FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2020 - 2021

NAME OF THE PROGRAMME: M. SC CHEMISTRY **PROGRAMME CODE: PSCH**

PROGRAMME OUTCOMES:

Students will have

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:

PSO1 : Equipped with an in-depth knowledge of varied fields namely Organic Chemistry, Inorganic Chemistry , Physical and nanochemistry.

PSO1 : Training in problem solving procedures enables to interpret the experimental data into structures and mechanisms.

PSO2 : Provides a tremendous exposure and cultivates analytical and synthesising measures necessary to take up project work in reputed institutions.

PSO3 : Programme renders diversified thinking thereby promotes creative skills.

PSO4 : Directed to solve the problems that cause a negative impact on surroundings to pursue salient steps to safeguard environment,.

PSO5 : Application-oriented input sharpens the skill to undertake CSIR-NET exam.

PSO6 : Knowledge with practical dimensions becomes a driving power to undertake research in different areas at a global level.

PSO7 : Multi-layered input enables to avail opportunities at chemical, pharmaceutical industries.

PSO8 : Becomes a contributing force and development agent in society.

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

		all fields
19PG1C2	ORGANIC CHEMISTRY-I	CO 1: To interpret the concept of aromaticity and the main properties of aromatic compounds. CO 2: To explore reactivity patterns of conjugated ,aromatic molecules and to evaluate the kinetics and thermos dynamics controlled reactions. CO 3: To define the fundamentals of chirality, prochirality, symmetry elements and applications of atropisomers. CO 4: To comprehend of nucleophiles, electrophiles, electronegativity, and resonance CO 5: To sketch the preparation and properties of heterocyclic compounds.
19PG1C3	PHYSICAL CHEMISTRY-I	CO 1: To gain knowledge Kohlrausch's law and electrolytic conductance

		CO 2: Calculate the molar conductance , degree of dissociation and electrical potential Possess thorough understanding of Debye-Huckel equation CO 3: To gain knowledge of Electrocatalysis and Electrosynthesis CO 4: Describe in detail about the three laws of thermos dynamics CO 5: Restate in their own words about the concept of distribution, thermos dynamic probability and most probable distribution
19PG1C4	INORGANIC QUALITATIVE ANALYSIS	CO 1: To study the principle of distribution of common and rare metal ions in different groups. CO 2: To know the inter- and intra group precipitation and separation of metal ions.

		CO 3: To improve the skill in the qualitative analysis of rare metal ions in different groups. CO 4: To identify the methodology to analyse a metal ion in the presence of another medallion.
19PG1C5	ORGANIC QUALITATIVE ANALYSIS	CO 1: To be skilled in the separation of binary organic mixtures CO 2: To gain knowledge on the skills of doing micro level analysis CO 3: To know the methods of qualitative analysis of organic compounds CO 4: To learn about the preparation of suitable derivative of the organic functional groups CO 5: To prepare organic compounds.

19C1EDC	ESSENTIALS OF LIFE	CO 1: To acquire knowledge of common medicine. CO 2: To express the concentration of solution in volumetric analysis. CO 3: To differentiate column and TLC technique. CO 4: To classify the different types of polymers and its characteristics. CO 5: To analyze the different types of soil and differentiate natural fertilizer from artificial fertilizer.
19PG2C6	INORGANIC CHEMISTRY-II	CO 1. Compare the stabilities of complexes using stability constants and to identify the types of isomers CO 2. To describe the theories of co-ordination compounds to understand the colours and magnetic properties and their position in the spectrochemical series

		CO 3. Investigate the structures of complexes using IR, NMR, E SR and other spectral techniques CO 4. To possess a thorough understanding of electronic spectra of complexes CO 5. To arrive at the mechanisms of substitution reactions in six and four coordinated complexes using kinetic studies
19PG2C7	ORGANIC CHEMISTRY-II	CO 1. To comprehend the mechanism of elimination and substitution reactions and to apply the stereochemistry in E1, E2,ionic and pyrolytic eliminations. CO 2. To interpret the concept of nucleophilic and free radical addition reactions and metal hydride reduction and to discriminate the reactivity of organometallic reagents. CO 3. To explore reactivity patterns of substituted

		cyclohexenes and to employ conformational reactivity in cis and trans decalins and to apply conformations inSN1, SN2, ionic, pyrolytic eliminations and NGP reactions. CO 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 λ max and IR frequency values . CO 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	CO 1. To acquire knowledge about the basic concepts of chemical kinetics CO 2. To identify and analyze the effect of physical parameters μ, □, D on rate of reaction

		CO 3. To derive rate constant for reactions using Lindemann, Hinshelwood, RRK, RRKM Theories CO 4. To develop a knowledge and understanding of the concept Normalisation and orthogonalization and to solve Schrodinger wave equation for particle in a one dimensional box, three dimensional box and Rigid rotator. CO 5. To apply variation and perturbation method to He atom.
19PG2C9	INORGANIC QUANTITATIVE ANALYSIS	CO 1. To enable the students to acquire the quantitative skills in volumetric analysis and gravimetric analysis CO 2. To improve the skill in quantitative estimation of metal ions by various titric methods CO 3. To identify the methodology to estimate a metal ion in the presence of another metalion.

		4. To be skilled in synthesis of inorganic complexes.
19PG2C10	ORGANIC PRACTICALS-II	1. To develop the ability for synthesizing organic compounds by single stage. 2. To develop the ability for synthesizing organic compounds by double stage. 3. To study the reaction mechanism.
19C2EDC	ESSENTIALS OF LIFE	1. To acquire knowledge of common medicine. 2. To express the concentration of solution in volumetric analysis. 3. To differentiate column and TLC technique. 4. To classify the different types of polymers and its characteristics.

		5. To analyze the different types of soil and differentiate natural fertilizer from artificial fertilizer.
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	To know about the alternative feedstock and to study about the process and advantages of alternative materials To get familiarise about the green chemistry technology To understand the need of alternative energy sources To learn different types of renewable energy sources 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 carnon nanoatructures, 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
19PG3SICI	INTERNSHIP	1. To carry out scientific experiments 2. To accurately record and analyze the results of such experiments.
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 organo metallic 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.