

M.Sc. (Organic Chemistry)

MSc-I Semester I	Course Outcome
Physical Chemistry Paper I	<ul style="list-style-type: none">• Students are expected to:- understand and explain the Maxwell's relations, state functions, Joule Thomson's effect, third law thermodynamic, standard molar entropies.• Quantum chemistry, postulates, Schrodinger's equation and its solution for particle in one, three dimensional box, free particle, harmonic oscillator, Hermitian operators.• Chemical Dynamics:- rate laws and kinetics of thermal chain reaction, decomposition reaction, polymerisation reactions, reactions in gas phase.• Electrochemistry:- Debye Huckel theory, Electrolytic conductance, batteries, bio-electrochemistry, elementary reactions in solutions, enzyme catalysed reactions, inhibition of enzyme action, kinetics of solid state reactions• Solid state chemistry:- types of defects and stoichiometry, phase equilibria, two component system, three component system.
Inorganic Chemistry-	<ul style="list-style-type: none">• Students are expected to know chemical bonding in specific

Paper-II	<p>polyatomic molecules like SF₆, B₂H₆, I₃, CO₂, they should have an idea about weak intermolecular forces of attraction.</p> <ul style="list-style-type: none"> • Students are expected to know group multiplication table, group theoretical treatment, for molecules by use of group theoretical concept. • Some environmental chemistry aspects should be known by students as well as some bio-inorganic concept of bio-molecules. • They should know inorganic spectroscopic concept and coordination reaction mechanism.
Organic Chemistry Paper- III	<ul style="list-style-type: none"> • Students should understand the various type of aliphatic, aromatic, nucleophilic substitution reaction. • Understand and apply principles of Organic Chemistry for understanding the scientific phenomenon in reaction mechanisms. • Understanding of stereochemistry applied to different types of organic molecules. • Learn the familiar name reactions, reagents and their reaction mechanisms.
Analytical Chemistry Paper-IV	<ul style="list-style-type: none"> • The student is expected to know about language of analytical chemistry, quality management system, audit, safety in laboratories, Accreditations, GLP. • Calculations based on chemical principals. • Optical methods (F.T.I.R, X-Ray), Thermal methods such as T.G.A, D.T.A and D. S.C . (instrumentation and applications) •
MSc-I Sem-II	Course Outcome
Physical Chemistry Paper I	<ul style="list-style-type: none"> • Quantum chemistry, postulates, Schrodinger's equation and its solution for particle in one, three dimensional box, free particle,

	<p>harmonic oscillator, Hermitian operators.</p> <ul style="list-style-type: none"> • Chemical ThermoDynamics:- rate laws and kinetics of thermal chain reaction, decomposition reaction, polymerisation reactions, reactions in gas phase. • Kinetics of reactions catalyzed by enzymes, their inhibition action and reaction in solid state. • Solid state chemistry:- types of defects and stoichiometry, phase equilibria, two component system, three component system.
Inorganic Chemistry- Paper-II	<ul style="list-style-type: none"> • Students are expected to know group multiplication table , group theoretical treatment, for molecules by use of group theoretical concept. • Understanding of Organometallic chemistry of transition metals • Some environmental chemistry aspects should be known by students as well as some bio-inorganic concept of bio-molecules. • They should know inorganic spectroscopic concept and coordination reaction mechanism.
Organic Chemistry Paper- III	<ul style="list-style-type: none"> • Students should understand the various type of aliphatic, aromatic, nucleophilic substitution reaction with carbonyl compounds. • Understand and apply principles of Organic Chemistry for understanding the scientific phenomenon in reaction mechanisms. • Understanding of molecular orbital theory for organic compounds. • Determine molecular structure by using UV, IR , NMR and Mass spectroscopy.
Analytical Chemistry Paper-IV	<ul style="list-style-type: none"> • Automation in chemical analysis. • Separation methods (G.C, H.P.L.C) • Mass Spectrometry also the radio analytical methods and

