Course Outcomes: M.Sc., Organic Chemistry

Semester I:

S.NO	NAME OF SUBJECT	COURSE OUTCOMES
1	General Chemistry	**The Students will be able to** CO1: Learn and understand the selection rules and criteria for molecules to exhibit rotational and IRspectroscopy. 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..
2	Inorganic Chemistry	**The student will be able to** CO1: Acquiretheknowledgeon applications of VSEPR, Valence Bond and Molecular orbital theories in explaining thestructures of simple molecules and role of p and d orbitals in pi bonding. CO2: Understandthe concept of MO theory to square planar (PtCl4 2-) and Octahedral complexes (CoF6 3- , Co(NH3)6 3+).And Walsh diagram for H2O molecule CO3: Apply theknowledgeandunderstandingofUnderstand the Orgel and Tanabe-Sugano diagrams for d1 –d 9 octahedral and tetrahedral transition metal complexes of 3d series tonewly prepared metal complexes CO4: 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.
	Inorganic Chemistry (Practical)	**The student will be able to** CO1: To develop an insight into the preparation of inorganic complexes CO2: To understand the process of preparation of inorganic complexes CO3: To acquire skills in the preparation of inorganic complexes

3	Organic chemistry	**The student will be able to** CO1: Acquire the knowledge of aliphatic nucleophilic substitution, neighbouring group mechanism by O,N,S and non classical carbo cations. compounds and chemistry of natural products CO2: Understand aliphatic electrophilic substitution reactions. CO3 To know about stereochemistry and conformational analysis. CO4: Develop interest in the areas of chemistry of heterocyclic compounds CO5: To Learn the chemistry of natural products – terpenoids, steroids and concept of Lipids.
4	Organic chemistry (Practical)	**The student will be able to** CO1: To develop an insight into the preparation of organic compounds in various reactions CO2: To understand the process of preparation of organic through various reactions CO3: To acquire skills in the preparation of organic compounds, their separation, purification and identification.
5	Physical chemistry	**The student will be able to** 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.
6	Physical chemistry (Practical)	**The student will be able to** CO1: To maintain laboratory ethics, safety and cleanliness CO2: To Preparation and standardization of solutions CO3: To have hands-on experience/practical knowledge in performing Physical chemistry experiments CO4: To develop skills on handling instruments like conductometry and perform different types of acid-base titrations CO5: To plot accurate graphs of the desired scale for the calculations of Langmuir and Freundlich isotherms CO6: To Prepare the solution of the desired concentration and the desired volume in Cuprammonium cation.

Semester II:

S.NO	NAME OF SUBJECT	COURSE OUTCOMES
1	General chemistry	**The student will be able to** CO1 Students will have the idea of wave function and understand the uncertainty relations CO2 Students will learn how to solve the Schrodinger Eq. rigorously for model systems CO3 Students will be able to understand and be able to explain the origin of quantized energy levels CO4 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 CO5 They will be able to understand and explain the differences between classical and quantum mechanics
2	Inorganic Chemistry	**The student will be able to** CO1 To give a basic and updated knowledge for the students on metal clusters, Organometallic chemistry of transition metals CO2 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
	Inorganic Chemistry (Practical)	**The Students will be able to** CO1 To have hands-on experience/practical knowledge in Inorganic chemistry experiments CO2 To develop skills on estimations of analyte by volumetrically CO3 To determine analyte by Gravimetrically CO4 To study the photochemical reactions

3	Organic Chemistry	**The Students will be able to** CO1 Acquire the knowledge of aromaticity, aromatic nucleophilic substitution CO2 Understand reactive intermediate and name reactions, CO3 Apply the knowledge and understanding of molecular rearrangementsn of electron deficient carbon, Nitrogen and Oxygen CO4 Develop interest in the areas of spectroscopy-Principles o9f UV, IR,NMR and Mass spectroscopy. CO5: To gain knowledge about alkaloids, peptides, proteins and nucleic acids
	Organic Chemistry(Practical)	**The Students will be able to** CO1 To develop an insight into the identification of organic compounds by systematic analysis CO2 To understand the process of identification of organic compounds by systematic analysis CO3 To acquire skills in the identification of organic compounds by systematic analysis
4	Physical Chemistry	**The Students will be able to** 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
	Physical Chemistry (Practical)	**The Students will be able to** CO1 To have hands-on experience/practical knowledge in performing Physical chemistry experiments CO2 To develop skills on handling instruments like Potentiometry and perform different types of acid-base and redox titrations CO3 To determine specific rotations and percentage of to optically active substances by polarimetrically CO4 To study the stability of complex ion and stranded free energy change and equilibrium constant by potentiometry

Semester III:

