

RK (PG) College Shamli UP
Department of Chemistry

Programme outcomes: M.Sc Chemistry

Department of Chemistry	After successful completion of two year degree programme in Chemistry, a student should be able to;
Programme outcomes	<ul style="list-style-type: none">● Think critically and analyse chemical problems in all discipline of chemistry● Demonstrate, solve and understand the major concepts of chemistry● Develop scientific temperament● Learn the application of computers in chemistry● Become professionally trained in the area of research and industry● To apply all modern methods of analysis to solve the chemical problems● To write and present scientific and technical information resulting from laboratory experiments● Enhance the ability of students to develop mathematical models for physical system● Learn to handle the sophisticated instruments● Demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory.

Course outcomes: M.Sc Chemistry

Semester- I

Course	Outcomes
	After completion of these courses, students will be able to;
Inorganic chemistry	<ul style="list-style-type: none">● Learn about stereochemistry and bonding in the main group compounds● Learn reaction mechanism of transition metal complex i.e. substitution and redox reaction● Learn metal-ligand equilibria and metal-ligand bonding
Organic chemistry	<ul style="list-style-type: none">● Learn about nature of bonding and stereochemistry in organic molecule● Learn the reaction mechanism of organic reactions i.e. structure and reactivity● Learn aliphatic, electrophilic and nucleophilic substitution

Physical chemistry	<ul style="list-style-type: none"> • Understand the classical, statistical and non-equilibrium thermodynamics • Learn the introduction of quantum mechanical results • Learn approximate method i.e. variation method, variation principle and perturbation theory • Learn about angular momentum, electronic structure of atoms and molecular orbital theory
Mathematics for chemists	<ul style="list-style-type: none"> • Learn matrix and vector algebra • Learn differential calculus and elementary differential equations • Learn about permutations and combinations as well as probability theorems
Biology for chemists	<ul style="list-style-type: none"> • Learn cell structure i.e. eukaryotic and prokaryotic cells and their functions • Learn structure of proteins, biosynthesis and sequence of amino acids • Learn about lipids and nucleic acids
Computers for chemists	<ul style="list-style-type: none"> • Learn about computer programming and their use in chemistry
Practical chemistry	<ul style="list-style-type: none"> • Handle and demonstrate the experiment on pH meter • Determine the viscosity of oil by using red wood viscometer • Analyse the mixture of two or three components • Synthesize various metal complexes • Separate and identify the binary organic mixture • Synthesize various single step preparation

Course outcomes: M.Sc Chemistry
Semester- II

Course	Outcomes
	After completion of these courses, students will be able to;
Inorganic chemistry	<ul style="list-style-type: none"> • Learn about Electronic and magnetic properties of transition metal complexes • Learn about metal clusters, metal complexes and nuclear chemistry
Organic chemistry	<ul style="list-style-type: none"> • Learn about aromatic, electrophilic and nucleophilic substitution • Learn about elimination and free radical reactions

	<ul style="list-style-type: none"> • Learn about addition to carbon-carbon and carbon-hetero multiple bonds • Learn about pericyclic reactions
Physical chemistry	<ul style="list-style-type: none"> • Learn about chemical dynamics, surface chemistry and electrochemistry, group theory, spectroscopy, diffraction method and solid state • Learn about various symmetry in group theory • Learn about various spectroscopy i.e. vibrational, electronic and magnetic resonance spectroscopy • Learn about X-ray diffraction and various spectroscopy principles
Practical chemistry	<ul style="list-style-type: none"> • Learn and demonstrate the experiment on conductometer • Find out the surface tension of various liquids • Determine the critical miscelle concentration of soap • Learn and perform various type of titration • Separate and do analysis of binary organic mixtures • Prepare two step organic preparations

Course outcomes: M.Sc Chemistry
Semester- III

Course	Outcomes After completion of these courses, students will be able to;
Photochemistry	<ul style="list-style-type: none"> • Learn about the basics of photochemistry • Determine reaction mechanism by using photochemical process • Understand the photochemical reaction of alkene, carbonyl compounds and aromatic compounds
Spectroscopy	<ul style="list-style-type: none"> • Learn about the UV- Vis, Infrared, NMR (¹H and ¹³C), ESR and Mossbaeur spectroscopy • Understand the optical rotatory dispersion (ORD) and circular dichroism (CD)
Analytical chemistry	<ul style="list-style-type: none"> • Learn about the various chromatographic techniques • Learn about thermal methods of analysis • Understand about various types of errors • Learn about radiochemical methods as well as electroanalytical techniques
Biorganic chemistry	<ul style="list-style-type: none"> • Understand about the basic introduction of enzymes

	<ul style="list-style-type: none"> • Understand about the mechanism of enzyme action and enzyme model • Learn about the biotechnological application of enzymes
Practical chemistry	<ul style="list-style-type: none"> • Understand and demonstrate the experiment by using UV-Vis spectrophotometer and flame photometer • Perform various experiments by using thin layer chromatography • Perform and estimate casein protein from milk • Estimate glucose in wine sample and sugar in blood

Course outcomes: M.Sc Chemistry
Semester- IV

Course	Outcomes After completion of these courses, students will be able to;
Environmental chemistry	<ul style="list-style-type: none"> • Understand about the various components of environment i.e. hydrosphere, atmosphere and soil • Understand about environmental toxicology and industrial pollution
Organic synthesis	<ul style="list-style-type: none"> • Learn organic reactions governed by organometallic reagents • Learn organic reactions governed by oxidising and reducing agents • Learn about various rearrangement reactions • Learn about metallocenes, non-benzoid aromatic and polycyclic aromatic compounds
Medicinal chemistry	<ul style="list-style-type: none"> • Learn about drug design • Understand about neuroactive, cardiovascular and antineoplastic agents • Understand computational approaches of medicinal chemistry
Polymer chemistry	<ul style="list-style-type: none"> • Understand the structure and properties of polymer • Understand polymer characterization, polymer processing and properties of commercial polymers
Practical chemistry	<ul style="list-style-type: none"> • Separate and analysis of ternary organic mixture • Synthesize three step organic preparations