

MSc CHEMISTRY

Program Specific Outcomes

- PSO1** : Develop a scientific temper and to learn the necessary skills to succeed in research or industrial field.
- PSO2** : Understand the interdisciplinary nature of Chemistry and to be aware of the emerging fields in Chemistry
- PSO3** : Develop skill to design and carry out scientific experiments and interpret the data
- PSO4** : Information Communication Technology to gather knowledge at will.

COURSE OUTCOME

SEMESTER 1

CH500101 Organometallics and Nuclear chemistry

- CO1- To study the structure, synthesis and reactions of commonly known
- CO2- To know the important applications of organometallic compounds in catalysis
- CO3- To study the important aspects of organometallic polymers
- CO4- To understand the functions and applications of bioorganic compounds
- CO5- To have a basic idea about nuclear Chemistry and its applications

CH500102 Structural and Molecular Organic chemistry

- CO1- To understand the basic concepts and mechanism in organic chemistry
- CO2- To get an idea about the various kinetic and thermodynamic factors which control the organic reactions.
- CO3- To know stereochemistry and various possible conformations of organic compounds and how it affects the reaction outcome
- CO4- To be familiarise with the important photochemical reactions in Organic Chemistry

CH500103 Quantum chemistry and Group Theory

- CO1- To study the basic postulates of quantum mechanics
- CO2- To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc.
- CO3- To understand the quantum mechanical aspect of angular momentum and spin.
- CO4- Enable the students to predict the point group of important molecules and to know how they are classified
- CO5- To understand the idea of space groups and to learn the theory of molecular symmetry.
- CO6- To gain skill to apply group theory to vibrational and electronic spectroscopy

CH500104 Thermodynamics, Kinetic Theory and Statistical Thermodynamics

- CO1- To know the basic concepts in classical thermodynamics and to learn the thermodynamic aspects of various processes.
- CO2- To understand the different aspects of statistical thermodynamics and its applications.

SEMESTER 2

CH500201 Coordination chemistry

- CO1- To know the structure and bonding of important coordination compounds
- CO2- To understand the magnetic properties of complexes and to know how Magnetic moments can be employed for the interpretation of their structure
- CO3- To get an overview about the stereochemistry of coordination compounds
- CO4- To study the reaction mechanisms of metal complexes.
- CO5- Enable the students to elucidate the structure of metal complexes using various spectroscopic methods
- CO6- To get an idea about the basic coordination chemistry of Lanthanides and Actinides

CH500202 Organic Reaction Mechanism

- CO1- To be familiarized with the mechanism of organic reactions and different factors which affect the reaction rate.
- CO2- To understand the role of various reaction intermediates like carbanion, carbocation, carbenes, radicals etc. in organic reactions

- CO3- To get insight into the chemistry of carbonyl compounds.
- CO4- To know the different types of concerted reactions in organic chemistry and orbital correlation approaches

CH500203 Chemical Bonding and Computational chemistry

- CO1- To understand the requirement of approximation methods in quantum mechanics
- CO2- To gain the knowledge to apply important approximation methods to problems in quantum mechanics
- CO3- To gain insight into valence bond theory, molecular orbital theory and the concept of hybridisation
- CO4- To know the applications of group theory in chemical bonding
- CO5- To get an exposure to the emerging world of computational chemistry
- CO6- To have a basic idea about computational chemistry calculations

CH500204 Molecular Spectroscopy

- CO1- To know the basic principle of different techniques employed in molecular spectroscopy
- CO2- To study the origin, instrumentation and important applications of Microwave, IR, Raman, UV, NMR, EPR and EQR techniques

SEMESTERS 1 & 2 PRACTICAL

CH500205 Inorganic chemistry Practical-1

- CO1- To be able to identify and separate less familiar ions such as Tl, W, Se, Mo, Ce, Th, Ti, Zr, V, U etc.
- CO2- To be able to estimate colorimetrically ions such as Fe, Cu, Ni, Mn, Cr etc.

