DEPARTMENT OF CHEMISTRY
M. Sc. Chemistry (Integrated 5 - Year Programme)

19ICHT14 - Inorganic, Organic and Physical Chemistry – I
Course Outcomes:
CO1 Students will know the important basics of chemistry
CO2 Students will start the basic building of chemistry principles in inorganic, organic and physical chemistry.

19ICHT24 - Inorganic, Organic and Physical Chemistry – II
Course Outcomes:
CO1 Students will know the important basics of chemistry
CO2 Students will start the basic building of chemistry principles in inorganic, organic and physical chemistry.

19ICHP25: Practical – I: Volumetric Analysis
Course Outcomes:
CO1 Students will know the important basics of practical chemistry
CO2 Students will understand the principles involved in practical physical chemistry

19ICHT33 - Inorganic, Organic and Physical Chemistry – III
Course Outcomes:
CO1 Students will understand the important basics of chemical bonding
CO2 Students will gain knowledge in various organic functional groups
CO3 Students will appreciate the fundamentals of electrochemistry

19ICHP34: Practical II - Inorganic Qualitative Analysis
Course Outcomes:
CO1 Students will able to perform inorganic analysis systematically and independently

19ICHT43 - Inorganic, Organic and Physical Chemistry – IV
Course Outcomes:
CO1 Students will know the important basics of metalurgy
CO2 Students will understand various organic compounds and stereochemistry
CO3 Students will appreciate the fundamentals of physical chemistry particularly Thermodynamics

19ICHP44: Practical III - Preparation and Analysis of Organic Compounds
Course Outcomes:
CO1 Students will able to perform single step preparations independently

19ICHT45 - Analytical Chemistry
Course Outcomes:
CO1 Students will know the advanced basics of analytical chemistry

19ICHT51 - Organic Chemistry – I
Course Outcomes:
CO1 Students will know the important basics conformational analysis

19ICHT52 - Inorganic Chemistry – I
Course Outcomes:
CO1 Students will know the important basics of chemical bonding
CO2 Students will understand various Inorganic compounds
CO3 Students will appreciate the fundamentals of nuclear chemistry

19ICHT53 - Physical Chemistry – I
Course Outcomes:
CO1 Students will know the advanced basics of electrochemistry
CO2 Students will appreciate the fundamentals of physical chemistry like phase equilibria and molecular structure.

19ICHP55 - Practical IV - Gravimetric Analysis
Course Outcomes:
CO1 Students will understand the gravimetric analysis of various anions and cations

19 ICHT61 - Organic Chemistry – II
Course Outcomes:
CO1 Students will know the basics of natural products
CO2 Students will appreciate the fundamentals of organic spectroscopy and molecular structure

19ICHT62 - Inorganic Chemistry – II
Course Outcomes:
CO1 Students will know the basics of coordination compounds
CO2 Students will appreciate the fundamentals of nanophase materials
CO3 Students are enable to understand the chemistry of environment

19ICHT63 - Physical Chemistry – II
Course Outcomes:
CO1 Students will know the basics of spectroscopy and quantum Chemistry
CO2 Students will appreciate the fundamentals of physical chemistry like solid state and Polymers

19ICHT64 - Pharmaceutical Chemistry
Course Outcomes:
CO1 Students will know the advanced basics of pharmaceutical chemistry
CO2 Students will appreciate the fundamentals of drugs, vitamin, hormone and enzymes

19ICHP65: Practical V - Physical Chemistry Practicals
Course outcome:
CO1 Acquire the necessary practical skills to perform physical chemistry practicals.
CO2 Gain expertise in the instrumental analysis.
CO3 Systematically evaluate calculations involving in physical chemistry
CO4 Apply the gained knowledge in industries

19ICHT71: Organic Reaction Mechanisms
Course Outcomes:
At the end of the course, the students will be able to
CO1: Understand various types of reaction mechanisms involved in synthetic organic transformation.
CO2: Appreciate various types of reaction mechanisms involved in synthetic organic transformation
CO3: Analyse basic stereochemistry concepts in a proper perspective.
CO4: Evaluate the principles of Photochemistry

CO5: Apply the concepts of asymmetric synthesis

19 ICHT72: Coordination Chemistry and Inorganic Reaction Mechanisms
Course Outcomes:
At the end of the course, the students will be able to
CO1: Understand the basics of coordination Chemistry.
CO2: Appreciate various theories of inorganic complexes
CO3: Evaluate inorganic reaction mechanisms
CO4: Analyse substitution reaction mechanisms and electron transfers
CO5: Apply the concepts of energy transfer to photovoltaics.

