PROGRAMME OUTCOMES
PROGRAMME SPECIFIC OUTCOMES
COURSE OUTCOMES

M.Sc Chemistry

Outcomes

At the end of Post Graduate Program at St. Thomas College (Autonomous), a student will have obtained:

PO1	Attained profound Expertise in Discipline
PO2	Acquired Ability to function in multidisciplinary domains
PO3	Attained ability to exercise Research Intelligence in investigations and Innovations
PO4	Learnt Ethical Principles and be committed to Professional Ethics
PO5	Incorporated Self-directed and Life-long Learning
PO6	Obtained Ability to maneuver in diverse contexts with Global Perspective
PO7	Attained Maturity to respond to one's calling

Program Specific Outcomes

At the end of M.Sc. Chemistry at St. Thomas College (Autonomous), Thrissur, a student will have developed:

PSO1	To achieve in depth knowledge in organic, inorganic, physical, theoretical chemistry.
PSO2	To study modern courses of chemistry as electives
PSO3	To understand the role of played by chemistry in industrial and societal applications
PSO4	To provide hand on training in laboratory experiments of inorganic, physical and organic chemistry, computational chemistry
PSO5	A Apply the knowledge and practical skills to innovative practices
PSO6	To bridge the gap between the traditional knowledge and research practices

Course Outcomes

M.Sc. Chemistry

CHE1C01 - Quantum Mechanics And Computational Chemistry

At the end of this course, a student will have developed ability to:

CO1	Understand the broad frame work of quantum mechanical theory
CO2	Understand the limitations of Schrodinger equations
CO3	Understand the approximation methods for multi electron atoms
CO4	Understand the approximation methods for molecules
CO5	Understand the origin of atomic orbitals
CO6	Analyze simple microscopic systems by solving Schrodinger equation
CO7	Apply the approximation methods to multi electron atoms
CO8	Evaluate molecular parameters using Gaussian programme

M.Sc. Chemistry

CHE1C02 - - Elementary Inorganic Chemistry

At the end of this course, a student will have developed ability to:

CO1	Compare bonding in P-N, P-S and S-N compounds.
CO2	Rationalize the acidic/basic behavior of substances in different solvents.
CO3	Apply Wade's rule to predict structure of Boron clusters.
CO4	Apply Styx numbers to predict polyhedral structure.
CO5	Predict theoretical magnetic moment of lanthanides.
CO6	Predict the products of a nuclear fission reaction.
CO7	Predict disproportionation of oxides based on Latimer diagram.
CO8	Evaluate suitable characterization techniques for a given nanomaterial.

M.Sc. Chemistry

CHE1C03 - Structure, And Reactivity Of Organic Compounds

At the end of this course, a student will have developed ability to:

CO1	Understand structure, bonding and stability of organic molecules.
CO2	Understand the theories of reactivity based on structure.
CO3	Understand the methods of conformational analysis
CO4	Understand the basic models for applications of stereochemistry.
CO5	Apply the methods of conformational analysis in organic reactions.
CO6	Predict the stereochemistry of products in asymmetric synthesis.

M.Sc. Chemistry

CHE1C04 – Thermodynamics, Kinetics And Catalysis

At the end of this course, a student will have developed ability to:

CO1	Understand the laws of thermodynamics
CO2	Understand the importance of catalysis in industrial processes
CO3	Analyze the important theories of chemical kinetics
CO4	Apply the thermodynamical principles to irreversible processes
CO5	Apply the principles of chemical kinetics to complex reaction mechanisms

M.Sc. Chemistry

CHE2C05 - Group Theory And Chemical Bonding

At the end of this course, a student will have developed ability to:

CO1	Understand the concept of symmetry operations, point group.
CO2	Ability to generate a set of representations.
CO3	Construction of character table using group theory.
CO4	Analyse the spectroscopic properties of molecules using theory.
CO5	Application of group theory principles and chemical bonding.
CO6	Applications of MO & VB theories and Huckel M.O. calculations.

M.Sc. Chemistry

CHE2C06 - Co-Ordination Chemistry

At the end of this course, a student will have developed ability to:

CO1	Compare the stability of complexes.
CO2	Compare the splitting of d-orbitals in different fields.
CO3	Derive dn configurations.
CO4	Apply 18 electron rule in metal carbonyls.
CO5	Apply redox properties of [Ru(bipy)3]2+ to understand water photolysis.
CO6	Predict the nature of substitution based on trans effect.

