M.Sc. CHEMISTRY

Sl No	Semester	Course Name	Nature of the course	Course Code	Course Outcome
1	1st Sem	Quantum Mechanics and Computational Chemistry	Core	CHE1CO1	1. To categorize translational, rotational, vibrational motion of molecules quantum mechanically. 2. To evaluate the importance of approximation methods to solve systems of many electrons. 3. To summarize the different methods used in computational chemistry. 4. To gain an insight into the structure of Gaussian file and how it is applied to find molecular parameters.
		Elementary Inorganic Chemistry	Core	CHE1CO2	1. To differentiate between different acid-base concepts. 2. To discuss the chemistry of main group, transition and inner transition elements. 3. To predict the stability of nuclei. 4. To explain the importance of Nano materials.
		Structure and reactivity of organic Compounds	Core	CHE1CO3	1. To predict and demonstrate the aromaticity of organic compounds. 2. To analyse the effect of conformation on the rate of reactions. 3. To categorize different types of stereoisomerism in organic compounds. 4. To summarize the basic aspects of asymmetric synthesis.

		Thermodynamics, Kinetics and Catalysis	Core	CHE1CO4	1. To compare and contrast the principles of reversible and irreversible thermodynamics. 2. To apply the basic concepts of chemical kinetics to study rates of different types of reactions. 3. To categorize the different theories of reaction rates. 4. To apply the basics of adsorption to determine surface parameters. 5. To analyse the different theories of catalysis.
2	2nd Sem	Group Theory and Chemical Bonding	Core	CHE2CO5	1. To correlate the principles of Group theory and quantum mechanics. 2. To apply the principles of group theory for spectroscopic analysis. 3. To apply the principles of group theory to study chemical bonding in diatomic and polyatomic molecules. 4. To describe the chemical bonding in diatomic and polyatomic molecules.
		Co-ordination Chemistry	Core	CHE2CO6	1. To summarize the stability of co-ordination compounds. 2. To categorize the different theories about Co-ordination compounds. 3. To explain the electronic spectra, magnetic properties characterization of Co-ordination compounds. 4. To discuss the different mechanisms for the reaction mechanism in metal complexes.
		Reaction Mechanism in Organic Chemistry	Core	CHE2CO7	1. To compare and contrast the different mechanisms of

					substitution, addition, elimination reactions. 2. To discuss the different kinds of reaction intermediate, its formation, stability and reactions. 3. To summarize the different reactions of carbonyl and related compounds. 4. To apply different methods for explaining the outcome of a Pericyclic reaction. 5. To explain the photochemistry of organic compounds.
		Electrochemistry, Solid State Chemistry and Statistical Thermodynamics	Core	CHE2C08	1. To compare the basic aspects of equilibrium electrochemistry and dynamic electrochemistry. 2. To explain the electronic and optical properties of solids. 3. To apply the principles of statistical thermodynamics to evaluate the properties of systems.
		Inorganic Chemistry Practicals-I & II	Core Practical	CHE1LO1 & CHE2LO4	1. To apply the principles of solubility product and common-ion effect to separate and identify cations in the given mixture. 2. To appreciate the different types of volumetric methods for the quantitative analysis of metal ions. 3. To apply the basic principles of Colorimetry for the quantitative analysis of metal ions.
		Organic Chemistry Practicals-I & II	Core Practical	CHE1LO2 & CHE2LO5	1. To appreciate the different methods for the purification and separation of organic compounds. 2. To formulate and perform the different methods for the

					separation of organic binary mixtures. 3. To perform two stage and three stage organic preparations.
		Physical Chemistry Practicals-I & II	Core Practical	CHE1LO3 & CHE2LO6	1. To determine heat of the solution using thermodynamic methods. 2. To gain an insight into the phase diagram of eutectic, binary systems. 3. To apply the principles of viscosity to determine the molecular weight of polymers. 4. To perform refractometric analysis, different types of potentiometric and conductometrric titrations.
3	3rd Sem	Molecular Spectroscopy	Core	CHE3CO9	1. To discuss the various branches of spectroscopy like rotational spectroscopy, vibrational spectroscopy, Raman and electronic spectroscopy. 2. To describe and interpret the magnetic nature of certain nuclei. 3. To apply the concepts of vibrational, electronic, NMR and mass spectroscopy in organic molecules.
		Organometallic & Bio-inorganic Chemistry	Core	CHE3C10	1. To classify and describe the different types of organometallic compounds. 2. To discuss the different type of reactions by organometallic compounds. 3. To explain the different aspects of metal clusters. 4. To describe the role of various metal ions in living systems.
		Reagents and Transformations in Organic Chemistry	Core	CHE3C11	1. To categorize different types of oxidising and reducing agents in organic chemistry.

					2. To classify and describe different type of polymers. 3. To describe the basic aspects of Heterocyclic and Supramolecular Chemistry. 4. To apply the concepts of reaction intermediates in the organic rearrangements.
		Green and Nano Chemistry	Elective	CHE3EO3	1. To apply the principles of green chemistry to devise alternate pathway for the conventional organic reactions. 2. To restate the role of microwave assisted reactions in organic synthesis. 3. To categorize different methods for the preparation of Nano materials. 4. To illustrate different techniques used for the characterisation of Nano Materials.
4	4th Sem	Instrumental methods of analysis	Core	CHE4C12	1. To summarize different methods for the treatment of statistical data. 2. To compare the volumetric and gravimetric methods of quantitative analysis. 3. To describe the different types of electro-analytical techniques, optical, thermal and radiochemical methods used in chemical analysis. 4. To classify and analyse different chromatographic methods in qualitative and quantitative analysis.
		Industrial Catalysis	Elective	CHE4EO5	1. To summarize different types of adsorption, its kinetics and theories. 2. To describe the preparation, deactivation of catalyst surfaces.

					3. To analyse the role of phase transfer catalyst and Bio-catalyst in catalysis. 4. To apply the principles of catalysis for conducting different organic reactions in macro scale.
		Natural Products and Polymer Chemistry	Elective	CHE4EO6	1. To apply the principles of organic synthesis for the structural elucidation of terpenoids, steroids, alkaloids, anthocyanins. 2. To summarize the basic aspects about dyes, pigments and Supramolecules. 3. To appreciate different types of polymerisation techniques. 4. To discuss the stereochemistry and various characterization techniques for polymers. 5. To describe the basic aspects of speciality polymers.
		Inorganic Chemistry Practicals-III & IV	Core Practical	CHE3LO7 & CHE4L10	1. To apply the gravimetric and colorimetric methods to separate and quantitatively analyse the inorganic ions present in it. 2. To perform ion-exchange methods for the separation and estimation of binary mixtures. 3. To generate inorganic complexes.
		Organic Chemistry Practicals-III & IV	Core Practical	CHE3LO8 &CHE4L11	1. To apply the different methods of organic analysis for the quantitative analysis of amino acids, vitamins and antibiotics. 2. To perform extraction and purification of natural products. 3. To apply the chromatographic technique

					for the analysis of natural products.
		Physical Chemistry Practicals-III & IV	Core Practical	CHE3LO9 & CHE4L12	1. To apply the concepts of chemical kinetics and Polarimetry to determine the rates of chemical reactions. 2. To apply the concepts of adsorption to verify isotherms. 3. To design phase diagram for different type of systems. 4. To apply the principles of spectrophotometry for the quantitative analysis of metals. 5. To apply the different methods of computational chemistry to calculate the molecular properties.
		Research Project	Core	CHE4P01	1.To recall the scientific methods of research project. 2. To apply the scientific methods in life situations. 3. To analyse scientific problems systematically.