M. Sc. Degree Program in Chemistry

Program outcome

- To understand the advanced facts and concepts in chemistry
- To apply the principles of chemistry
- To develop research aptitude in chemistry
- To be able to work in pure, inter-disciplinary and multi-disciplinary areas of chemistry
- To familiarize with emerging areas of chemistry
- To develop the skills in the proper handling of the instruments and chemicals
- To Familiarize with the different processes used in industries and their applications
- To develop an ecofriendly attitude by creating a sense of environmental awareness

Course outcome

COURSE OUTCOME:

Sl No	**Name of the paper**	**Course Code**	**Course outcome**
1	**QUANTUM MECHANICS AND COMPUTATIONAL CHEMISTRY**	**CHE1C01**	● To introduce the concept of Quantum mechanics among students ● To learn the theory and application of Quantum Chemistry ● Analyze the various possibilities of the concept in future research ● To learn different Quantum mechanical models, co-ordinate systems, wavefunctions etc ● To learn the basic principles of group theory and molecular symmetry ● To learn the method of representation of a point group and reduction formula ● To analyse the relation between quantum mechanics and group Theory
2	**ELEMENTARY INORGANIC CHEMISTRY**	**CHE1C02**	● To distinguish between different acid base concepts ● To analyse the molecular structure and bonding in molecules ● To learn the preparation,reactions and bonding in Boron hydrides ● To understand the different allotropic forms of C,S,P,As,Sb,Bi etc

			● To study the synthesis structure and uses of various compounds of main group elements ● To familiarize with the structure of nucleus, fission, fusion reactions etc ● To understands the interaction of radiation with matter
	STRUCTURE, AND REACTIVITY OF ORGANIC COMPOUNDS	**CHE1C03**	● To understand the basic principles of structure and bonding in organic molecules ● To learn the importance of different substituent effects and their application in organic chemistry ● To study the conformational analysis of various organic molecules an their application ● To learn the effect of conformation on the course of reaction rate in different system of molecules ● To understand the basic concepts of stereo chemisty ● To introduce the concept of Asymmetric synthesis and its application in various fields especially in research. ●
	THERMODYNAMICS, KINETICS AND CATALYSIS	**CHE1C04**	● To learn the basic theories and equations in Thermodynamics. ● To study the kinetic aspects of chemical reactions via molecular reaction dynamics ● To study thermodynamics of ideal and non ideal solutions ● To study homogeneous and heterogeneous catalysis
	GROUP THEORY and CHEMICAL BONDING	**CHE2C05**	● To learn the different approximation methods in Quantum mechanics ● To study the Quantum mechanics of many electrom atoms ● To apply the theories of quantum mechanics in bonding of diatomic and polyatomic molecules ● To learn molecular vibrations of molecules and apply group theory in noleculer spectroscopy ● To apply group theory in chemical bonding
	COORDINATION CHEMISTRY	**CHE2C06**	● To analyse the stability of coordination complexes ● To learn theories of bonding in coordination

			● To familiarise with electronic and magnetic properties of complexes ● To study characterisation techniques in coordination complexes ● To study the mechanisms of reactions of met complexes in detail ● To analyse the mechanisms of redox and photochemical reactions of complexes ●
	REACTION MECHANISM IN ORGANIC CHEMISTRY	**CHE2C07**	● To gain knowledge of the mechanisms of aliphatic and aromatic nucleophillic and electrophillic substitution reactions. ● To learn addition and elimination reactions and reactive intermediates ● To understand the chemistry of carbonyl compounds ● To study the pericyclic reactions in detail ● To learn photochemistry of organic compounds ● To understand the chemistry of natural products
	ELECTROCHEMISTRY, SOLID STATE CHEMISTRY AND STATISTICAL THERMODYNAMICS	**CHE2C08**	● To study the dynamic electrochemistry ● To learn ionic interactions and equilibrium electrochemistry ● To study the crystal structure, imperfections and electronic structure of solids ● To learn quantum statistics of statistic thermodynamics
	INORGANIC CHEMISTRY PRACTICALS– I & II	**CHE1L01 & CHE2L04**	● To study the seperation and identification of four met cations of which one is rare metal ion. ● To learn to carry our the spot tests of elements effectively ● To familiarise cerimetric and colourimetric estimation of metals
	ORGANIC CHEMISTRY PRACTICALS– I & II	**CHE1L02 & CHE2L05**	● To learn the methods of Separation and Purification of Organic Compounds ● Analysis of binary mixtures, some of which containing compounds with more than one functional group ● To carry out multiple stage organic preparation
	PHYSICAL CHEMISTRY	**CHE1L03 & CHE2L06**	● To carry out different physical experiments with precision and accuracy