M.Sc. Chemistry

CHE2C07 - Reaction Mechanism In Organic Chemistry

At the end of this course, a student will have developed ability to:

CO1	Understand common substitution and elimination reactions.
CO2	Interpret structure and synthesis of various natural products.
CO3	Analyse the role of intermediates in common reactions.
CO4	Analyse the mechanistic aspects of various name reactions.
CO5	Apply the principles of pericyclic reactions.
CO6	Apply the photochemical reactions in various organic molecules.

M.Sc. Chemistry

CHE2C08 - Electrochemistry, Solid State Chemistry And Statistical Thermodynamics

At the end of this course, a student will have developed ability to:

CO1	Understand the important principles of statistical thermodynamics
CO2	Understand the theory of over-voltage
CO3	Understand the electronic structure of crystalline solids
CO4	Apply the electrochemical principles to batteries
CO5	Apply the principles of statistical thermodynamics to the physical properties of system

M.Sc. Chemistry

CHE1L01 & CHE2L04 – Inorganic Chemistry Practicals– I & II

At the end of this course, a student will have developed ability to:

CO1	Enable students to identify rare elements in a sample.
CO2	Enable the students to develop analytical skills.
CO3	Gain expertise in preparation of standard solutions.
CO4	Acquire skills in quantitative calorimetric analysis.
CO5	Apply acquired skills to analyse quality of potable water and food samples.
CO6	Apply the basic concept of inter group separation to identify cations in a given mixture.

M.Sc. Chemistry

CHE1L02 & CHE2L05 – Organic Chemistry Practicals– I & II

At the end of this course, a student will have developed ability to:

CO1	Practice various purification techniques.
CO2	Prepare organic compounds by multistage methods.
CO3	Enable functional group analysis.
CO4	Determine the physical constants of organic compounds.
CO5	Analyse organic binary mixture.
CO6	Apply organic qualitative analysis by microscale techniques.

M.Sc. Chemistry

CHE1L03 & CHE2L06 – Physical Chemistry Practicals – I &II

At the end of this course, a student will have developed ability to:

CO1	Determine the molarheat of solution of a substance
CO2	Determine phase diagram of a simple eutectic system
CO3	Determine phase diagram of a binary solid system forming a compound
CO4	Determine molar refractions of pure liquids
CO5	Determine strength of acids/bases using conductometric/ potentiometric titrations
CO6	Apply principles of viscosity to determine molecular weight of a polymer
CO7	Apply refractometry to determine of the composition of liquid mixtures

M.Sc. Chemistry

CHE3C09 - Molecular Spectroscopy

At the end of this course, a student will have developed ability to:

CO1	Understand the fundamentals of spectroscopy.
CO2	Understand theory and applications of NMR techniques.
CO3	Familiarize the principles and applications of Mossbauer Spectroscopy.
CO4	Correlate mass spectral data to the structure of organic compounds.
CO5	Apply Raman, IR and electronic spectra in structural analysis.
CO6	Apply basic principle of microwave spectroscopy.
CO7	Analyse various spectral data.

M.Sc. Chemistry

CHE3C10 - Organometallic And Bioinorganic Chemistry

At the end of this course, a student will have developed ability to:

CO1	Identify the role of metal ions in biological systems.
CO2	Comprehend the significance of enzymes in biological systems.
CO3	Interpret the application of organometallic compounds as catalysts.
CO4	Analyse bonding pattern and stability of organomatallic compounds.
CO5	Predict the reactivity and reactions given by organometallic compounds.
CO6	Predict stability of organometallic compounds using 18-electron rule.

M.Sc. Chemistry

CHE3C11 - Reagents And Transformations In Organic Chemistry

At the end of this course, a student will have developed ability to:

CO1	Understand the oxidation reactions in organic chemistry.
CO2	Understand various types of polymerization.
CO3	Use of important synthetic reagents for organic reactions.
CO4	Apply the principles of reduction and various coupling reactions in organic synthesis.
CO5	Apply the mechanisms of the different rearrangements and transformations in chemical reactions.
CO6	Analyse natural and artificial supramolecular systems.
CO7	Analyse the strategy of peptide synthesis.

M.Sc. Chemistry

CHE3E01 - Synthetic Organic Chemistry

At the end of this course, a student will have developed ability to:

CO1	Understand the chemistry of carbonyl condensation reactions.
CO2	Understand the chemistry of fused and higher ring heterocyclics.
CO3	Understand the basic principle of multistep synthesis.
CO4	Application of metal catalyzed coupling reaction in organic synthesis.
CO5	Application of organometallic and organo-nonmetallic reagents.
CO6	Application of reagents for oxidation reduction reactions.

