

Postgraduate Department of Chemistry

M.Sc. Chemistry

Programme Outcomes

PO1	Provides a fundamental insight into the changes taking place in and around our fascinating nature.
PO2	Understand the issues of environmental contexts and sustainable development
PO3	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.
PO5	Acquire the ability to engage in independent and lifelong learning in the broadest context

Programme Specific Outcomes

PSO1	Acquires ability to synthesise , separate and characterise compounds using laboratory and instrumentation techniques
PSO2	Develops analytical skills and problem solving skills requiring application of chemical principles
PSO3	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
PSO5	Develop an understanding of eco-friendly chemical processes and impact of chemistry on health and environment.

Course Outcomes

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

CO1 To recollect and familiarize the basic concepts in organic chemistry

CO2 To develop a deep knowledge about the physical organic chemistry

CO3 To have a well defined idea on organic photochemistry

CO4 To have an authenticated idea of stereochemistry of organic compounds

CO5 To know and understand the conformational analysis of organic compounds

CH500103: QUANTUM CHEMISTRY AND GROUP THEORY

CO1 Students will be able to revise and update the fundamental ideas, mathematical concepts and application of group theory to molecular systems

CO2 Expertise in categorising common molecules into various point groups and applying GOT to derive the character tables of various point groups

CO3 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, UVVis 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.

CH 01 04 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.