	PRACTICALS – I &II		• To plot graph efficiently and find out the unknown measurement from the graph • To familiarise with electronic analytical instruments like potentiometer and conductometer
	MOLECULAR SPECTROSCOPY	**CHE3C09**	• To learn basic aspects of microwave, Infrared, NMR and Electronic spectroscopy • To study the applications of Electronic and vibrational spectroscopy in Organic chemistry • To familarise with the proton and C-13 NMR analysis in different organic molecules • To learn Mass spectroscopy and its application in structural elucidation of organic compounds •
	ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY	**CHE3C10**	• To learn the historical background and Nomenclature of organometallic compounds • To study the organometallic compounds with linear and cyclic pi system • To get knowledge about different reactions of organometallic compounds and catalysis • To study about metal clusters and carbonyl clusters • To learn the importance of bio-inorganic chemistry in various phases of biological system •
	REAGENTS AND TRANSFORMATIONS IN ORGANIC CHEMISTRY	**CHE3C11**	• To study in detail Oxidation and reduction reactions of organic compounds • To learn various synthetic reagents and their role in different reactions • To learn classification of polymers and importance of Bio polymers and chemistry of hetero cyclic compounds • To study various molecular rearrangements and transformations
	SYNTHETIC ORGANIC CHEMISTRY (ELECTIVE)	**CHE3E01**	• To learn the reagents used for oxidation and reduction reactions • To familiarize with various organometallic and organonon-metallic reagents • To introduce different coupling reactions in organic chemistry • To introduce the concept of Retro-synthetic analysis and multi-step synthesis

	INSTRUMENTAL METHODS OF ANALYSIS	**CHE4C12**	• To learn about the errors in chemical analysis • To study in detail about the conventional analytical methods • To learn electro Analytical, optical, Thermal and Radio-chemical methods • To study the theory and applications of chromatography
	INDUSTRIAL CATALYSIS (ELECTIVE)	**CHE4E05**	• To get an introduction to adsorption process • To learn the preparative methods of a catalyst • To study the deactivation of catalyst • To introduce phase-transfer catalysis and Biocatalysts
	NATURAL PRODUCTS AND POLYMERS (ELECTIVE)	**CHE4E05**	• To study in depth about the natural products • Brief introduction to dyes and pigments • Introduction to polymers and polymerization processes • Applications of polymers
	INORGANIC CHEMISTRY PRACTICALS– III & IV	**CHE3L07 & CHE4L10**	• To develop analytical skills in inorganic quantitative analysis • To understand ion exchange separation and estimation of binary mixture • To understand the principles behind the colorimetric and to apply it in quantitative analysis • To prepare inorganic complexes
	ORGANIC CHEMISTRY PRACTICALS– III & IV	**CHE3L08 & CHE4L11**	• To develop talent in organic preparations to ensure maximum yield • To apply the concept of melting or boiling pints to check the purity of compounds • To analyze and characterize symbol organic functional group • To analyze individual amino acids from a mixture using chromatography
	PHYSICAL CHEMISTRY PRACTICALS– III & IV	**CHE3L09 & CHE4L12**	• To develop analytical skills in determining the physical properties • To understand the principles of refractomery , potentiometry and conductometry
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