M.Sc. Chemistry

CHE3E02 - Computational Chemistry (Elective)

At the end of this course, a student will have developed ability to:

CO1	Conceptual understanding of the laws of quantum mechanics necessary for the description of atoms and molecules and their chemical reaction
CO2	Identify and explain the main similarities and differences between theoretical approaches such as HF (Hartree-Fock), DFT (Density Functional Theory)and force field methods.
CO3	Describe advantages / disadvantages for simulating/modelling various scientific problems.
CO4	Choose the appropriate method in terms of applicability, accuracy, and economy for the calculation of a given chemical problem
CO5	Apply quantitative techniques and computational methods in the analysis of chemistry and chemical problems

M.Sc. Chemistry

CHE3E03- Green And Nanochemistry (Elective)

At the end of this course, a student will have developed ability to:

CO1	Identify alternative synthesis, reagents and reaction conditions
CO2	Identify the structure of carbon clusters and nanostructures
CO3	Implement green Practices
CO4	Analyze the various methods used in the characterisation of nanomaterials

M.Sc. Chemistry

CHE4C12- Instrumental Methods Of Analysis

At the end of this course, a student will have developed ability to:

CO1	Measure errors in analytical data
CO2	Understand the principles of analytical procedures in chemistry
CO3	Identify the components of instruments and tools used in chemical analysis
CO4	Interpret the data obtained from analytical instruments.

M.Sc. Chemistry

CHE4E04 - Petrochemicals And Cosmetics

At the end of this course, a student will have developed ability to:

CO1	Identify the ingredients of perfumes.
CO2	Enable to distinguish products of fractional distillation of crude oil.
CO3	Analyse petroleum fuels and its quality standards.
CO4	Analyse the composition of crude petroleum.
CO5	Analyse the uses and purification of petroleum products.
CO6	Analyse the role of chemicals as cosmetics.

M.Sc. Chemistry

CHE4E05 - Industrial Catalysis (Elective)

At the end of this course, a student will have developed ability to:

CO1	Appreciate the importance of catalysis in industrial processes
CO2	Understand the fundamentals principles of catalysis and kinetics
CO3	Understand methods of preparation of catalysts
CO4	Understand the methods of characterization of catalysts
CO5	Analyze the mechanism of catalyzed chemical reactions

M.Sc. Chemistry

CHE4E06 - Natural Products & Polymer Chemistry

At the end of this course, a student will have developed ability to:

CO1	Introduce synthetic route of polymers.
CO2	Understand the structure and basic concepts of various dyes and supramolecules.
CO3	Understand the mechanism of polymerization.
CO4	Understand various constituents of natural products.
CO5	Analyse the structure of alkaloids and anthocyanins.
CO6	Analyse the properties of polymers.
CO7	Apply various methods for characterization of polymer.
CO8	Apply the structure elucidation strategy of steroids and terpenoids.

M.Sc. Chemistry

CHE4E07 - Material Science (Elective)

At the end of this course, a student will have developed ability to:

CO1	Differentiate between ceramics, ferroelectrics and piezoelectric materials.
CO2	Understand theories of superconductivity.
CO3	Understand Ceramic matrix composite materials
CO4	Evaluate methods to test materials
CO5	Evaluate use of different plastics based on their structure and properties.
CO6	Evaluate Micro structural features of fracture.
CO7	Apply sol-gel techniques to synthesize nano-materials.
CO8	Predict material behavior using phase diagrams.

M.Sc. Chemistry

CHE4E08 – Organometallic Chemistry (Elective)

At the end of this course, a student will have developed ability to:

CO1	Aware of fundamental principles of organometallic chemistry
CO2	Understand the types of reactions and their mechanisms to explore the efficient catalytic processes
CO3	Understand the applications of organometallic homogeneous catalysis
CO4	Predict the role of organometallic catalysts in specific transformations
CO5	Analyze the difference in reactivity of simple organometallic compounds to those of different organometallic polymers

M.Sc. Chemistry

CHE3L07 & CHE4L10 – Inorganic Chemistry Practicals– III & IV

At the end of this course, a student will have developed ability to:

CO1	Enable the students to enhance analytical skills.
CO2	Acquire skills in inorganic preparations.
CO3	Appreciate the basic concepts of inter group separation.
CO4	Analyse systematically mixtures containing four cations.
CO5	Apply the principles behind gravimetry to do quantitative analysis.
CO6	Apply the principles behind colorimetry to perform quantitative analysis.

M.Sc. Chemistry

CHE3L08 & CHE4L11 – Organic Chemistry Practicals– III & IV

At the end of this course, a student will have developed ability to:

CO1	Identify various food colours.
CO2	Determine the purity of organic compounds by chromatographic methods.
CO3	Understand common methods of extraction of natural products.
CO4	Analyse organic compounds by quantitative methods.
CO5	Apply the principle of colourimetry to organic compounds.