FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2021 - 2022

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes (PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

NAME OF THE PROGRAMME: B. Sc Chemistry

Programme Outcomes (POs)

PO 1	Are skilled in problem solving, critical thinking and analytical reasoning.
PO 2	Are able to identify and solve chemical problems and explore new areas of research.
PO 3	Are able to communicate the results of their work to chemists and non-chemists.
PO 4	Students will be able to explain that chemistry is an integral part in addressing social, economic, and environmental problems.
PO 5	Students turn out to be globally competent there by establishing themselves as attractive professionals.

Programme Specific Outcomes (PSOs)

PSO 1	Thorough understanding of all basic concepts and theories pertaining to Chemistry
PSO 2	A comprehensive view of bonding, structure, reactivity and stability of chemical species.
PSO 3	An overall perspective view of physical principles that govern all physical and chemical transformations.
PSO 4	Basic knowledge about instrumentation involving UV, IR, ESR and NMR.
PSO 5	Hands on experience of laboratory experiments both qualitative and quantitative
PSO 6	Project undertaking enables presentation of results and strengthens the learners in lab to land procedures that nurture societal need and environmental protection.
PSO 7	Diversified informative sources that equip learners to enter varied fields.
PSO 8	Additional in-puts of using appropriate software related to Chemistry and chemical calculations.

Course Outcomes (COs)

Course Code	Course Title	Nature of the Course	Course Description	Course Outcomes

		(Local/National /Regional/ Global)		
19C1CC1	Inorganic Chemistry -I	Regional	This course deals with the basics of chemistry required for UG programme	1.To comprehend the fundamental properties of atoms, molecules, and the various states of matter 2. To classify the electronic structure of atoms and its influence on chemical 3. To acquire the knowledge of properties, characteristics and application of non-aqueous solvents 4. To recognize the anomalous properties of Li and compares the properties Li with those other alkali metal 5. To illustrate the factors affecting the strength of acid and bases.

19C1CC2	Organic Chemistry –I (Reaction mechanism, alkanes, cycloalkanes and alkyl halides)	Global	This paper deals with electron displacement effects, Fundamentals of reaction mechanism and prepration, properties uses of alkanes, cycloalkanes	1. Gain a thorough knowledge about the chemistry of aliphatic saturated compounds 2. Analyze the behaviour of an organic compound through electron displacement effects 3. Describe the structure and stability of different types of intermediates involved in reaction mechanism. 4. Know the nomenclature, classification of alkanes, alkyl halides. 5. To derive and familiarise the mechanisms of nucleophilic substitution reactions of organic compounds.
19C1CC3	Volumetric Analysis-I	Global	This course trains the students to prepare the solutions of	1. To compare the principles behind all types of titrations 2. To identify suitable

			different concentrations and to estimate quantitatively by different techniques	indicators for a particular reaction. 3. To prepare solutions of desired concentrations. 4. To apply the principles of volumetric analysis in acid base, permanganometry, and iodometric titrations.
19N1ACC1	Allied Chemistry-I	National	This paper deals with the concept of chemical bonding – detailed study of VB Theory & MO Theory. Types of Organic Reactions	1. To predict the geometry of any molecule with the help of VB and VSEPR theory 2. To construct M.O diagram for homonuclear diatomic molecule 3. To categorize the types of organic reactions 4. To describe the chemistry of carbohydrates. 5. To classify the chemical

				reactions involved in volumetric analysis
19Z1ACC1	Allied Chemistry-I	National	This paper deals with the concept of chemical bonding – detailed study of VB Theory & MO Theory and types of Organic Reactions	1. To predict the geometry of any molecule with the help of VB and VSEPR theory 2. To construct M.O diagram for homonuclear diatomic molecule 3. To categorize the types of organic reactions 4. To describe the chemistry of carbohydrates. 5. To classify the chemical reactions involved in volumetric analysis
19C1NME	Profitable Home Industries	Global	This course is designed for the students to become self-employed by	1. Recognize the important nutrients present in food

			training them in the preparation of household articles	2. Gain knowledge about the fundamental chemistry involved in dairy products 3. Determine the manufacture and functions of various soaps and creams 4. Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish 5. Demonstrate the preparation of some home products like candle, detergent powder, soap oil,ink , phenoyl and computer sambirani
19Z1ACC2	Allied Chemistry Practicals -I	National	. This course trains the students to prepare the solutions of different	1. Describe the principles and procedures of various titrimetric methods 2. Identify suitable indicators for a particular reaction 3. Know the various terms

