONAL CHEMISTRY

CO 1	Students will be able to apply, analyze and evaluate group theoretical concepts in spectroscopy
CO 2	Expertise in extending the ideas of quantum mechanics to many electron systems
CO 3	Critically evaluate valence bond theory and molecular orbital theory
CO 4	Understand and develop basic foundation on using various tools in computational chemistry
CO 5	Create knowledge on format of GAMESS / Firefly

CH500204: MOLECULAR SPECTROSCOPY

CO 1	To understand the basic principles and theory of microwave, NMR, IR, Raman, UV-Vis spectroscopy.
CO2	Apply the theory to simple problems

CH500205: INORGANIC CHEMISTRY PRACTICAL-1

CO 1	To apply the principles of qualitative and quantitative analytical techniques in inorganic chemistry for identification of ions.
CO 2	To familiarize the preparation of inorganic complexes.
CO 3	To understand the characterization of inorganic complexes.

CH 500206: ORGANIC CHEMISTRY PRACTICAL-1

CO 1	Apply class room learning in separation and purification of organic compounds and binary mixtures
CO 2	Use the computational tools to draw the reaction schemes and spectral data to various organic reactions

CH500207:PHYSICAL CHEMISTRY PRACTICAL-1

CO 1	Students will be able to apply the theory behind adsorption, distribution law and surface tension
CO 2	Expertise in constructing and studying phase diagrams of three component and eutectic systems
CO 3	Using computational tools to compute Single point energy, Geometry optimization as well as doing conformational analysis

Semester III**CH 500301 STRUCTURAL INORGANIC CHEMISTRY**

CO 1	To acquire knowledge about solids and its electrical, magnetic and optical Properties
CO 2	To familiarize about inorganic chains, rings, cages and metal clusters.
CO 3	To Learn about glasses, ceramics, refractories etc

CH 500302: ORGANIC SYNTHESSES

CO 1	Understand the application of various oxidising and reducing agents used in organic synthesis
CO 2	Identify the importance of organic reagents like NBS, DDQ, DCC and Gilman reagent in organic synthesis
CO 3	Gain an understanding of the different ways of synthesising carboxylic rings
CO 4	Illustrate the necessity of protection and deprotection in organic synthesis
CO 5	Knowledge of retrosynthetic approach to planning organic synthesis

**CH500303: CHEMICAL KINETICS, SURFACE CHEMISTRY
AND CRYSTALLOGRAPHY**

CO 1	Learn the fundamental theories of reaction rates and mechanism of chain reactions.
CO 2	Study the different types of surfaces and application of various isotherms in surface catalyzed reactions.
CO 3	Familiarize the symmetries of different point groups and types of liquid crystals.

CH 500304 SPECTROSCOPIC METHODS IN CHEMISTRY

CO 1	The learners should be able to apply the different spectroscopic methods to solve problems
CO 2	Using spectral data for explaining important organic reactions and functional transformations.

Semester IV

CH 800401 : ADVANCED INORGANIC CHEMISTRY

CO 1	To apply group theory in inorganic chemistry
CO 2	To understand about inorganic spectroscopic methods and other analytical methods
CO 3	To know about inorganic photochemistry and nanomaterials
CO 4	To familiarize about acids and bases and non-aqueous solvents

CH 800402 ADVANCED ORGANIC CHEMISTRY

CO 1	Gain knowledge about the role of molecular receptors in medicine
CO 2	Develop skill to characterise nanomaterials with SEM, TEM, XRD
CO 3	To engage in deep understanding of the advances in polymer chemistry
CO 4	Instill scientific thinking with knowledge in scientific thinking

CH800403: ADVANCED PHYSICAL CHEMISTRY

CO 1	Understand the excited states involved in a photochemical reaction
CO 2	Analyze and apply diffraction methods and atomic spectroscopic techniques.
CO 3	Apply the theories in electrochemistry for analyzing kinetics of electrode reactions.

CH0104 05: INORGANIC CHEMISTRY PRACTICAL-2

CO 1	To estimate simple binary mixtures of metallic ions in solution by volumetric and gravimetric methods
CO 2	To analyze alloys and ores

CH 010406: ORGANIC CHEMISTRY PRACTICAL-2

CO1	Students will have a firm foundation in the fundamentals and application of green chemistry
CO2	Students will be able to design and carry out multi step synthesis and to purify the products obtained by relevant methods
CO 3	Carry out experiments using microwave assisted organic synthesis
CO 4	Using UV-Visible spectrophotometric techniques for estimating organic compounds

CH010407: PHYSICAL CHEMISTRY PRACTICAL-2

CO 1	Analyse and apply the theoretical principles of chemical kinetics
CO 2	Acquire practical skill to undertake experiments with polarimeter and refractometer
CO 3	Evaluation of unknown concentration of solutions using techniques like conductometry, potentiometry and viscosity measurements