

CHEMISTRY - SPECIFIC PROGRAMME OUTCOME

PROGRAMME	PROGRAMME SPECIFIC OUTCOME
M.Sc.	<ol style="list-style-type: none">1. Have sound knowledge about the fundamentals and applications of chemical and scientific theories2. Every branch of Science and Technology is related to Chemistry3. Easily assess the properties of all elements discovered.4. Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.5. Will become familiar with the different branches of chemistry like analytical, organic, inorganic , physical, environmental, polymer and biochemistry6. Helps in understanding the causes of environmental pollution and can open up new methods for environmental pollution control.7. Develops analytical skills and problem solving skills requiring application of chemical principles.8. Acquires the ability to synthesize, separate and characterize compounds using laboratory and instrumentation techniques.

CHEMISTRY - COURSE OUTCOME

CLASS	PAPER TITLE	COMPULSORY/ OPTIONAL	POINTS OF COURSE OUTCOME
M.Sc. – I sem. (Chemistry)	Group theory and chemistry of metal complexes	COMPULSORY	<ol style="list-style-type: none"> 1. Students will study symmetry and group theory in chemistry and will be able to imagine and visualize the point group, 2. Students will get acquainted with the unifying principles of spectroscopy like uncertainty relation, natural line width, selection rules, Born-Oppenheimer approximation, energy levels, etc. 3. Students will understand the theories of chemical bonding in co-ordination chemistry. 4. Students will interpret metal ligand equilibrium in solution through stepwise and overall formation constants, chelate effect, inert and labile complexes. 5. Students will have an understanding of reaction mechanism of transition metal complexes through kinetics of octahedral substitution, acid hydrolysis, the trans effect, etc.
	Concept in organic chemistry	COMPULSORY	<ol style="list-style-type: none"> 1. Students will develop an understanding of nature of bonding in organic molecules, aromaticity, anti-aromaticity, homo-aromaticity, various reaction intermediates. 2. Students will develop an understanding about elimination reaction mechanisms, aliphatic and aromatic nucleophilic substitution mechanisms. 3. Students will develop an understanding about aliphatic electrophilic substitution, aromatic electrophilic substitution, etc. through examples.

			<p>4. Students will study Stereochemistry and Conformational analysis in chemistry and will be able to predict the structure and orientation of optically active organic compound.</p> <p>5. Students will understand pericyclic reaction with many examples.</p>
	Quantum chemistry, thermodynamics and chemical dynamics - I	COMPULSORY	<p>1. Students will be able to perform mathematical analysis of vectors, matrix algebra and probability, rules and applications of differentiation and integration</p> <p>2. Students will have an insight into the atomic structure, quantum Chemistry, Schrodinger equation and its application, Basic idea about angular momentum.</p> <p>3. Students will study the application of Schrodinger equation to multielectron system through approximate methods.</p> <p>4. Students will get acquainted with the Basics of chemical dynamics, Photochemical reaction, Homogeneous catalysis, kinetics of enzyme reaction, fast reaction.</p>
	Theory and application of spectroscopy -I	COMPULSORY	<p>1. Students will understand Instrumentation and working procedure of Molecular Spectroscopy and Microwave spectroscopy.</p> <p>2. Students will study the Infrared spectroscopy, Raman Spectroscopy and their Instrumental Techniques. They will be able to predict structural properties of compound.</p> <p>3. Students will learn about the instrumentation and application of various spectroscopy instruments like FTIR, Microwave, Raman spectra etc. for the</p>

			structural determination of organic and inorganic molecules
M.Sc. – II sem. (Chemistry)	Transition metal complexes	COMPULSORY	<ol style="list-style-type: none"> 1. Student will have an Understanding of Electronic Spectra of Transition Metal Complexes 2. Students will understand the Magnetic Properties of Transition Metal Complexes 3. Students will acquainted with the Basics of Neutron Diffraction, Metal clusters and Isonomy and Heterophony Acids and Salts.
	Reaction mechanisms	COMPULSORY	<p>The students will be able to:</p> <ol style="list-style-type: none"> 1. Acquire the skills for correct stereochemical assignment and interpretation in rather simple organic molecules. 2. Formulate his/her own reasoned opinions in the mechanistic side of organic reactions.
	Quantum chemistry, thermodynamics and chemical dynamics - II	COMPULSORY	<p>The students will be able to:</p> <ol style="list-style-type: none"> 1. Identified thermodynamics properties of any system to apply it for various systems. 2. Acquire the knowledge of phase equilibrium for various systems. 3. Get knowledge about various electrochemical phenomena.
	Theory and application of spectroscopy -II	COMPULSORY	<ol style="list-style-type: none"> 1. Students will study Nuclear Magnetic Resonance Spectroscopy. 2. Students will learn about the instrumentation and application of various spectroscopy instruments like NMR, MASS spectra etc. for the structural