19ICHT73: Chemical Thermodynamics, Photochemistry and Group Theory
Course Outcomes:
At the end of the course, the students will be able to
CO1: Understand basics of Thermodynamics
CO2: Evaluate basic reaction mechanisms involved in Photochemistry
CO3: Understand the fundamentals of statistical thermodynamics
CO4: Appreciate the fundamentals of photochemistry and radiation Chemistry
CO5: Apply the principles of Group theory

19ICHT74: Organic Chemistry Practical – I
Course Outcomes:
At the end of the course, the students will be able to
CO1 Acquire basic laboratory skills required to carry out organic reactions
CO2 Independently perform two step organic preparations
CO3 Analyse the mechanisms of reactions.
CO4 Gain the expertise to apply it to specific research problems.

19ICHT75: Physical Chemistry Practical – I
Course Outcomes:
At the end of the course, the students will be able to
CO1 acquire practical knowledge on important equations in thermodynamics
CO2 acquire the practical knowledge of understanding important equations in distribution experiments
CO3 perform conductometric experiments
CO4 acquire the practical knowledge of understanding important equations in distribution experiments
CO5 evaluate their knowledge to analyze analytical problems.

19ICHT81: Organic Photochemistry and Molecular Rearrangements
Course Outcomes:
At the end of the course, the students will be able to
CO1 Understand the theoretical basis and mechanisms underlying additions and elimination reactions.
CO2 Appreciate reaction mechanisms involved in rearrangements
CO3 Evaluate the chemistry of dyes and their synthetic utilities.
CO4 Differentiate the various types of heterocyclic molecules.
CO5 Understand the relationship between the structure and function of various classes of natural compounds

19ICHT82: Solid State and Organometallic Chemistry
Course Outcomes:
CO1 Correlate the structure of solids with their applications
CO2 Understand the various classes of polymeric inorganic compounds
CO3 Appreciate the classification and factors influencing phase transitions
CO4 Evaluate the structure and applications of organometallic compounds

19ICHT83: Chemical Kinetics and Quantum Mechanics
Course Outcomes:
CO1 Understand the theoretical basis underlying the kinetics of different chemical reactions
CO2 Appreciate the theories of molecular dynamics
CO3 Comprehend the quantum mechanics of simple systems
CO4 Evaluate the applications of quantum chemistry

19ICHP84: Organic Chemistry Practical – II
Course Outcomes:
CO1 acquire the necessary practical skills to independently analyse organic compounds.
CO2 gain expertise in the separation of two component mixtures of organic compounds.
CO3 systematically evaluate organic compounds
CO4 apply the knowledge in industries.

19ICHP85: Inorganic Chemistry Practical – I
Course Outcomes:
CO1 acquire the necessary practical skills to independently analyse Inorganic compounds.
CO2 gain expertise in the systematic analysis if inorganic compounds.
CO3 apply the knowledge in industries

19ICHT91: Synthetic Organic Chemistry
Course Outcomes:
CO1 understand the concepts of retrosynthetic analysis
CO2 learn about various organic reagents used in synthetic organic chemistry
CO3 evaluate the various organic reactions and its mechanisms
CO4 understand about selective synthetic methods
CO5 gain knowledge about polymers

19ICHT92: Green Chemistry, Computational Chemistry, Drug Design and Spectroscopy
Course Outcomes:
CO1 correlate the UV absorption and molecular structure
CO2 understand IR stretching frequencies of organic compounds with their functional groups.
CO3 interpret the 1H and 13C NMR spectra of organic compounds
CO4 learn the principles of multidimensional NMR
CO5 analyze the unknown compounds by spectroscopy.

19ICHT93: Spectral and Analytical Techniques
Course Outcomes:
CO1 evaluate the spectral and magnetic properties of complexes.
CO2 analyse the spectral techniques like PES and ESR
CO3 understand the theory of NQR
CO4 appreciate the diffraction methods

CO5 gain knowledge on ORD and CD

19ICHT94: Electrochemistry and Spectroscopy
Course Outcomes:
CO1 understand the theories of strong electrolytes.
CO2 acquire the knowledge about various electro analytical techniques
CO3 solve the numerical and analytical problems related to electrochemistry and surface chemistry.
CO4 appreciate the theories of molecular spectroscopies like UV and IR.

19ICHP95: Inorganic Chemistry Practical – II
Course Outcomes:
CO1 acquire the necessary practical skills to independently determine inorganic ions.
CO2 gain expertise in the systematic analysis of inorganic compounds.
CO3 apply the knowledge in industries.

