FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2020 - 2021

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 **PROGRAM CODE: UACH**

PROGRAM OUTCOME

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

PROGRAMME SPECIFIC OUTCOMES:

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 Code	Course Title	Nature Of The Course (Local/National/ Regional/Global)	Course Description	Course Outcomes
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. To derive and familiarise the mechanisms of nucleophilic substitution reactions of organic compounds. organic compound through electron displacement effects 2. Describe the structure and stability of different types of intermediates involved in reaction mechanism. 3. Know the nomenclature,

				classification ofalkanes, alkyl halides.
19C1CC3	VOLUMETRIC ANALYSIS-I	Global	This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different techniques	1. To compare the principles behind all types of titrations 2. To identify suitable indicators for a Particular reaction. 3. To prepare solutions of desired concentrations . 4. To apply the principles of volumetric analysis in acid base, ermanganometry and iodometric titrations.
19N1ACC1	ALLIED CHEMISTRY-I	National	This paper deals with the concept of chemical bonding –	1. To predict the geometry of any molecule with the help of VB and VSEPR theory

			detailed study of VB Theory & MO Theory. Types of Organic Reactions	2. To construct 3. M.O diagram for homonuclear diatomic molecule 4. To categorize the types of organic reactions 5. To describe the chemistry of carbohydrates. 6. 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	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

			Theory and types of Organic Reactions	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 training them in the preparation of household articles	1. Demonstrate the preparation of some home products like candle, detergent powder, soap oil, ink , phenoyl and computer sambirani 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
19Z1ACC2	ALLIED CHEMISTRY PRACTICALS -I	Nationa1	This course trains the students to prepare the solutions of different concentrations and to estimate	1. procedures of various titrimetric methods 2. Identify suitable indicators for a particular reaction 3. Know the various terms such as standard solution,

			quantitatively by different techniques	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	1. Describe the principles and procedures of various titrimetric methods 2. Identify suitable indicators for a particular reaction 3. Know the various terms

			quantitatively by different techniques	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	Regional	This paper deals with the theories of bonding and the chemistry of III, IV, V & VI	1. To categorize the soft, hard and border line acids and bases. 2. To compare Valence bond theory and molecular orbital

	soft acids – bases, chemical bonding and chemistry of group III, IV, V & VI Elements)		group elements.	theory 3. To understand the synthetic importance of organo 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,	Regional	This course covers the topics alkenes, alkadien es, alkynes and organometallics with special	1. Gain a basic knowledge about elimination reactions to prepare alkenes 2. Describe the chemical reactions and

	Alkadienes, organo metallic compounds, Alcohols and Ethers)		emphasis on their synthetic applications	3. structure of alkenes Classify the alkadienes and alkynes Choose the specific reagents to prepare various organic compounds from GR 4. Compare the properties of alcohols and ethers
19C2CC6	VOLUMETRIC ANALYSIS-I1	Global	This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different	1. To apply the principles of volumetric analysis in various estimations. 2. To estimate the amount of calcium using permangano metric method 3. To estimate the amount of calcium and magnesium

			techniques	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. reaction 5. To evaluate the types of catalysis and theories of catalysis
19N2ACC3	ALLIED CHEMISTRY-II (Theory behind chemical bonding, and	National	This paper gives a basic understanding of chemistry to other major students as	1. Apply the rules for naming the coordination complexes and to illustrate the applications of metal complexes in biological

	organic qualitative analysis, kinetics of chemical reactions and catalysis)		allied paper.	systems. 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
19Z2ACC4	ALLIED CHEMISTRY	National	This course trains the students to	1. Gain the knowledge of appearance, colour,

	PRACTICALS-II		analyse the given organic compound	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 Demonstrate the preparation 5. of some home products like

				candle, detergent powder, soapoil, ink , phenoyl and computer sambirani.
19C3CC7	ORGANIC AND INORGANIC CHEMISTRY	Region1	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 thermodyna mics 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	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 Derive the relationship between molar mass of a non- volatile solute and

	and nuclear chemistry)			colligative properties 3. Calculate the mass defect, packing fraction and binding energy for any nuclei 4. 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. Realize the requirements of manures and fertilizers for better production of various types of crops 4. Examine the adverse effect of

				pesticides 5. 5. Calculate the amount of calcium and magnesium present in various types of soils
19P3ACC1	ALLIED CHEMISTRY-I (Theory behind chemical bonding, quantitative and qualitative analysis, kinetics of chemical reactions and thermo	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

	dynamics)			chemical kinetics. 5. To highlight the importance of 6. Thermodynamic s 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'	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

			block elements.	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 5. Organometallic compounds 6. 5. Gain knowledge about the chemistry of Lanthanides and Actinides
19C4CC11	PHYSICAL CHEMISTRY-II (Chemical Kinetics, Solid State and	National	This course provides an elaborate study of chemical	1. To determine integrated rate expression for zero order, first order, second order reactions and their respective half- life period expressions

	distribution Law)		kinetics, solid state and distribution law.	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 To recognize and give the lattice parameter relationships for the seven crystal systems 4. To value the Nernst distribution law 5. - 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. es in dyes	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 Predict the structure of dyes 4. Recognise the applications of dyes in various industries
19C4CC12	ORGANIC	Global	This paper involves	1. Gain the knowledge of