			concentrations and to estimate quantitatively by different techniques	such as standard solution, normality, molality, molarity, equivalent weight and molecular weight. 4. Select the specific titrimetric method to estimate the amount of analyte present in the given solution 5. Apply the expressions and equations to calculate the strength of solutions
19N1ACC2	Allied Chemistry Practicals -I	National	This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different techniques	1. Describe the principles and procedures of various titrimetric methods 2. Identify suitable indicators for a particular reaction 3. Know the various terms such as standard solution, normality, molality, molarity, equivalent weight and

				molecular weight. 4. Select the specific titric method to estimate the amount of analyte present in the given solution 5. Apply the expressions and equations to calculate the strength of solutions
19C2CC4	Inorganic Chemistry –II (Theories of hard and soft acids – bases, chemical bonding and chemistry of group III, IV, V & VI Elements)	Regional	This paper deals with the theories of bonding and the chemistry of III, IV, V & VI group elements.	1. To categorize the soft, hard and border line acids and bases. 2. To compare Valence bond theory and molecular orbital theory 3. To understand the synthetic importance of organ metallic compounds of Al, B and Si 4. To criticize the chemistry of hydrazine and hydroxyl amine 5. To draw the structure of oxo

				halides and oxo acids of sulphur.
19C2CC5	Organic Chemistry –II (Alkenes, Alkynes, Alkadienes, organo metallic compounds, Alcohols and Ethers)	Regional	This course covers the topics alkenes, alkadienes, alkynes and organometallics with special emphasis on their synthetic applications	1. Gain a basic knowledge about elimination reactions to prepare alkenes 2. Describe the chemical reactions and structure of alkenes 3. Classify the alkadienes and alkynes 4. Choose the specific reagents to prepare various organic compounds from GR 5. Compare the properties of alcohols and ethers
19C2CC6	Volumetric Analysis-II	Global	This course trains the students to	1. To apply the principles of volumetric analysis in various

			prepare the solutions of different concentrations and to estimate quantitatively by different techniques	estimations. 2. To estimate the amount of calcium using permanganometric method 3. To estimate the amount of calcium and magnesium using EDTA method. 4. To apply the principle of Argentimetry in the estimation of chloride ions. 5. To understand the principles behind the estimations of phenol & Aniline iodometrically.
19Z2ACC3	Chemistry-II (Theory behind chemical bonding, and organic qualitative analysis, kinetics of chemical	National	This paper gives a basic understanding of chemistry to other major students as allied paper.	1. Apply the rules for naming the coordination complexes and to illustrate the applications of metal complexes in biological systems.

	reactions and catalysis)			2. To analyze the various organic compounds qualitatively 3. To understand the procedure involved in detection of elements. 4. To explain the kinetics of a chemical reaction and to calculate the order of a particular reaction 5. To evaluate the types of catalysis and theories of catalysis
19N2ACC3	ALLIED CHEMISTRY-II (Theory behind chemical bonding, and organic qualitative analysis, kinetics of chemical	National	This paper gives a basic understanding of chemistry to other major students as allied paper.	1. Apply the rules for naming the coordination complexes and to illustrate the applications of metal complexes in biological systems. 2. To analyze the various organic compounds

	reactions and catalysis)			qualitatively 3. To understand the procedure involved in detection of elements. 4. To explain the kinetics of a chemical reaction and to calculate the order of a particular reaction 5. To evaluate the types of catalysis and theories of catalysis
19Z2ACC4	Allied Chemistry Practicals-II	National	This course trains the students to analyse the given organic compound	1. Gain the knowledge of appearance, colour, physical state and odour of organic substances. 2. Distinguish whether the given compound is Aliphatic or Aromatic, and Saturated or Unsaturated. 3. Perform the confirmatory

				test for various functional groups present in the given organic compound. 4. Recognize the usage of apparatus and laboratory reagents. 5. Relate the experimental observations with theory behind practicals.
19N2ACC4	Allied Chemistry Practicals-II	National	This course trains the students to analyse the given organic compound	1. Gain the knowledge of appearance, colour, physical state and odour of organic substances. 2. Distinguish whether the given compound is Aliphatic or Aromatic and Saturated or Unsaturated. 3. Perform the confirmatory test for various functional groups present in the given

