M.Sc ORGANIC CHEMISTRY

Programme Outcomes

PO1: Have strong foundations in the basic concepts of Organic Chemistry

PO2: Have good employment opportunities in pharmaceutical labs

PO3: Will get Jobs in various Chemical industries related to Pharma companies, polymer companies, pollution control boards etc.

PO4: Have excellent opportunities to pursue research

PO5: Can build their careers as Entrepreneurs by establishing “Start ups”.

PO6: Have an opportunity to pursue career teaching in chemistry at various levels.

SEMESTER – I

Course	Outcomes After completion of these courses a student will gain knowledge in
P- I General Chemistry	CO1: Learn and understand the selection rules and criteria for molecules to exhibit rotational and IR spectroscopy.
	CO2: Understand the Classical and quantum mechanical theories of Raman spectroscopy and basic concepts of electronic spectroscopy.
	CO3: Learn spectroscopic methods based on magnetic resonance principles.
	CO4: Learn basics of group theory and its application in chemistry.
	CO5: Understand the basic concepts of FORTRAN programming and its applications
P-II, Inorganic Chemistry	CO 1: Acquire the knowledge on applications of VSEPR, Valence Bond and Molecular orbital theories in explaining the structures of simple molecules and role of p and d orbitals in pi bonding.
	CO 2: Understand the concept of MO theory to square planar (PtCl4 2-) and Octahedral complexes (CoF6 3- , Co (NH3)6 3+). And Walsh diagram for H2O molecule
	CO 3: Apply the knowledge and understanding of Understand the Orgel and Tanabe-Sugano diagrams for d1 –d 9 octahedral and tetrahedral transition metal complexes of 3d series to newly prepared metal complexes
	CO 4: Develop interest in the areas of magnetic properties of transition and inner transition metal complexes – spin and orbital moments – quenching of orbital momentum by crystal fields in complexes.
	CO5: To understand the concept of Term symbols and electronic spectra and Magnetic properties of complexes
P-III, Organic Chemistry	CO1: Acquire the knowledge of aliphatic nucleophilic, aliphatic electrophilic, stereochemistry and conformational analysis, chemistry of heterocyclic compounds and chemistry of natural products
	CO2: Understand aliphatic nucleophilic, aliphatic electrophilic, stereochemistry and conformational analysis, chemistry of heterocyclic compounds and chemistry of natural products
	CO3: Apply the knowledge and understanding of aliphatic nucleophilic, aliphatic electrophilic, stereochemistry and conformational analysis.
	CO4: Develop interest in the areas of aliphatic nucleophilic, aliphatic electrophilic, stereochemistry and conformational analysis, chemistry of heterocyclic compounds and chemistry of natural products
	CO-5 Applying chemistry of heterocyclic compounds and chemistry of natural products to new situations
P-IV, Physical Chemistry	CO1: Explain the basic concepts of Thermodynamics and its applications
	CO2: Understand the concepts of thermodynamics of solutions.
	CO3: To understand the principle of micellisation.
	CO4: Understand the various kinetic theories, measurements of reaction rates.
	CO5: Learn experimental techniques for measuring the kinetics of fast reactions and homogenous catalyzed reactions

SEMESTER – II

Course	Outcomes After completion of these courses a student will gain knowledge in
P- I General Chemistry	CO 1: Students will have the idea of wave function and understand the uncertainty relations
	CO2: Students will learn how to solve the Schrödinger Eq. rigorously for model systems
	CO 3: Students will be able to understand and be able to explain the origin of quantized energy levels
	CO 4: Students will learn to apply concepts from physics and methods from mathematics to derive and understand the properties of chemical systems that arise from quantum mechanical models for the structure of atoms and molecules.
	CO 5: They will be able to understand and explain the differences between classical and quantum mechanics
P-II, Inorganic Chemistry	CO1: To give a basic and updated knowledge for the students on metal clusters, Organometallic chemistry of transition metals
	CO 2: To discuss the preparation and structures of and functional aspects of metal clusters
	CO3: Design new coordination compounds based on a fundamental understanding of their electronic properties
	CO4: To discuss basics principles of reaction mechanism in metal complexes
	CO5: To understand the concept of Term symbols and Electronic spectra and Magnetic properties of complexes
P-III, Organic Chemistry	CO1: Acquire the knowledge of aromaticity, aromatic nucleophilic substitution, reactive intermediates and name reactions, molecular rearrangements, spectroscopy, alkaloids, peptides, proteins and nucleic acids
	CO2: Understand aromaticity, aromatic nucleophilic substitution, reactive intermediates and name reactions, molecular rearrangements, spectroscopy, alkaloids, peptides, proteins and nucleic acids
	CO3: Apply the knowledge and understanding of aromaticity, aromatic nucleophilic substitution, reactive intermediates and name reactions, molecular rearrangements, spectroscopy, alkaloids, peptides, proteins and nucleic acids to new situations
	CO4: Develop interest in the areas of aromaticity, aromatic nucleophilic substitution, reactive intermediates
	CO-5 Applying name reactions, molecular rearrangements, spectroscopy, alkaloids, peptides, proteins and nucleic acids in synthetic methods.
P-IV, Physical Chemistry	CO1: Explain the basic concepts of Crystallography.
	CO2: Understand the types of polymers and analyze various physical properties of polymers.
	CO3: understand the concepts of electrochemistry and theories like Debye Huckel theory
	CO4: Understand the basic concept and theories of electrode-electrolyte interface.
	CO5: Learn Principles of photochemistry and various photochemical reactions.