19ICHP96: Physical Chemistry Practical – II
Course Outcomes:
CO1 understand the necessary practical skills in instrumental analysis.
CO2 gain expertise in systematic calculations and graphical representation.
CO3 apply the knowledge in industries

19ICHT101: Nuclear, Bioinorganic and Materials Chemistry
Course Outcomes:
CO1 understand about radioactivity and its application for peaceful purposes
CO2 get familiarise with chemical reactions in physiological systems
CO3 understand lanthanides and actinides
CO4 appreciate bioinorganic chemistry
CO5 learn preparative techniques in inorganic chemistry

19ICHT102: Nanomaterials, Macromolecular and Surface Chemistry
Course Outcomes:
CO1 know various methods of preparations of nanomaterial and its characterization using various microscopic techniques.
CO2 evaluate the principle and applications of industrially important materials
CO3 understand concepts of polymers, mechanism, kinetics and applications
CO4 understand about polymer chemistry
CO5 understand the basic surface chemistry

19ICHP103: Organic Chemistry Practical – III
Course Outcomes:
CO1 examine quantitative analysis of organic compounds
CO2 understand the quantitative methods
CO3 perform the estimation of phenol
CO4 analyse glucose and ketones
CO5 apply the knowledge in industries

19ICHP104: Inorganic Chemistry Practical – III
Course Outcomes:
CO1 understand the colorimetric estimations of metal ions
CO2 gain knowledge on the preparation of complexes

CO3 evaluate the water quality that will be useful in environmental aspect
CO4 understand the complexometric titrations
CO5 calculate the hardness of water

19ICHP105: Physical Chemistry Practical – III
Course outcome:
CO1 acquire the necessary practical skills to perform physical chemistry practicals.
CO2 gain expertise in the instrumental analysis.
CO3 evaluate calculations involving in physical chemistry
CO4 apply the gained knowledge in industries

19ICHPJ106: Project Work / Inplant training
Course Outcomes:
CO1 acquire the practical knowledge of understanding research problems.
CO2 gain knowledge basic principles of various components of research
CO3 apply the principles of chemistry in various fields

19ICHE15A: ELECTIVE I: APPLIED CHEMISTRY
Course Outcomes:
CO1: understand the concept of water technology
CO2: understand the mechanism of Corrosion
CO3: understand about fuels and cementing materials

19ICHE15B: Elective 2: Industrial Chemistry
Course Outcomes:
CO1: categorize fuels and energysources
CO2: describe the types of polymerization methods as well as preparation and uses of few well-known polymers
CO3: describe the composition and manufacturing process of cements andfertilizers
CO4: demonstrate the manufacturing process and applications of iron, steel, alloys, glass, ceramics andrefractories

19ICHE35A: Elective 3: Chemistry for Mankind
Course Outcomes:
CO1 Describe the chemistry ofcarbohydrates
CO2 Determine the structures of selected alkaloids andterpenes
CO3 Classify protein and demonstrate the primary and secondary structure ofproteins

19ICHE35B: Elective 4: Food Chemistry
Course Outcomes:
CO1 Describe the food laws
CO2 Discuss the general composition and quality of food
CO3 Determine the toxins and adulterants of food
CO4 Describe the food additives

19ICHE54A: Elective 5: Clinical Chemistry
Course outcome:
CO1: the student able to understand the concepts of clinical chemistry

19ICHE54B: Elective 6: Agricultural Chemistry

Course Outcomes:

CO1: describe the basics ofsoil

CO2: classify and explain plant nutrients andfertiliizers

CO3: predict the mechanism of pesticides and herbicides

CO4: describe the structure and functions of plant growthregulators

19ICHE74A: Elective 7: Selective Materials, Techniques and Environmental Chemistry

Course Outcomes:

CO1 Demonstrate knowledge of materials and chemical and biochemical principles of fundamental environmentalprocessesinair,water,andsoil.

CO2 Developanunderstandingofchemicalsandtheireffectsontheenvironment.

CO3 Develop an understanding of some basic principles of chemistry and apply these principlestocurrentenvironmentalissues

CO4 Acquire broad knowledge of the field of environmental toxicology and chemistry including basicprinciples, targetorgantoxicity and the toxicity of aselect group of chemicalcompounds.

19ICHE74B: Elective 8: Applied Chemistry

Course Outcomes:

CO1 Demonstrate knowledge of polymers

CO2 Developanunderstandingofchemicalsandtheireffectsontheenvironment.

CO3 Develop an understanding of some basic principles of Photochemistryapply these principlestocurrentenvironmental issues

CO4 Acquire broad knowledge of the field of fuel analysis

19ICHE94A: Elective 9: Scientific Research Methodology

Course Outcomes:

CO1: will be able to understand the basics of research

CO2: will appreciate the tools of research

CO3: will get exposure to research problems

19ICHE94B: Elective 10: Organic Chemical Technology

Course Outcomes:

CO1: will be able to understand the basics of chemical technology

CO2: will appreciate principle of chemical engineering

CO3: will get idea about applications of chemistry in industries

DEPARTMENT OF CHEMISTRY
M.Sc. Chemistry (Two-Year) Programme

19CHEC101: Organic Reaction Mechanisms

Course Outcomes:

CO1: Understand various types of reaction mechanisms involved in synthetic organic transformation

CO2: Appreciate various types of reaction mechanisms involved in synthetic organic transformation

CO3: Analyse basic stereochemistry concepts in a proper perspective

CO4: Evaluate the principles of Photochemistry

CO5: Apply the concepts of asymmetric synthesis

19CHEC102: Coordination Chemistry and Inorganic Reaction Mechanisms
Course Outcomes:
CO1: Understand the basics of coordination Chemistry
CO2: Appreciate various theories of inorganic complexes
CO3: Evaluate inorganic reaction mechanisms
CO4: Analyse substitution reaction mechanisms and electron transfers
CO5: Apply the concepts of energy transfer to photovoltaics

19CHEC103: Chemical Thermodynamics, Photochemistry and Group Theory
Course Outcomes:
CO1: Understand basics of Thermodynamics
CO2: Evaluate basic reaction mechanisms involved in Photochemistry
CO3: Understand the fundamentals of statistical thermodynamics
CO4: Appreciate the fundamentals of photochemistry and radiation Chemistry
CO5: Apply the principles of Group theory

19CHEP104: Organic Chemistry Practical – I
Course Outcomes:
CO1: Acquire basic laboratory skills required to carry out organic reactions
CO2: Independently perform two step organic preparations
CO3: Analyse the mechanisms of reactions
CO4: Gain the expertise to apply it to specific research problems

19CHEP105: Physical Chemistry Practical – I
Course Outcomes:
CO1: Acquire practical knowledge on important equations in thermodynamics
CO2: Acquire the practical knowledge of understanding important equations in distribution experiments
CO3: Perform conductometric experiments
CO4: Acquire the practical knowledge of understanding important equations in distribution experiments
CO5: Evaluate their knowledge to analyze the analytical problems.

19CHEC201: Organic Photochemistry and Molecular Rearrangements
Course Outcomes:
CO1: Understand the theoretical basis and mechanisms underlying additions and elimination reactions
CO2: Appreciate reaction mechanisms involved in rearrangements
CO3: Evaluate the chemistry of dyes and their synthetic utilities
CO4: Differentiate the various types of heterocyclic molecules
CO5: Understand the relationship between the structure and function of various classes of natural compounds

19CHEC202: Solid State and Organometallic Chemistry
Course Outcomes:
CO1: Correlate the structure of solids with their applications
CO2: Understand the various classes of polymeric inorganic compounds
CO3: Appreciate the classification and factors influencing phase transitions
CO4: Evaluate the structure and applications of organometallic compounds

19CHEC203: Chemical Kinetics and Quantum Mechanics
Course Outcomes:
CO1: Understand the theoretical basis underlying the kinetics of different chemical reactions
CO2: Appreciate the theories of molecular dynamics
CO3: Comprehend the quantum mechanics of simple systems
CO4: Evaluate the applications of quantum chemistry

19CHEP204: Organic Chemistry Practical – II
Course Outcomes:
CO1: Acquire the necessary practical skills to independently analyse organic compounds
CO2: Gain expertise in the separation of two component mixtures of organic compounds
CO3: Systematically evaluate organic compounds
CO4: Apply the knowledge in industries

19CHEP205: Inorganic Chemistry Practical – I
Course Outcomes:
CO1: Acquire the necessary practical skills to independently analyze Inorganic compounds
CO2: Gain expertise in the systematic analysis if inorganic compounds
CO3: Apply the knowledge in industries

19CHEC301: Synthetic Organic Chemistry
Course Outcomes:
CO1: Understand the concepts of retrosynthetic analysis
CO2: Learn about various organic reagents used in synthetic organic chemistry
CO3: Evaluate the various organic reactions and its mechanisms
CO4: Understand about selective synthetic methods
CO5: Gain knowledge about polymers