	<p>surface analytical techniques.</p> <ul style="list-style-type: none"> • They should know new sources for atomic spectroscopy. Electroanalytical methods such as electrogravimetry, coulometry etc.
MSc-II Semester III	Course Outcome
Theoretical Organic Chemistry- Paper-I	<ul style="list-style-type: none"> • Students are able to understand the structure effects and reactivity by determination of reaction mechanism involving different intermediates for synthesis. • Understanding of different types of pericyclic reaction and their mechanism under thermal and photochemical condition. • Stereochemistry of different molecules of medium ring size and their reactivity towards different reagents. • Photochemical reactions of different functional groups and their application.
Synthetic Organic Chemistry- Paper-II	<ul style="list-style-type: none"> • Understanding of various name reactions, their mechanism & applications. • Understanding the concept of radical mechanism and its use in the organic synthesis. • Study of various reaction intermediates, ylides, enamines and their reactions along with applications. • Concept of metals and non-metals use in organic synthesis.
Natural Product and Spectroscopy - Paper III	<ul style="list-style-type: none"> • Student should be able to understand the classification, properties, structure elucidation and few synthesis of carbohydrates, natural pigments and insect pheromones. • Understand the multi-step synthesis of natural products and study of prostaglandins, lipids and insect growth regulators. • Detail study of 1D-Proton NMR spectroscopy. Understand the

	<p>factors affecting chemical shift, spin notations of various spin systems.</p> <ul style="list-style-type: none"> • Interpret NMR spectra on basic values of PMR & C-13 NMR Delta values & IR -frequencies. • Discuss the problem of UV, IR and NMR & Mass. • Discuss the 2D-NMR spectroscopy with different techniques: COSY, HETCOR, DEPT, NOESY. Discuss the problems of the same technique.
<p>Medicinal Chemistry, Biogenesis, Green chemistry Paper-IV</p>	<ul style="list-style-type: none"> • Student are able to understand the concept of drug discovery, design and development and synthesis. • Understanding basic concept of medicinal chemistry related to drug action. • Knowledge of the connection between the structural features of the drugs & their physicochemical characteristics, mechanism of action & uses. • Understanding of biogenesis and biosynthesis of natural products. • Concepts of Green chemistry and technologies like microwave synthesis, ultrasound assisted reaction.
<p>MSc-II Semester IV</p>	<p>Course Outcome</p>
<p>Theoretical Organic Chemistry- Paper-I</p>	<ul style="list-style-type: none"> • Understanding the concept of racemisation and resolution method. Determination of enantiomers and diastereomers by chromatographic, chiral derivatisation agent and lanthanide shift reagents. • Concepts of supramolecular chemistry and their application with synthesis. • Understanding of the concept of asymmetric synthesis with use of chiral auxillary in different types of reactions like aldol, sharpless epoxidation, aminohydroxylation, Diels-Alder

	reaction.
Synthetic Organic Chemistry- Paper-II	<ul style="list-style-type: none"> • Designing organic synthesis using protecting groups. Introduction of retro synthetic analysis. • Students are able to understand the electro-organic chemistry and selected methods of organic synthesis. • Application of transition and rare earth metals in organic synthesis.
Natural Product, Heterocyclic chemistry Paper III	<ul style="list-style-type: none"> • Concepts of classification, structure, occurrence, biological role and synthesis of natural products like steroids, vitamins, antibiotics and terpenoids. • Classification of heterocyclic compounds of monocyclic and fused heterocycles with their structure, reactivity, synthesis and reactions.
Research Methodology- Paper-IV	<ul style="list-style-type: none"> • Understanding basic concepts of research & its methodologies. • Identify appropriate research topics. • Select & define appropriate research problem and parameters. • Prepare a project proposal, organise and conduct research. • Write a research proposal, report and thesis. • Understanding of Data analysis, Chemical safety and Ethical handling of chemicals.