SEMESTER – III

Course	Outcomes After completion of these courses a student will gain knowledge in
P- I, Organic reaction mechanism, pericyclic and photochemistry	CO 1: Acquire the knowledge of reactions and mechanisms of Substitution, Elimination, Addition, Pericyclic and Organic Photochemistry
	CO 2: Understand reactions and mechanisms of Substitution, Elimination, Addition, Pericyclic and Organic Photochemistry
	CO 3: Apply the knowledge and understanding of new situations reactions and mechanisms of Substitution, Elimination, Addition, Pericyclic and Organic Photochemistry
	CO 4: Develop interest in the areas of reactions and mechanisms of Substitution, Elimination, Additions.
	CO-5 Develop interest in the areas of reactions and mechanisms of Pericyclic and Organic Photochemistry
P-II, Organic Spectroscopy	CO 1: Acquire the knowledge of UV, Infrared, NMR and Mass Spectrocopic techniques and structural elucidation of organic compounds using the data obtained
	CO 2: Understand UV, Infrared, NMR and Mass Spectrocopic techniques and structural elucidation of organic compounds using the data obtained
	CO 3: Apply the knowledge and understanding of new situations UV, Infrared, NMR and Mass Spectrocopic techniques and structural elucidation of organic compounds using the data obtained
	CO 4: Develop interest in the areas of UV, Infrared, NMR and Mass Spectrocopic techniques and structural elucidation of organic compounds using the data obtained
	CO-5 Finding out the structures organic compounds using all the spectral data
P-III, Organic Synthesis	CO 1: Acquire the knowledge of formation of C-C and C=C bonds, organic polymers, unactivated C-H bonds, Asymmetric Synthesis
	CO 2: Understand formation of C-C and C=C bonds, organic polymers, unactivated C-H bonds, Asymmetric Synthesis
	CO 3: Apply the knowledge and understanding of formation of C-C and C=C bonds, organic polymers, unactivated C-H bonds, Asymmetric Synthesis to new situations
	CO 4: Develop interest in the areas of formation of C-C and C=C bonds, organic polymers, unactivated C-H bonds.
	CO-5 Develop interest in the areas of Asymmetric Synthesis
P-IV, Chemistry of natural products	CO 1: Acquire the knowledge of isolation, structural elucidation, stereochemistry, synthesis and biological properties of selected antibiotics, terpenes, alkaloids, flavonoids and natural pigments
	CO 2: Understand isolation, structural elucidation, stereochemistry, synthesis and biological properties of selected antibiotics, terpenes, alkaloids, flavonoids and natural pigments
	CO 3: Apply the knowledge and understanding of new situations isolation, structural elucidation, stereochemistry, synthesis and biological properties of selected antibiotics, terpenes, alkaloids, flavonoids and natural pigments
	CO 4: Develop interest in the areas of isolation, structural elucidation, stereochemistry, synthesis and biological properties of selected antibiotics,

	terpenes, alkaloids, flavonoids and natural pigments
	CO-5 Understand structural elucidation, stereochemistry, synthesis and biological properties of selected antibiotics, terpenes, alkaloids, flavonoids and natural pigments

SEMESTER – IV

Course	Outcomes After completion of these courses a student will gain knowledge in
P- I, Organic reaction mechanism	CO-1 Acquire the knowledge of various modern synthetic methods, multicomponent reactions, oxidation, reduction and green chemistry related reactions
	CO-2 . Understand various modern synthetic methods, multicomponent reactions, oxidation, reduction and green chemistry related reactions
	CO-3 . Apply the knowledge and understanding of new situations various modern synthetic methods
	CO-4 Develop interest in the areas of various modern synthetic methods, multicomponent reactions, oxidation, reduction and green chemistry related reactions
	CO-5 Multicomponent reactions, oxidation, reduction and green chemistry related reactions
P-II, Organic Spectroscopy	CO-1 Applications of 13C NMR in heteronuclear couplings.
	CO-2 Understand 13C and Heteronuclear, 2D NMR and Instrumentation, ESR, ORD and CD spectroscopy and structural determination of natural products by spectroscopy
	CO-3 Assigning the structure of too complicated molecules with 2DNMR.
	CO-4 Finding out the configurations of molecules.
	CO-5 Finding out the structures of natural products by spectral methods.
P-III, Organic Synthesis	CO-1 Desingning different organic molecules.
	CO-2 Synthetic applications of organo boranes and organo silanes.
	CO-3 Apply the knowledge and understanding of new situations the principles of disconnection approach

	CO-4 Develop interest in the areas of the principles of disconnection approach, synthetic strategies for one group and two group disconnection, organoboranes and organosilanes
	CO-5 Applying synthetic strategies for one group and two group disconnection, organoboranes and organosilanes
P-IV, Chemistry of natural products	CO-1 Understanding basic consideration of drugs.
	CO-2 Drug designing , synthesis and their importance.
	CO-3 Apply the knowledge and understanding of new situations drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs, antineoplastic drugs, cardiovascular drugs, oral hypoglycaemic drugs, local anti-infective and antiviral drugs
	CO-4 Develop interest in the areas of drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs, antineoplastic drugs, cardiovascular drugs, oral hypoglycaemic drugs, local anti-infective and antiviral drugs
	CO-5 Understand drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs, antineoplastic drugs, cardiovascular drugs, oral hypoglycaemic drugs, local anti-infective and antiviral drugs