CH500206 Organic chemistry Practical-1

- CO1- To learn the separation and purification of an organic mixture by chemical/solvent separation methods.
- CO2- To gain the knowledge to draw the structure of compounds using Chemdraw software

CH500207 Physical chemistry Practical-1

- CO1- To verify some important principles in physical chemistry and to determine various physical properties
- CO2- To learn to carry out some simple computational chemistry calculations

SEMESTER 3

CH500301 Structural Inorganic chemistry

- CO1- To understand the structure and different properties of solids
- CO2- To learn the important aspects of inorganic chains, rings, cages and metal clusters.
- CO3- To understand the chemistry and applications of materials such as glasses, ceramics, composites, nanomaterials etc.

CH500302 Organic Syntheses

- CO1- To know the various methods employed for reactions like oxidation, reduction, carbocyclic and heterocyclic ring formation etc.
- CO2- To get insights into novel reactions and reagents in organic synthesis
- CO3- To know the utility of protecting group strategy in organic synthesis
- CO4- To be equip the students with the basic principles of retro syntheses, Biosynthesis and biomimetic synthesis

CH010303 Chemical Kinetics, Surface chemistry and Crystallography

- CO1- To learn the different theories of reaction rates and factors affecting reaction rates
- CO2- To have an idea about the different types of catalysis and their mechanisms
- CO3- To study the chemistry of surfaces and different types of surface phenomena
- CO4- To get an idea about the various techniques employed for the characterization of surfaces
- CO5- To know the general properties of colloids and macromolecules
- CO6- To have an idea about the important aspects of crystallography

CH500304 Spectroscopic Methods in chemistry

- CO1- To get a deep insight into the various spectroscopic methods used for the characterisation of organic compounds.
- CO2- Enable the students to elucidate the structure of compounds by analysing the Spectrum

SEMESTER 4

ELECTIVE COURSES

CH800401 Advanced Inorganic chemistry

- CO1- To understand the applicability of group theory in coordination chemistry
- CO2- To know the utility of spectroscopic methods such as IR, Raman, EPR and Mossbauer techniques for the characterisation of inorganic complexes
- CO3- To understand the photochemistry of inorganic compounds
- CO4- Introduce the emerging field of nano chemistry, synthesis and characterization of nanomaterials and evolving interfaces of nanotechnology to the students.
- CO5- To study the acid –base concept in non-aqueous media and reactions in non-Aqueous media

CH800402 Advanced Organic chemistry

- CO1- To get a brief idea about emerging branches in chemistry like supramolecular chemistry, nanochemistry, medicinal chemistry, polymer chemistry and its applications. To learn the principles of green chemistry and to know the various green protocols inorganic synthesis
- CO2- To study the important stereoselective transformations in organic synthesis
- CO3- To know the basic aspects of natural product chemistry.
- CO4- To get an overview about research process and to gain the ability to apply various research methods and techniques.

CH800403 Advanced Physical chemistry

- CO1- To get an overview about the structure and properties of solid crystals and Liquid crystals
- CO2- To know the characterisation of crystals using X-Ray diffraction
- CO3- To learn the important aspects of gaseous state and electrochemistry
- CO4- To study the principle, instrumentation and applications of diffraction method, fluorescence spectroscopy, atomic spectroscopy and electro analytical techniques.

PRACTICAL- SEMESTERS 3 AND 4

CH010405 Inorganic chemistry practical-2

CO1-Enable the students to estimate the binary mixtures of metallic ions by volumetric and gravimetric methods

CO2-To acquire the skill to analyse some common alloys and ores.

CH010406 Organic chemistry practical-2

CO1- To gain the skill to prepare organic compounds using greener protocols

CO2- Enable the students to prepare organic compounds via two step synthetic sequences

CO3- To know about enzyme/coenzyme catalysed reactions

CH010407 Physical chemistry practical-2

CO1- Enable the students to determine the various physical properties using instrumental methods like polarimetry, refractometry etc.