MASTER OF SCIENCE(CHEMISTRY)

M.SC. CHEMISTRY

PROGRAMME OUTCOMES

PO1: Understand fundamental principles and advanced concepts of organic, inorganic and physical chemistry.

PO2: Evaluate the reaction mechanism and structure of transition metal complexes.

PO3: Study quantum mechanics, thermodynamics and electrochemistry.

PO4: Analyze the structure, chemical bonding and stereochemistry of organic molecules.

PO5: Understand the various instrumental techniques for the structural analysis of compounds.

PO6: Interpret analytical data for structure elucidation obtained using NMR, IR, UV and Mass spectroscopy.

PO7: Perform the thermodynamic and surface studies of the liquid mixtures.

PO8: Understand nuclear, radio analytical and corrosion technology.

PO9: Study the bioorganic, bioinorganic and heterocyclic chemistry along with their applications.

PO10: Acquire knowledge of organometallics, solid state chemistry, photochemistry, polymer chemistry and natural products isolation.

PO11: Learn about the potential uses of analytical chemistry, medicinal chemistry and green chemistry.

PO12: Grasp the mechanism of different types of organic and inorganic reactions.

PO13: Carry out experiments in the area of organic analysis, estimation, separation, synthesis, inorganic semi micro analysis, preparation, conduct metric, potentiometric and pH metric analysis.

PO14: Develop skills to handle modern analytical and spectroscopic instruments.

PO15: Evaluate results obtained, observations and conclusion of experiments.

PO16: Formulate ideas, scientific writing and authentic reporting, effective presentation and communication skills.

PO17: Outline research problem related to research area of interest and planning of methodology for execution.

PO18: Review scientific literature and findings in systematic manner and processing of information obtained to understand scope for novelty.

PO19: Design novel synthetic routes using a retrosynthetic approach for development of elegant, economic and eco-friendly schemes.

PO20: Demonstrate importance of industrial applications of organic chemistry in various fields.

PO21: Have worldwide level research opportunities to pursue Ph.D. programme.

PO22: Demonstrate vast job opportunities in central and state government organizations.

PO23: Demonstrate ability for collaborative research and scientific communication through projects and skill enhancement courses.

PO24: Apply green chemistry approach towards planning and execution of research in frontier areas of chemical sciences.

PO25: Enhance the scientific tamper among the students so as to develop a research culture and implementation of policies to tackle burning issues at global and local level.

MASTER OF SCIENCE(CHEMISTRY)

M.SC. CHEMISTRY

1st SEMESTER

MAJOR
• Coordination and Crystal Chemistry • Quantum, Thermodynamics and Electrochemistry • Organic Bonding, Reactions and Stereochemistry

Name of the Course- Coordination and Crystal Chemistry
Course Code- 24CHE201DS01

Course Outcomes-

CO1: Have a firm foundation in coordination chemistry.
CO2: Understand metal-ligand bonding using molecular orbital diagrams.
CO3:Explore the bonding in transition metal complexes and elucidates concepts such as crystal field theory, ligand field theory, and molecular orbital theory.
CO4: Describe various thermodynamic aspects of coordination complexes.
CO5: Introduce mechanism of ligand substitution in transition metal complexes.
CO6: Get the knowledge of redox chemistry of coordination complexes.
CO7:Understand the structures and properties of isopoly/heteropoly acids and salts.
CO8: Explain crystal structures of selected binary and ternary compounds.

Name of the Course- Quantum, Thermodynamics and Electrochemistry
Course Code- 24CHE201DS02

Course Outcomes-

CO1: Understand the concept of quantum mechanics.
CO2: Solve the Schrodinger equation for simple systems like rigid rotator, simple harmonic oscillator, hydrogen atom, particle in a box, etc.
CO3: Understand the concept of different laws of thermodynamics.
CO4: Study thermodynamics of dilute solutions-phase rule and its applications.
CO5: Study the kinetics of complex reactions.

CO6: Study the kinetics of chain reactions and enzymatic reactions.
CO7: Discuss Debye-Huckel theory of ion-ion interaction and activity coefficient, its applicability, limitations and its modification for finite-sized ions, the effect of ion-solvent interaction on activity coefficient.
CO8: Derive the DHO equation, its applicability and limitations, pair-wise association of ions (Bjerrum treatment) and its modifications for ion-pair formation.

Name of the Course- Organic Bonding, Reactions and Stereochemistry
Course Code -24CHE201DS03

Course Outcomes-
CO1: Explain the nature of bonding in organic molecules.
CO2: Develop an understanding of chirality, stereo centers, and the distinction between enantiomers and diastereomers.
CO3: Learn about the Cram's rule and Prelog's rule.
CO4: Know about host guest chemistry and supramolecular complexes.
CO5: Understand the concept of chiral molecules and asymmetric synthesis.
CO6: Comparedifferent reaction mechanisms and reaction intermediates.
CO7: Understand different types of elimination and addition reactions.
CO8: Understand effects of substrate structures, attacking base, leaving group and medium on reactivity.

MASTER OF SCIENCE(CHEMISTRY)

M.SC. CHEMISTRY

2nd SEMESTER

MAJOR
• Inorganic Spectroscopy and Advanced Inorganic Chemistry • Physical Spectroscopy and Advanced Physical Chemistry • Organic Spectroscopy and Advanced Organic Chemistry

Name of the Course- Inorganic Spectroscopy and Advanced Inorganic Chemistry
Course Code- 24CHE202DS01

Course Outcomes-

CO1: Learn about the selection rules for electron absorption spectroscopy.
CO2: Apply NMR techniques in the characterization of inorganic compounds.
CO3: Understand the structure and bonding of various types of clusters.
CO4: Know about the mingo's rule and wade's rule.
CO5: Have the basic understanding of the electronic spectra of metal complexes.
CO6: Explain the colour of transition metal complexes.
CO7: Understand the elementary theory of magneto-chemistry.
CO8: Explore the application of magneto-chemistry in structure determination.

Name of the Course Physical Spectroscopy and Advanced Physical Chemistry
Course Code- 24CHE202DS02

Course Outcomes-

CO1: Learn about point symmetry groups for various molecules.
CO2: Understand The Great Orthogonality theorem and its importance.
CO3: Learn the basic principles of different types of spectroscopy.
CO4: Understand and use basic rotational, vibrational and electronic spectroscopy concepts to interpret spectra.
CO5: Know about the fundamentals of photochemistry.

CO6: Understand the formation and decay of excimer and exciplex.
CO7: Discuss applications of Lasers in photochemical kinetics.
CO8: Understand the potentiometric methods and ion-selective electrodes.

Name of the Course- Organic Spectroscopy and Advanced Organic Chemistry
Course Code- 24CHE202DS03

Course Outcomes-

CO1: Gain insight into the basic principles of UV, IR and NMR spectroscopic techniques.
CO2: Solve the problems based on UV,IR and NMR Spectroscopy to interpret structure.
CO3: Identify and differentiate the aromatic and aliphatic nucleophilic substitution reactions.
CO4: Learn about the different reaction mechanisms of substitution reactions.
CO5: Compare the aliphatic and aromatic electrophilic substitution reactions.
CO6: Understandreactions of carbonyl compounds with different reagents.
CO7: Learn about the classification of pericyclic reactions.
CO8: Understand and apply the Woodward-Hoffmann rules governing pericyclic reactions.