	QUALITATIVE ANALYSIS		the analysis of inorganic mixtures of acid and basic radicals qualitatively.	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.
C5CC11	ORGANIC CHEMISTRY – III	National	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
C5CC12	PHYSICAL CHEMISTRY - III	Global	This course provides an elaborate study of the thermodynamics,	3. To predict the feasibility of chemical reactions applying II law of thermodynamics 4. To explain the absolute

			Phase Rule and Group theory	entropy of substances and to calculate it
C5CC13	INORGANIC PRACTICALS	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.
C5CC14	ORGANIC PREPARATION AND ESTIMATION	National	This paper deals with the preparation of some organic Compounds and analysis of organic	1. Recognize the usage of apparatus and laboratory reagents. 2. Relate the experimental observations with theory

			compounds.	behind practicals.
C5ME1	SPECTRO SCOPY	Global	This paper will be of much use of the students to take up higher studies.	1. To identify various functional groups present in organic molecules using IR frequency. 2. To predict the number and nature of protons/ carbons in organic molecules in 3. 1H-NMR/ 13C- NMR 4. spectroscopy
C5ME2	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

C5SB3	MEDICINAL CHEMISTRY	Global	This paper highlights the causes of common diseases the role of vitamin for the healthy life and the importance of hormones	3. To study the mechanism of drug action 4. To determine the designing and binding of drugs with receptors
C5SB4	NANO CHEMISTRY	Global	This paper deals with study of synthesis, properties, structure and applications of nano particles.	1. Learn about the background on Nanoscience . 2. Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment

C6CC15	ORGANIC CHEMISTRY-IV	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
C6CC16	PHYSICAL CHEMISTRY-IV	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
C6ME3	ADVANCED ORGANIC CHEMISTRY	Global	The course is offered to expose the advanced	1. To sketch Frontier molecular orbitals in photochemistry. 2. To differentitate the

			topics in the field of organic chemistry.	molecular rearrangement s and to solve the simple problems
C6ME4	POLYMERCHE	Global	The course is offered to expose the advanced topics in the field of polymer chemistry	1. 1. To understand the theories and mechanism of different types of polymerisation processes. 2. 2. To study the applications of the above techniques to synthesize different natural and synthetic polymers.
C6ME5	ADVANCED PHYSICAL CHEMISTRY	Global	The course is offered to expose the advanced topics in the field of physical	1. To understand the theories behind the spectral techniques like MW.IR,NMR and ESR 2. To study the applications of

			chemistry.	the above techniques to elucidate the structures of molecules
C6ME6	ADVANCED INORGANIC CHEMISTRY	Global	The course is offered to expose the advanced topics in the field of Bioinorganic chemistry.	1. To understand the theories behind inorganic photochemistry and 2. Electroanalytic al techniques. 3. 2. To study the applications of the above techniques to elucidate the structures of Bio-inorganic molecules
C6SB5	COMPUTERS IN CHEMISTRY	Global	This course deals with the use of computers in molecular	1. To write programs to determine lattice energy, half-life, normality, molarity, molality

			modelling and drug design and also covers the use of internet and its application in data search.	2. To present structure based drug designing in both 2D and 3D
C6SB6	GREEN CHEMISTRY	Global	This course highlights the need for green chemistry approach which is the need of hour to protect the environment from hazardous chemical pollution.	1. To differentiate between yield and atom economy 2. To interpret the concept of Stereo selectivity, Chemo selectivity and 3. Regio selectivity
C6CC17	PHYSICAL CHEMISTRY	Global	This paper involves the experimental	1. Experience in some scientific methods employed in basic

	PRACTICALS		studies on Rast method, determination of transition temperature, phase diagrams, &electro chemistry	and applied physical chemistry 2. Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry
C6CC18	GREEN CHEMISTRY PRACTICALS	Global	This paper includes the greener methods of preparation of Organic compounds and nano particles	1. To understand green synthetic methods 2. To familiarise the synthesis of silver nanoparticle by green approach