				organic compound. 4. Recognize the usage of apparatus and laboratory reagents. 5. Relate the experimental observations with theory behind practicals.
19C2NME	Profitable Home Industries	Global	This course is designed for the students to become self-employed by training them in the preparation of household articles	1. Recognize the important nutrients present in food 2. Gain knowledge about the fundamental chemistry involved in dairy products 3. Determine the manufacture and functions of various soaps and creams 4. Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish 5. Demonstrate the

				preparation of some home products like candle, detergent powder, soap oil, ink, phenoyl and computer sambirani
19C3CC7	Organic And Inorganic Chemistry	Regional	This paper deals with the concept of aromaticity and the inorganic chemistry part of the paper deals with the general characteristics of elements	1. To interpret the concept of aromaticity and the main properties of aromatic compounds. 2. To explore reactivity patterns of conjugated, aromatic molecules and to evaluate the kinetics and thermodynamics-controlled reactions. 3. Explain types of oxides and oxyacids, their structure and reactivity in halogens 4. Discuss the properties d block elements & triads of transition elements.

				5. Recognize the role of oxidizing agents, reducing agents, group reagents and complexing agents, and inferences with theory behind practicals.
19C3CC8	Physical Chemistry-I (Gaseous state, Solutions, dilute solutions, radio activity & Nuclear transformations and nuclear chemistry)	Regional	This course provides a detailed study of Gaseous state, Solutions, Theory of dilute, solutions and Radio activity	1. Gain a basic knowledge about the kinetic theory of gases, gaseous laws, types of velocities and properties of gases 2. Distinguish between ideal and non-ideal solutions 3. Derive the relationship between molar mass of a non-volatile solute and colligative properties 4. Calculate the mass defect, packing fraction and binding energy for any nuclei 5. Predict the growing rate,

				mechanism and age of plants using radioactive elements
19C3SB1	Agricultural Chemistry	Global	The Course gives an introduction to soil and fertilizers and also gives the effect of pesticides.	1. Define the term soil 2. Describe the various types of fertilizers and their uses 3. Realise the requirements of manures and fertilizers for better production of various types of crops 4. Examine the adverse effect of pesticides 5. Calculate the amount of calcium and magnesium present in various types of soils
19C3SB1(A)	Diary Chemistry	National	This paper provides an understanding of the bioactive role, chemical	1. To understand The Composition, physical and chemical properties of milk. ·

			interactions of milk constituents their components	2. To Know the minerals and vitamins present in the milk. · 3. To Gain the skills to develop milk powder processing 4. To Gain knowledge about the chemistry of milk and milk products
19P3ACC1	Allied Chemistry-I (Theory behind chemical bonding, quantitative and qualitative analysis, kinetics of chemical reactions and thermodynamics)	National	This paper deals with topics namely bonding and shapes of molecules. Certain physical chemistry portions such as chemical kinetics, thermodynamics are included	1. To comprehend the fundamental theories of Valence Bond, types of overlapping and VSEPR. 2. To categorize the reactions involved in volumetric analysis 3. To analyze the various organic compounds qualitatively 4. To recognize the theories of chemical kinetics.

				5. To highlight the importance of thermodynamics and its related functions.
19C3CC9	Inorganic Qualitative Analysis	National	This course involves the analysis of inorganic mixtures of acid and basic radicals qualitatively.	1. Gain the knowledge of appearance, colour, physical state, and odour of inorganic substances 2. Distinguish whether the given compound is interfering or non-interfering radicals. 3. Perform the confirmatory test for various acid and basic radicals present in the given inorganic compound. 4. Recognize the usage of apparatus and laboratory reagents. 5. Avoiding hazardous experiments by doing microlevel eco friendly

				experiments.
19P3ACC2	Allied chemistry practicals-I	National	This course trains the students to estimate the solutions quantitatively by different techniques.	1. Describe the principles and procedures of various titrimetric methods 2. Identify suitable indicators for a particular reaction 3. Know the various terms such as standard solution, normality, molality, molarity, equivalent weight and molecular weight. 4. Select the specific titric method to estimate the amount of analyte present in the given solution. 5. Apply the expressions and equations to calculate the strength of solutions.