			determination of organic and inorganic molecules
M.Sc. – III sem. (Chemistry)	Resonance spectroscopy, photochemistry and organ catalysis	COMPULSORY	<ol style="list-style-type: none"> 1. Understanding of Photochemical reaction, determination of reaction mechanism of photochemical reaction. 2. Understanding of Photo Fries Rearrangement and B.A.rton reaction. 3. Students will acquaint The Photoelectron Spectroscopy, Photo acoustic Spectroscopy and Electron Spin Resonance, NQR Spectroscopy.
	Chemistry of biomolecule	COMPULSORY	<ol style="list-style-type: none"> 1. This section deals with metal and their significant role in biological process like respiration, photosynthesis and catalytic activities. 2. Detail knowledge about Bioinorganic and supramolecular & photo inorganic chemistry. 3. Metalloenzymes- understanding of metalloenzymes and their functions in human body/living body.
	Catalysis, solid state and surface chemistry	COMPULSORY	<ol style="list-style-type: none"> 1. Understanding of solid state chemistry, crystal structures of various ionic compound, defects. 2. understanding of electronic properties & B.A.nd theory of insulator, conductors and semiconductors.
	Analytical techniques and data analysis	COMPULSORY	<ol style="list-style-type: none"> 1. Detailed knowledge about glasses, ceramics, composites & non-materials. 2. Understanding of Microscopic composites, nanomaterials. 3. Understanding about Principle and application of TGA, DTA, & DSC.

			4. Understanding of Radiation Chemistry, radio analytical techniques.
M.Sc. – IV sem. (Chemistry)	Instrumental methods of analysis	COMPULSORY	<p>The student should be able to: -</p> <ol style="list-style-type: none"> 1. Explain the theoretical principles and important applications of classical analytical methods within titration (acid/B.A.se titration, complex metric titration, redox titration), and various techniques within gravimetric and bolometric methods. 2. Explain the theoretical principles of selected instrumental methods within electro analytical and spectrometric/ spectrophotometric methods, and main components in such analytical instruments. 3. Explain the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques. 4. Assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance. 5. Performing risk assessment of chemical experiments and chemical analytical activity. 6. Performing classical analytical experiments, and make observations and assessments of important factors that could affect the analytical result. 7. Be familiar with calculations in analytical chemistry, be able to calculate titration errors for method evaluation, and perform statistical evaluation of results from classical and instrumental chemical experiments and analyses. 8. Make scientific reports from chemical experiments and present the results in a transparent manner.
	Natural products and medicinal chemistry	COMPULSORY	<ol style="list-style-type: none"> 1. The main objectives of this master in medicinal chemistry are: 2. Understanding of the Basic biological and pharmacological interactions by using both natural products and total synthesis of bioactive molecules.

			<p>3. Use of corresponding knowledge for the development of biologically and clinically active drugs.</p> <p>4. It will include advanced courses in natural products, organic synthesis, medicinal chemistry; fundamentals of cell biology, molecular biology, drug design, and analytical methods.</p> <p>5. Detail knowledge about metal cheats as medicine, study about synthetic approach of antibiotics.</p>
	Material and nuclear chemistry	COMPULSORY	<p>1. Students will learn about the non-equilibrium thermodynamics and material chemistry.</p> <p>2. Understanding about Supramolecular chemistry .</p> <p>3. Basic knowledge of nuclear structure, stable and unstable atomic nuclei, nuclear reaction and different methods for measurements of radioactivity.</p> <p>4. The fundamentals of radiochemistry and the applications of these in measuring technology and materials and process technology.</p>
	Environmental and applied chemical analysis	COMPULSORY	<p>1. Development of understanding of environment, biogeochemical cycles of C.N.P.S.</p> <p>2. Understanding of quality of water and its qualitative analysis, treatment of water pollutant.</p> <p>3. Understanding of air pollution and its causes.</p> <p>4. Detailed knowledge of various industrial pollutants, toxicology.</p>