

ST. STEPHEN'S COLLEGE UZHAVOOR

(Affiliated To Mahatma Gandhi University, Kottayam)



PROGRAMME OUTCOMES

UZHAVOOR P. O, KOTTAYAM, KERALA – 686 634

Email: info@ststephens.net.in

Website: www.ststephens.net.in

Postgraduate Programme Outcomes – MSc/MCom

Post Graduate Programmes offered by Mahatma University is Outcome-based, and the expected outcomes are as follows

PO1	Enhancing the horizon of knowledge so as to enable the learners to carry out qualitative research and pursue academic or professional careers.
PO2	Developing problem analysis skills and knowledge and applying the same in real life situation.
PO3	Using research knowledge and aptitude acquired in the course of study for solving socially relevant problems
PO4	Understanding the role and applicability of knowledge acquired in the context of society, environment and sustainable development sticking on to the ethics and values.
PO5	Developing effective communication skills and ability to work in teams by strengthening group dynamics
PO6	Fostering ability to engage in life long learning, demonstrating empathetic social concern, contributing to the development of nation, by making sure of awareness gained on various issues.

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PROGRAMME SPECIFIC OUTCOMES M Sc Chemistry

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Master of Science in Chemistry Programmes offered by Mahatma University is Outcome-based, and the expected PSOs are as follows

PSO1	Students have an advanced level understanding of the following areas of chemistry - Analytical, Inorganic, Organic, and Physical Chemistry.
PSO2	They have in-depth and detailed functional knowledge of the fundamental theoretical concepts and experimental methods of chemistry.
PSO3	Students are able to communicate scientific results in writing and in oral presentations
PSO4	Students acquired the basic tools needed to carry out independent chemical research. Students are proficient in their specialized area of chemistry and successfully completed an advanced research project.
PSO5	Students are able to explore new areas of research in both chemistry and allied fields of science and technology.
PSO6	Graduates are able to use modern library search tools to locate and retrieve scientific information about a topic, chemical, chemical technique, or an issue relating to chemistry.
PSO7	Graduates are able to use computers in data acquisition and processing and use available software as a tool in data analysis.
PSO8	Graduates are able to use standard laboratory equipment, modern instrumentation, and classical techniques to carry out experiments.
PSO9	Acquired the ability to engage in independent and self-learning as well as to successfully pursue their career objectives in advanced education and in professional courses, in a scientific career in government or industry, in a teaching career in the school systems, or in a related career following graduation.

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COURSE OUTCOMES M Sc Chemistry

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Master of Science in Chemistry Programmes offered by Mahatma University is Outcome-based, and the expected COs are as follows

COURSE OUTCOMES

SEMESTER 1

CH1C01 Organometallics and Nuclear chemistry

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

CH1C02 Structural and Molecular Organic chemistry

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

CH1C03 Quantum chemistry and Group Theory

- ❖ To study the basic postulates of quantum mechanics
- ❖ 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.
- ❖ To understand the quantum mechanical aspect of angular momentum and spin.

- ❖ Enable the students to predict the point group of important molecules and to know how they are classified
- ❖ To understand the idea of space groups and to learn the theory of molecular symmetry.
- ❖ To gain skill to apply group theory to vibrational and electronic spectroscopy

CH1C04 Classical and Statistical Thermodynamics

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

SEMESTER 2

CH2C05 Coordination chemistry

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

CH2C06 Organic Reaction Mechanism

- ❖ To familiarize with the mechanism of organic reactions and different factors which affect the reaction rate.
- ❖ To understand the role of various reaction intermediates like carbanion, carbocation, carbenes, radicals etc. in organic reactions
- ❖ To get insight into the chemistry of carbonyl compounds.
- ❖ To know the different types of concerted reactions in organic chemistry and orbital

correlation approaches

CH2C07 Chemical Bonding and Computational chemistry

- ❖ To understand the requirement of approximation methods in quantum mechanics
- ❖ To gain the knowledge to apply important approximation methods to problems in quantum mechanics
- ❖ To gain insight in to valance bond theory molecular orbital theory and the concept of hybridisation
- ❖ To know the applications of group theory in chemical bonding
- ❖ To get an exposure to the emerging world of computational chemistry
- ❖ To have a basic idea about computational chemistry calculations

CH2C08 Molecular Spectroscopy

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

SEMESTERS 1 & 2 PRACTICAL

CH2P01 Inorganic chemistry Practical-1

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

CH2P02 Organic chemistry Practical-1

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

CH2P03 Physical chemistry Practical-1

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

SEMESTER 3

CH3C09 Structural Inorganic chemistry

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

CH3C10 Organic Syntheses

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

CH3C11 Chemical Kinetics, Surface chemistry and Photochemistry

- ❖ To learn the different theories of reaction rates and factors affecting reaction rates
- ❖ To have an idea about the different types of catalysis and their mechanisms
- ❖ To study the chemistry of surfaces and different types of surface phenomena
- ❖ To get an idea about the various techniques employed for the characterisation of surfaces
- ❖ To know the general properties of colloids and macromolecules
- ❖ To have an idea about the important aspects of photochemistry

CH3C12 Spectroscopic Methods in chemistry

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

SEMESTER 4

ELECTIVE COURSES

CH4E01 Advanced Inorganic chemistry

- ❖ To understand the applicability of group theory in coordination chemistry.
- ❖ To know the utility of spectroscopic methods such as IR, Raman, EPR and Mossbauer techniques for the characterisation of inorganic complexes
- ❖ To understand the photochemistry of inorganic compounds
- ❖ Introduce the students the emerging field of nanochemistry and its fascinating aspects
- ❖ To study the acid –base concept in non-aqueous media and reactions in non-aqueous media

CH4E02 Advanced Organic chemistry

- ❖ 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 in organic synthesis
- ❖ To study the important stereoselective transformations in organic synthesis
- ❖ To know the basic aspects of natural product chemistry.
- ❖ To get an overview about research process and to gain the ability to apply various research methods and techniques.

CH4E03 Advanced Physical chemistry

- ❖ To get an overview about the structure and properties of solid crystals and liquid crystals · To know the characterisation of crystals using X-Ray diffraction
- ❖ To learn the important aspects of gaseous state and electrochemistry
- ❖ To study the principle, instrumentation and applications of diffraction method, fluorescence spectroscopy, atomic spectroscopy and electroanalytical techniques.

PRACTICAL- SEMESTERS 3 AND 4 CH4P04

Inorganic chemistry practical-2

- ❖ Enable the students to estimate the binary mixtures of metallic ions by volumetric and gravimetric methods
- ❖ To acquire the skill to analyse some common alloys and ores.

CH4P05 Organic chemistry practical-2

- ❖ To gain the skill to prepare organic compounds using greener protocols
- ❖ Enable the students to prepare organic compounds via two step synthetic sequences
- ❖ To know about enzyme/coenzyme catalysed reactions

CH4P05 Physical chemistry practical-2

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

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