19CHEC302: Green Chemistry, Computational Chemistry, Drug Design and Spectroscopy
Course Outcomes:
CO1: Correlate the UV absorption and molecular structure
CO2: Understand IR stretching frequencies of organic compounds with their functional groups
CO3: Interpret the 1H as well as 13C NMR spectra of organic compounds
CO4: Learn the principles of multidimensional NMR
CO5: Analyze the unknown compounds by spectroscopy
19CHEC303: Spectral and Analytical Techniques
Course Outcomes:
CO1: Evaluate the spectral and magnetic properties of complexes
CO2: Analyse the spectral techniques like PES and ESR
CO3: Understand the theory of NQR
CO4: Appreciate the diffraction methods
CO5: Gain knowledge on ORD and CD

19CHEC304: Electrochemistry and Spectroscopy
Course Outcomes:
CO1: Understand the theories of strong electrolytes
CO2: Acquire the knowledge about various electro analytical techniques
CO3: Solve the numerical and analytical problems related to electrochemistry and surface chemistry
CO4: Appreciate the theories of molecular spectroscopies like UV and IR

19CHEP305: Inorganic Chemistry Practical – II
Course Outcomes:
CO1: Acquire the necessary practical skills to independently determine inorganic ions
CO2: Gain expertise in the systematic analysis if inorganic compounds
CO3: Apply the knowledge in industries.

19CHEP306: Physical Chemistry Practical – II
Course Outcomes:
CO1: Understand the necessary practical skills in instrumental analysis
CO2: Gain expertise in the systematic calculations and graphical representation
CO3: Apply the knowledge in industries

19CHEC401: Nuclear, Bioinorganic and Materials Chemistry
Course Outcomes:
CO1: get a clear understanding about radioactivity and its application for peaceful purposes
CO2: get familiar with chemical reactions in physiological systems
CO3: understand lanthanides and actinides
CO4: appreciate bioinorganic chemistry
CO5: learn preparative techniques in inorganic chemistry

19CHEC402: Nano Materials, Macromolecular and Surface chemistry
Course Outcomes:
CO1: know various methods of preparations of nanomaterial and its characterization using various microscopic techniques.
CO2: evaluate the principle and applications of industrially important materials
CO3: understand concepts of polymers, mechanism, kinetics and applications
CO4: understand about polymer chemistry
CO5: understand the basic surface chemistry

19CHEP403: Organic Chemistry Practical – III
Course Outcomes:
CO1: critically examine quantitative analysis of organic compounds
CO2: understand the quantitative methods
CO3: perform the estimation of phenol
CO4: analyze glucose and ketones
CO5: apply the knowledge in industries

19CHEP404: Inorganic Chemistry Practical – III
Course Outcomes:
CO1: understand the colorimetric estimations of metal ions
CO2: gain knowledge on the preparation of complexes
CO3: evaluate the water quality that will be useful in environmental aspect
CO4: understand the complexometric titrations
CO5: calculate the hardness of water

19CHEP405: Physical Chemistry Practical – III
Course Outcomes:
CO1: acquire the necessary practical skills to perform physical chemistry practicals

CO2: gain expertise in the instrumental analysis
CO3: systematically evaluate calculations involving in physical chemistry
CO4: apply the gained knowledge in industries

19CHEPJ406: Project (Dissertation and Viva-Voce) / In plant training
Course Outcomes:
CO1: acquire the practical knowledge of understanding research problems
CO2: gain knowledge basic principles of various components of research
CO3: apply the principles of chemistry in various fields

19CHEE206-1: Selective Materials, Techniques and Environmental Chemistry
Course Outcomes:
CO1: Demonstrate knowledge of materials and chemical and biochemical principles of fundamental environmental processes in air, water, and soil
CO2: Developanunderstanding of chemicalsand theireffectson theenvironment
CO3: Develop an understanding of some basic principles of chemistry and apply these principles to current environmental issues
CO4: Acquire broad knowledge of the field of environmental toxicology and chemistry Including basic principles, target organ toxicity and the toxicity of a select group of chemical compounds

19CHEE206-2: Applied Chemistry
Course Outcomes:
CO1: Demonstrate knowledge of polymers
CO2: Developanunderstanding of chemicalsand theireffectson the environment.
CO3: Develop an understanding of some basic principles of photochemistry and apply these principles to current environmental issues
CO4: Acquire broad knowledge of the field of fuel analysis

19CHEE307-1: Scientific Research Methodology
Course Outcomes:
CO1: will be able to understand the basics of research
CO2: will appreciate the tools of research
CO3: will get exposure to research problems

19CHEE307-2: Organic Chemical Technology
Course Outcomes:
CO1: will be able to understand the basics of chemical technology
CO2: will appreciate principle of chemical engineering
CO3: will get idea about applications of chemistry in industries