S.NO	NAME OF SUBJECT	COURSE OUT COMES
1	Organic Reaction Mechanism	**The student will be able to** CO 1: Acquire the knowledge of reactions and mechanisms of radical Substitution CO 2: Understand reactions and mechanisms of Elimination reactions and their stereo chemistry. CO 3: Apply the knowledge and understanding of Addition reactions to carbon- carbon , carbon- hetero atom multiple bonds. CO 4: Acquire the knowledge of reactions and mechanism Pericyclic reactions and their classification. CO5: Understand the concept of photochemistry of carbonyl compounds, unsaturated systems and aromatic compounds.
2	Organic spectroscopy	**The Student will be able to** CO 1: Acquire the knowledge of UV spectra of aromatic and hetero cyclic compounds and conformations of substituted cyclo hexanones. CO 2: Understand the characteristic vibrational frequencies of various functional groups by Infrared spectroscopy. CO 3: Apply the knowledge and understanding the principle of NMR and itsd applications. CO 4: Develop interest in the areas of Mass Spectrocopic techniques and fragm,entations of various functional groups. CO5: To acquire the knowledge on structural elucidation of organic compounds using UV, IR, NMR, Mass spectral data.
3	Organic Synthesis	**The Student will be able to** CO 1: Acquire the knowledge of formation of C-C via enolates, enamines, organo metallic reagents. CO 2: Understand formation of C=C bonds , pyrolytic syn eliminations. CO 3: Apply the knowledge and understanding the introduction of organic polymers, properties and their classification. CO4: To understand the concept of reactions of unactivated C-H bonds and their synthetic applications. CO5: Develop interest in the areas of Asymmetric synthesis, Diels alder reaction.
4	Organic Chemistry of Natural Products	**The Student will be able to** CO 1: Acquire the knowledge of isolation, structural elucidation,

		stereochemistry, synthesis and biological properties of selected antibiotics, • CO 2: Understand isolation, structural elucidation, stereochemistry, synthesis and biological properties of selected terpenes • CO 3: Apply the knowledge and understanding isolation, structural elucidation, stereochemistry, synthesis and biological properties of alkaloids • CO 4: Develop interest in the areas of isolation, structural elucidation, stereochemistry, synthesis and biological properties of Flavonoids • CO5: Understand isolation, structural elucidation, stereochemistry, synthesis and biological properties of natural pigments
	Practical 1: Multistage synthesis	**The student will be able to** • Prepare, purify and characterization of organic compounds involving multistage. • Students will be able to know the melting
	Practical 2:chromatography	• Able to separate the non-volatile mixtures using column chromatography. • Understand the column chromatography. • Understand the paper chromatography to determine the purity.

Semester IV:

S.NO	NAME OF SUBJECT	OUT COMES
1	MODERN SYNTHETIC METHODOLOGY IN ORGANIC CHEMISTRY	**The student will be able to** CO 1: Acquire the knowledge of various modern synthetic methods. CO 2: Understand multicomponent reactions and meta thesis CO 3: Apply the knowledge and understanding of metal and non metal based oxidations CO4: To understand the concept of Reduction - homogeneous and heterogeneous catalytic hydrogenation. CO5: Develop interest in the areas of green chemistry, nano materials and phase transfer catalysis.
2	ORGANIC SPECTROSCOPY AND STRUCTURE DETERMINATION OF NATURAL PRODUCTS	**The Student will be able to** CO 1: Acquire the knowledge of 13C NMR spectroscopy CO 2: Understand Heteronuclear coupling and ESR spectroscopy. CO 3: Apply the knowledge and understanding of NMR instrumentation and 2D NMR techniques. CO 4: Develop interest in the ORD and CD spectroscopy CO5: To gain knowledge on structural determination of natural products by spectroscopy
3	DESIGNING ORGANIC SYNTHESIS AND SYNTHETIC APPLICATIONS OF ORGANO- BORANES AND SILANES	**The Student will be able to** CO 1: Acquire the knowledge of the disconnection approach and its principles. CO 2: Understand the synthetic strategies for one group disconnection CO 3: Apply the knowledge and understanding of disconnection approach, synthetic strategies in two group disconnection CO 4: Develop interest in the areas of the organo boranes preparations and their synthetic applications. CO5: Understand the preparations and synthetic applications of organosilanes.
4	DRUG DESIGN AND DRUG CHEMISTRY	**The Student will be able to** CO 1: Acquire the knowledge of drugs, their classification, drug metabolism and drug development, Structure Activity Relationship in drugs CO 2: Understand drugs, their classification, drug metabolism of antineoplastic drugs CO 3: Understand drugs, their classification,

		drug metabolism of cardiovascular drugs CO4: Acquire the knowledge of oral hypoglycaemic drugs. CO5:Apply the knowledge and understanding of local anti-infective and antiviral drugs
	Practical 1:Organic mixture analysis	Detect the solubility and the extra elements in the given compound. Identify and confirm the given binary compound. Able to know the melting and boiling points of derivatives.
	Practical 2: Estimations and isolations.	Able to extract lycopene from tomato. Isolate caffeine from coffee.