PROGRAMME OUTCOMES AND COURSE OUTCOMES

2021 – 2022

NAME OF THE PROGRAMME: M. Sc Chemistry **PROGRAMME CODE: PSCH**

Programme Outcomes (POs)

PO1:	Firm hold and sound footing in theoretical and practical aspects of Chemistry
PO2:	An overall comprehensive and an in-depth knowledge and equip learners to posses global competency
PO3:	Diversified branches with deep rooting cultivate research aptitude that leads to innovative findings
PO4:	Informative but application oriented inputs
PO5:	Enhanced chances to take up careers in industries and other pivotal sectors
PO6:	Rigorous training to tackle challenges in the academic and societal need based fields
PO7:	Opportunity to be exposed to the current emerging trends in the field of Chemistry through activities such as workshops, seminars and projects.

Programme Specific Outcomes (PSOs)

PSO 1	Training in problem solving procedures enables to interpret the experimental data into structures and mechanisms.
PSO 2	Provides a tremendous exposure and cultivates analytical and synthesising measures necessary to take up project work in reputed institutions.
PSO 3	Programme renders diversified thinking thereby promotes creative skills.
PSO 4	Directed to solve the problems that cause a negative impact on surroundings to pursue salient steps to safeguard environment,.
PSO 5	Application-oriented input sharpens the skill to undertake CSIR-NET exam.
PSO 6	Knowledge with practical dimensions becomes a driving power to undertake research in different areas
PSO 7	at a global level.
PSO 8	Multi-layered input enables to avail opportunities at chemical, pharmaceutical industries.

Course Outcomes (COs)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
19PG1C1	INORGANIC CHEMISTRY-I	1.To analyse all chemical species involved in organic and Inorganic reactions and to identify those as acid and bases. 2.To classify the bonds as ionic and covalent and to compare the theories. 3.To categorize the solid systems, to calculate the lattice energy and draw conclusions on their stability. 4.To predict the structures and magnetic properties of Inorganic compounds. 5.To gain in depth knowledge of nuclear reactions, reactors and the applications of radio isotopes in all fields.

19PG1C2	ORGANIC CHEMISTRY-I	1.To interpret the concept of aromaticity and the main properties of aromatic compounds. 2.Toexplore reactivity patterns of conjugated ,aromatic molecules and to evaluate the kinetics and thermodynamics controlled reactions. 3.To define the fundamentals of chirality, prochirality, symmetry elements and applications of atropisomers. 4.To comprehend of nucleophiles, electrophiles, electronegativity, and resonance 5.To sketch the preparation and properties of heterocyclic compounds.
19PG1C3	PHYSICAL CHEMISTRY-I	1. • To gain knowledge Kohlrausch's law and electrolytic conductance, Calculate the molar conductance , degree of dissociation and electrical potential Possess thorough understanding of Debye-Huckel equation.

		2.To gain knowledge of Electrocatalysis and Electrosynthesis. 3.Describe indetail about the three laws of thermodynamics. 4.Restate in their own words about the concept of distribution, thermodynamic probability and most probable distribution 5.Correlate and explain the partial molar properties, chemical potential
19PG1C4	INORGANIC QUALITATIVE ANALYSIS	1.To study the principle of distribution of common and rare metal ions in different groups. 2.To know the inter- and intra group precipitation and separation of metal ions. 3.To improve the skill in the qualitative analysis of rare metal ions in different groups. 4.To identify the methodology to analyse a metal ion in the presence of another metal ion.

19PG1C5	ORGANIC QUALITATIVE ANALYSIS	1.To be skilled in the separation of binary organic mixtures. 2.To gain knowledge on the skills of doing micro level analysis. 3.To know the methods of qualitative analysis of organic compounds 4.To learn about the preparation of suitable derivative of the organic functional groups 5.To prepare organic compounds.
21C1EDC	ANALYSIS OF SOIL, WATER, FOOD,COSMETICS AND OIL	1.Acquire the complete knowledge ofsoil and its texture 2.Develop idea about water and its treatment 3.Idetify different types of food colour, aditives and food adulterants 4.Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish. 5.Understand the need of detoxification of oil and various adulterants present in oil.
19PG2C6	INORGANIC	1.Compare the stabilities of complexes using stability constants and to