19C4CC10	Inorganic Chemistry-III (Coordination Chemistry)	Global	The Course enables the students to gain knowledge on the chemistry of coordination compounds, carbonyl compounds and "F' block elements.	1. Know the structure and bonding of important coordination compounds 2. Apply the rules to calculate the magnetic properties of complexes and how magnetic moments can be employed for the interpretation of their structure 3. Get an overview about the reaction mechanism of metal complexes 4. Import the skills to elucidate the structure and mode of bonding in organometallic compounds 5. Gain knowledge about the chemistry of Lanthanides and Actinides

19C4CC11	Physical Chemistry-II (Chemical Kinetics, Solid State and distribution Law)	Regional	This course provides an elaborate study of chemical kinetics, solid state and distribution law.	1. To determine integrated rate expression for zero order, first order, second order reactions and their respective half-life period expressions with examples 2. To study the various factors which affect the rate of a chemical reaction such as concentration, temperature, and solvent 3. To learn the crystal diffraction and experimental techniques used to characterize the solid crystals 4. To recognize and give the lattice parameter relationships for the seven crystal systems 5. To value the Nernst distribution law - its thermodynamic derivation,

				modification of law when solute undergoes association, dissociation and chemical combination with one of the solvents
19C4SB2	Natural And Synthetic Dyes	Global	This paper highlights the uses of dyes in our day today life.	1. Know and comprehend the principle and theories of dyes 2. Identify the chromophoric groups and auxochromes present in the dyes 3. Classify the of dyes whether natural or synthetic 4. Predict the structure of dyes 5. Recognise the applications of dyes in various industries
19C4SB2(A)	Health Chemistry	National	This course deals with the basic knowledge about the significances of health and hygiene	1.To Acquire the basic knowledge about the significances of food and hygiene 2.To Classify the given drugs

			in every day human life.	whether they belong to antipyretics, analgesics, depressants etc 3. To Interpret the structure and mechanism of enzyme action 4.To Catagorize and identify the function of the different types of harmones 5. To Analyse the reason for common diseases affecting the human body
19C4CC12	Organic Qualitative Analysis	Global	This paper involves the analysis of inorganic mixtures of acid and basic radicals qualitatively.	1. Gain the knowledge of appearance, colour, physical state, and odour of organic substances 2. Distinguish whether the given compound is Aliphatic or Aromatic and Saturated or Unsaturated.

				3. Perform the confirmatory test for various functional groups present in the given organic compound. 4. Recognize the usage of apparatus and laboratory reagents. 5. Avoiding hazardous experiments by doing microlevel eco-friendly experiments.
19P4ACC3	Allied Chemistry-II (Periodic table and atomic properties, electro chemistry–I, II, Catalysis and photochemistry)	National	This course gives a detailed study of periodic properties, electrochemistry & photochemistry.	1. Understand the periodicity in periodic table 2. Understand the different types of condutances and their relations and the effect of dilution. 3. Use Nernst equation to calculate the electrode potential and emf of electrochemical cells. Study

				the applications of electrochemical measurements 4. Understand the basics of photochemistry using laws of photochemistry and Jablonsky diagram 5. Derive the rate constants o certain photochemical reactions.
19P4ACC4	Allied Chemistry Practicals	National	This course trains the students to estimate the solutions quantitatively by different techniques.	1. Gain the knowledge of appearance, colour, physical state and odour of organic substances. 2. Distinguish whether the given compound is Aliphatic or Aromatic and Saturated or Unsaturated. 3. Perform the confirmatory test for various functional groups present in the given

				organic compound. 4. Recognize the usage of apparatus and laboratory reagents. 5. Relate the experimental observations with theory behind practicals.
19C5CC13	Organic chemistry –III (Aldehydes and Ketones, Carboxylic Acids and Their Derivatives, steroisomerism, Amines And Diazo Compounds And Carbohydrates)	Regional	This course provides an elaborate study of the preparation, reactions and synthetic application of organic compounds	1.To analyze the synthetic importance of reactive methylene compounds 2.To generalize the characteristic features of optical isomers and geometrical isomers
19C5CC14	Physical Chemistry –III (Thermodynamics,	Global	This course provides an elaborate study of the	1. To predict the feasibility of chemical reactions applying II law of thermodynamics 2. To explain the absolute