	CHEMISTRY-II	identify the types of isomers 2.To describe the theories of co-ordination compounds to understand the colours and magnetic properties and their position in the spectrochemical series 3. Investigate the structures of complexes using IR,NMR , ESR and other spectral techniques. 4. Possess a thorough understanding of electronic spectra of complexes. 5.To arrive at the mechanisms of substitution reactions in six and four coordinated complexes using kinetic studies
19PG2C7	ORGANIC CHEMISTRY-II	1.To comprehend the mechanism of elimination and substitution reactions and to apply the stereochemistry in E1, E2,ionic and pyrolytic eliminations. 2.To interpret the concept of nucleophilic and free radical addition reactions and metal hydride reduction and to discriminate the reactivity of organometalic reagents. 3. To explore reactivity patterns of substituted cyclohexanes and to employ

		conformational reactivity in cis and transdecalins and to apply conformations in SN1, SN2, ionic, pyrolytic eliminations and NGP reactions. 4. To acquire a complete knowledge of the principles of UV, IR spectroscopy and to examine the various functional groups present in organic molecules using λmax and IR frequency values . 5. To differentiate the molecular rearrangements and to solve the simple problems and to recall the various naming reactions and to interpret the products.
19PG2C8	PHYSICAL CHEMISTRY-II	1.To acquire knowledge about the basic concepts of chemical kinetics 2.To identify and analyze the effect of physical parameters μ, □, D on rate of reaction 3.To derive rate constant for reactions using Lindemann, Hinshelwood, RRK, RRKM Theories. 4.To develop a knowledge and understanding of the concept Normalisation and orthogonalisation and to solve Schrodinger wave equation for particle in a one dimensional box, three dimensional box and Rigid rotator. 5.To apply variation and perturbation

		method to He atom.
19PG2C9	INORGANIC QUANTITATIVE ANALYSIS	1.To enable the students to acquire the quantitative skills in volumetric analysisand gravimetric analysis 2.To improve the skill in quantitative estimation of metal ions by various titricmethods. 3.To identify the methodology to estimate a metal ion in the presence of another metal ion. 4.To be skilled in synthesis of inorganiccomplexes.
19PG2C10	ORGANIC QUANTITATIVE ANALYSIS	1.To develop the ability for synthesizing organiccompounds by single stage. 2.To develop the ability for synthesizing

		organiccompounds by double stage. 3.To study the reaction mechanism.
21C2EDC	ANALYSIS OF SOIL, WATER, FOOD,COSMETICS AND OIL	1.Acquire the complete knowledge ofsoil and its texture. 2.Develop idea about water and its treatment. 3.Idetify different types of food colour, aditives and food adulterants. 4.Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish. 5.Understand the need of detoxification of oil and various adulterants present in oil.
19PG3SICI	INTERNSHIP	1.To carry out scientific experiments 2.To accurately record and analyze the results of such experiments.

19PG3C11	ORGANIC CHEMISTY-III	1. To acquire a complete knowledge of the basic principles of 1H-NMR, 13C-NMR and Mass spectroscopy 2. To be acquainted with complete knowledge of photochemistry of ketone &cyclo addition reactions and to develop an understanding of the significance of the number, and splitting of signals in NMR 3. To be competent to assign structures to simple molecules on the basis of nuclear magnetic resonance spectra 4. To distinguish the similarities and differences of Pericyclic reactions and Cyclo addition and sigmatropic reactions 5. To apply the Spectral concepts to solve the problems, to elucidate the structures of simple organic compounds using the data from all the spectral techniques
19PG3C12	PHYSICAL CHEMISTRY-III	1. To learn about symmetry elements and symmetry operations, the point groups and character table 2. To Describe the selection rule for infrared-active and Raman

		active transitions, electronic transitions 3. To analyse the hybridization of given compounds and to apply HMO theory to Ethylene and some conjugated systems 4. To Classify of surface active agents, Polymers, and to derive Gibbs adsorption and BET isotherms 5. To explain the kinetics of vinyl, cationic and anionic polymerizations and to determine the mass of polymers.
19PG3C13	GREEN CHEMISTRY	1.To know about the alternative feedstock and to study about the process and advantages of alternative materials 2.To get familiarise about the green chemistry technology 3.To understand the need of alternative energy sources 4.To learn different types of renewable energy sources 5.To acquire knowledge about the greener techniques in industries

19PG3CE1	MATERIAL CHEMISTRY	1. To gain knowledge about the basic principles of nanochemistry and classification of nanomaterials. 2. To describe several synthesis of inorganic nanoparticles, one-dimensional nanostructures (nanotubes, nanorods, nanowires), thin films, nanoporous materials, and nanostructured bulk materials, 3. To criticize the importance of various instrumentation techniques such as NMR, IR, UV, X-ray diffraction, ESR etc., for elucidating the structures of nanomaterials. 4. To depict the structure of carnonnanoatructures, organic nanopolymers and supra molecular structures 5. To recognize the important role of nanomaterials in various fields.
19PG3CE2	BIO-ORGANIC CHEMISTRY	1. Understand concepts of molecular recognition and drug design 2. Remember the synthesis and structure of Proteins and amino acids. 3. Know the extraction and purification of enzymes and their application in catalysis.

		4. Categorize and analyze enzyme mechanisms. 5. Analyze the structure and biological functions of Coenzymes.
19PG4C14	PHYSICAL CHEMISTRY PRACTICALS-I	1.Developed expertise relevant to the professional practice of chemistry 2. Developed an understanding of the breadth and concepts of physical chemistry 3. An appreciation of the role of physical chemistry in the chemical sciences and engineering 4. Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry 5. An understanding of methods employed for problem solving in physical chemistry
19PG4C15	INORGANIC CHEMISTRY-III	1. Illustrate the structure and mode of bonding in organometallic complexes

		2. Apply the different electron counting procedures to predict the shape and stability of organometallic complexes 3. Illustrate the mechanism of dioxygen binding in various oxygen carrier proteins 4. Classify and identify the different types of metalloenzymes and metallo proteins based on their biological functions. 5. Interpret the structure of borazines, boranes and carboranes.
19PG4C16	ORGANIC CHEMISTRY-IV	1. To differentiate the carbon –carbon bond forming reactions and to interpret the products and to explore reactivity patterns of various coupling reactions 2. To elucidate the structural units of quinine, morphine, □-pinene and □-codinene 3. To correlate the skeletal units of nucleotides and nucleosides-RNA and DNA 4. To categorize the reducing and oxidizing agents and its applications.

		5. To Sketch the effective and logical synthetic route for the synthesis of new molecules
19PG4C17	PHYSICAL CHEMISTRY-IV	1. Describe the structure and mode of bonding in organometallic complexes containing carbonyls, nitrosyls, carbenes, carbynes, alkenes, alkynes and also metallocene complexes 2. Apply different electron counting procedures to predict the shape and stability of organometallic complexes 3. Illustrate the mechanism of dioxygen binding in various oxygen carrier proteins 4. Classify different types of metalloenzymes and metallo proteins based on their biological functions. 5. Distinguish whether the given compound belongs to chain or ring or cage or cluster
19PG4CE3	ANALYTICAL CHEMISTRY	1. To acquire the complete knowledge of C language 2. To develop logics which will help them to create programs, applications of chemistry problems in C.

		3. To explicate the theoretical principles of selected instrumental methods within electro analytical and spectrometric/spectrophotometric methods, and main components in such analytical instruments. 4. To explain the confidence level and confidence limit, the sources of random errors and effects of random errors on analytical results. 5. To illuminate the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques
19PG4CE4	CHEMICAL ENGINEERING	1. To write C- Program using various features of C- language 2 To categorize the various conditioning methods in water treatment 3 To apply the principles involved in spectrophotometric analysis. 4 To compare the mechanism between dry corrosion and wet corrosion 5 To synthesize some industrially important polymers

19PG4C18	PHYSICAL CHEMISTRY PRACTICALS- II	Experience in some scientific methods employed in basic and applied physical chemistry Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry Developed skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments Developed some understanding of the professional and safety responsibilities residing in working with chemical systems.
19PG4CPR	PROJECT	1.To carry out scientific experiments 2.To accurately record and analyze the results of such experiments.