	Phase Rule & Group Theory)		thermodynamics, Phase Rule and Group theory	entropy of substances and to calculate it
19C5CC15	Inorganic Practicals (Gravimetric Analysis)	National	This paper deals with the preparation of some inorganic complexes and gravimetric estimation of metal ions	1. Acquire the knowledge of concept of gravimetric estimations. 2. Recognise the role of reagents in chemistry.
19C5CC16	Green Chemistry Practicals	National	This paper deals with the preparation of some organic Compounds and analysis of organic compounds.	1. Recognize the usage of apparatus and laboratory reagents. 2. Relate the experimental observations with theory behind practicals.
19C5ME1	Spectroscopy	Global	This paper will be of much use of the students to take up	1. To identify various functional groups present in organic molecules using IR frequency.

			higher studies.	2.To predict the number and nature of protons/ carbons in organic molecules in 1H-NMR/ 13C-NMR spectroscopy
19C5ME2	Bio Chemistry	Regional	This course gives an overview of classification of enzyme and mechanism of enzyme action	1.To identify the various metabolic reactions 2. To understand the importance of nucleic acids
19C5SB3	Medicinal Chemistry	Global	This paper highlights the causes of common diseases the role of vitamin for the healthy life and the importance of hormones	1.To study the mechanism of drug action 2.To determine the designing and binding of drugs with receptors
19C5SB4	Nano Chemistry	Global	This paper deals with study of synthesis, properties,	1. Learn about the background on Nanoscience. 2. Understand the synthesis of nanomaterials and their

			structure and applications of nano particles.	application and the impact of nanomaterials on environment
19C6CC17	Organic chemistry –IV (Polynuclear Hydrocarbons, Heterocyclic Compounds, Amino Acids And Proteins)	Regional	This paper includes the topics, Polynuclear Hydrocarbons, Heterocyclic Compounds, Amino Acids and Proteins, Alkaloids and terpenes.	1. To explicate the structures of Citral, Dipentene and Camphor. 2. To distinguish the properties of quinolin and isoquinoline.
19C6CC18	Physical Chemistry-IV (Electrolytic Conductance And Electrochemistry)	Regional	This course gives a detailed study of electrochemistry & photochemistry	1. Calculate the cell potential for a nonstandard cell. 2. Know the chemical reactions used in a lead-acid battery
19C6ME3	Advanced Organic Chemistry	Global	The course is offered to expose the advanced topics in the field of	1. To sketch Frontier molecular orbitals in photochemistry. 2. To differentitate the

			organic chemistry.	molecular rearrangements and to solve the simple problems
19C6ME4	Polymer Chemistry	Global	The course is offered to expose the advanced topics in the field of polymer chemistry	1. To understand the theories and mechanism of different types of polymerisation processes. 2. To study the applications of the above techniques to synthesize different natural and synthetic polymers.
19C6ME5	Advanced Physical Chemistry	Global	The course is offered to expose the advanced topics in the field of physical chemistry.	1. To understand the theories behind the spectral techniques like MW.IR,NMR and ESR 2. To study the applications of the above techniques to elucidate the structures of molecules
19C6ME6	Advanced Inorganic Chemistry	Global	The course is offered to expose	1. To understand the theories behind inorganic

			the advanced topics in the field of Bioinorganic chemistry.	photochemistry and electroanalytical techniques. 2. To study the applications of the above techniques to elucidate the structures of Bio-inorganic molecules
19C6SB5	Computers In Chemistry	Global	This course deals with the use of computers in molecular modelling and drug design and also covers the use of internet and its application in data search.	1. To write programs to determine lattice energy, half-life, normality, molarity, molality 2. To present structure-based drug designing in both 2D and 3D
19C6SB6	GREEN CHEMISTRY	Global	This course highlights the need for green chemistry approach which is the need of hour to protect the environment from	1. To differentiate between yield and atom economy 2. To interpret the concept of Stereo selectivity, Chemo selectivity and Regio selectivity

			hazardous chemical pollution.	
19C6CC19	PHYSICAL PRACTICALS	Global	This paper involves the experimental studies on Rast method, determination of transition temperature, phase diagrams, &electro chemistry	1. Experience in some scientific methods employed in basic and applied physical chemistry 2. Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry