AQAR – QUALITATIVE METRIC

2022 - 2023

Criterion 1 - Curricular Aspects

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:

PO1	Have firm foundations in the fundamentals and application of current chemical and scientific theories.
PO2	Are skilled in problem solving, critical thinking and analytical reasoning.
PO3	Are able to identify and solve chemical problems and explore new areas of research.
PO4	Are able to communicate the results of their work to chemists and non-chemists.
PO5	Students will be able to explain that chemistry is an integral part in addressing social, economic, and environmental problems.
PO6	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 Outcomes:

Course Code	**Course Title**	**Nature of the Course (Local/National/Regional/Global)**	**Course Description**	**Course Outcomes**
19C1CC1	Inorganic	Regional	This course deals with the basics of	To comprehend the fundamental properties of

	Chemistry -I		chemistry required for UG programme	atoms, molecules, and the various states of matter CO 2. To classify the electronic structure of atoms and its influence on chemical CO 3. To acquire the knowledge of properties, characteristics and application of non-aqueous solvents CO 4. To recognize the anomalous properties of Li and compares the properties Li with those other alkali metal CO 5. To illustrate the factors affecting the strength of acid and bases.
19C1CC2	Organic Chemistry –I (Reaction Mechanism, Alkanes, Cycloalkanes And	Global	This paper deals with electron displacement effects, Fundamentals of reaction mechanism andprepration,propert	CO 1. Gain a thorough knowledge about the chemistry of aliphatic saturated compounds CO 2. Analyze the behaviour of an organic compound through

	Alkyl Halides)		ies uses of alkanes,cycloalkanes	electron displacement effects CO 3. Describe the structure and stability of different types of intermediates involved in reaction mechanism. CO 4. Know the nomenclature, classification of alkanes, alkyl halides. CO 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 different concentrations and to estimate quantitatively by different techniques	CO 1. To compare the principles behind all types of titrations CO 2. To identify suitable indicators for a particular reaction. CO 3. To prepare solutions of desired concentrations . CO 4. To apply the principles of volumetric analysis in acid base,

				permanganometry,and iodometric titrations.
21C1ACN1	Allied Chemistry-I	National	This paper deals with the concept of chemical bonding – detailed study of VB Theory & MO Theory. Types of Organic Reactions	CO1.To predict the geometry of any molecule with the help of VB and VSEPR theory CO2. To construct M.O diagram for homonuclear diatomic molecule CO3. To categorize the types of organic reactions CO 4. To describe the chemistry of carbohydrates. CO 5. To classify the chemical reactions involved in volumetric analysis
21C1ACZ1	Allied Chemistry-I	National	This paper deals with the concept of chemical bonding – detailed study of VB Theory & MO Theory and types of Organic	CO1.To predict the geometry of any molecule with the help of VB and VSEPR theory CO2. To construct M.O diagram for homonuclear diatomic molecule

			Reactions	CO3. To categorize the types of organic reactions CO 4. To describe the chemistry of carbohydrates. CO 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	CO1. Recognize the important nutrients present in food CO2. Gain knowledge about the fundamental chemistry involved in dairy products C3. Determine the manufacture and functions of various soaps and creams CO4. Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish CO5. Demonstrate the preparation of some home

				products like candle, detergent powder, soap oil,ink , phenoyl and computer sambirani
21C1ACN2	Allied Chemistry Practicals -I	National	. This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different techniques	CO 1. Describe the principles and procedures of various titrimetric methods CO 2. Identify suitable indicators for a particular reaction CO 3. Know the various terms such as standard solution, normality, molality, molarity, equivalent weight and molecular weight. CO 4. Select the specific titrimetric method to estimate the amount of analyte present in the given solution CO 5. Apply the expressions and equations to calculate the strength of solutions

21C1ACZ2	Allied Chemistry Practicals -I	National	This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different techniques	CO 1. Describe the principles and procedures of various titrimetric methods CO 2. Identify suitable indicators for a particular reaction CO 3. Know the various terms such as standard solution, normality, molality, molarity, equivalent weight and molecular weight. CO 4. Select the specific titric method to estimate the amount of analyte present in the given solution CO 5. Apply the expressions and equations to calculate the strength of solutions
19C2CC4	Inorganic Chemistry –II (Theories Of Hard And Soft Acids – Bases, Chemical	Regional	This paper deals with the theories of bonding and the chemistry of III, IV, V & VI group	CO 1. To categorize the soft, hard and border line acids and bases. CO 2. To compare Valence bond theory and molecular orbital

	Bonding And Chemistry Of Group III, IV, V & VI Elements)		elements.	theory CO 3. To understand the synthetic importance of organo metallic compounds of Al, B and Si CO 4. To criticize the chemistry of hydrazine and hydroxyl amine CO 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	CO 1. Gain a basic knowledge about elimination reactions to prepare alkenes CO2. Describe the chemical reactions and structure of alkenes CO 3. Classify the alkadienes and alkynes CO 4. Choose the specific reagents to prepare various organic compounds from GR CO 5. Compare the properties of alcohols and ethers

19C2CC6	Volumetric Analysis-II	Global	This course trains the students to prepare the solutions of different concentrations and to estimate quantitatively by different techniques	CO 1. To apply the principles of volumetric analysis in various estimations. 2. To estimate the amount of calcium using permanganometric method CO 3. To estimate the amount of calcium and magnesium using EDTA method. CO 4. To apply the principle of Argentimetry in the estimation of chloride ions. CO 5. To understand the principles behind the estimations of phenol & Aniline iodometrically.
21C1ACN3	Allied Chemistry-II (Theory Behind Chemical Bonding, And Organic	National	This paper gives a basic understanding of chemistry to other major students as allied paper.	CO 1. Apply the rules for naming the coordination complexes and to illustrate the applications of metal complexes in biological systems. CO 2. To analyze the various

	Qualitative Analysis, Kinetics Of Chemical Reactions And Catalysis)			organic compounds qualitatively CO 3. To understand the procedure involved in detection of elements. CO 4. To explain the kinetics of a chemical reaction and to calculate the order of a particular reaction CO 5. To evaluate the types of catalysis and theories of catalysis
21C1ACZ3	Allied Chemistry-II (Theory Behind Chemical Bonding, And Organic Qualitative Analysis, Kinetics Of Chemical Reactions And Catalysis)	National	This paper gives a basic understanding of chemistry to other major students as allied paper.	CO 1. Apply the rules for naming the coordination complexes and to illustrate the applications of metal complexes in biological systems. CO 2. To analyze the various organic compounds qualitatively CO 3. To understand the procedure involved in detection ofelements.

				CO 4. To explain the kinetics of a chemical reaction and to calculate the order of a particular reaction CO 5. To evaluate the types of catalysis and theories of catalysis
21C1ACN4	Allied Chemistry Practicals-II	National	This course trains the students to analyse the given organic compound	CO 1. Gain the knowledge of appearance, colour, physical state and odour of organic substances. CO 2. Distinguish whether the given compound is Aliphatic or Aromatic, and Saturated or Unsaturated. CO 3. Perform the confirmatory test for various functional groups present in the given organic compound. CO 4. Recognize the usage of apparatus and laboratory

				reagents. CO 5. Relate the experimental observations with theory behind practicals.
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				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	CO 1. Recognize the important nutrients present in food CO 2. Gain knowledge about the fundamental chemistry involved in dairy products CO 3. Determine the manufacture and functions of various soaps and creams CO 4. Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish CO 5. Demonstrate the preparation of some home products like candle, detergent powder, soap oil, ink , phenoyl and computer sambirani
19C3CC7	Organic And Inorganic	Regional	This paper deals with the concept of	CO 1. To interpret the concept of aromaticity and the main properties of

	Chemistry		aromaticity and the inorganic chemistry part of the paper deals with the general characteristics of elements	aromatic compounds. CO 2. To explore reactivity patterns of conjugated, aromatic molecules and to evaluate the kinetics and thermodynamics controlled reactions. CO 3. Explain types of oxides and oxyacids, their structure and reactivity in halogens CO 4. Discuss the properties d block elements & triads of transition elements. CO 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	Regional	This course provides a detailed study of Gaseous state, Solutions, Theory	CO 1. Gain a basic knowledge about the kinetic theory of gases, gaseous laws, types of velocities and properties of gases

	Solutions, Radio Activity & Nuclear Transformations And Nuclear Chemistry)		of dilute, solutions and Radio activity	CO 2. Distinguish between ideal and non-ideal solutions CO 3. Derive the relationship between molar mass of a non-volatile solute and colligative properties CO 4. Calculate the mass defect, packing fraction and binding energy for any nuclei CO 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.	CO 1. Define the term soil CO 2. Describe the various types of fertilizers and their uses CO 3. Realise the requirements of manures and fertilizers for better production of various types of crops CO 4. Examine the adverse effect of pesticides CO 5. Calculate the amount of calcium and magnesium present

				in various types of soils
19C3SB1(A)	Diary Chemistry	National	This paper provide an understanding of the bioactive role, chemical interactions of milk constituents their components	CO1. To understand The Composition, physical and chemical properties of milk.· CO2. To Know the minerals and vitamins present in the milk. · CO3.To Gain the skills to develop milk powder processing CO4.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	CO 1. To comprehend the fundamental theories of Valence Bond, types of overlapping and VSEPR. CO 2. To categorize the reactions involved in volumetric analysis CO 3. To analyze the various organic compounds qualitatively CO 4. To recognize the theories

				of chemical kinetics. CO 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.	CO 1. Gain the knowledge of appearance, colour, physical state, and odour of inorganic substances CO 2. Distinguish whether the given compound is interfering or non-interfering radicals. CO 3. Perform the confirmatory test for various acid and basic radicals present in the given inorganic compound. CO 4. Recognize the usage of apparatus and laboratory reagents. CO 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.	CO 1. Describe the principles and procedures of various titrimetric methods CO 2. Identify suitable indicators for a particular reaction CO 3. Know the various terms such as standard solution, normality, molality, molarity, equivalent weight and molecular weight. CO 4. Select the specific titric method to estimate the amount of analyte present in the given solution. CO 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	CO 1. Know the structure and bonding of important coordination compounds CO 2. Apply the rules to

			compounds, carbonyl compounds and "F' block elements.	calculate the magnetic properties of complexes and how magnetic moments can be employed for the interpretation of their structure CO 3. Get an overview about the reaction mechanism of metal complexes CO 4. Import the skills to elucidate the structure and mode of bonding in organometallic compounds CO 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.	CO 1. To determine integrated rate expression for zero order, first order, second order reactions and their respective half-life period expressions with examples CO 2. To study the various

				factors which affect the rate of a chemical reaction such as concentration, temperature, and solvent CO 3. To learn the crystal diffraction and experimental techniques used to characterize the solid crystals CO 4. To recognize and give the lattice parameter relationships for the seven crystal systems CO 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	Dyes And Pigments	NATIONAL	This paper highlights the uses of dyes in our day today life.	CO 1. Know and comprehend the principle and theories of dyes

				CO 2. Identify the chromophoric groups and auxochromes present in the dyes CO 3. Classify the of dyes whether natural or synthetic CO 4. Predict the structure of dyes CO 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 in every day human life.	CO 1.To Acquire the basic knowledge about the significances of food and hygiene CO 2.To Classify the given drugs whether they belong to antipyretics,analgesics, depressants etc CO 3. To Interpret the structure and mechanism of enzyme action CO 4.To Catagorize and identify the function of the different

				types of harmones CO 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.	CO 1. Gain the knowledge of appearance, colour, physical state, and odour of organic substances CO 2. Distinguish whether the given compound is Aliphatic or Aromatic and Saturated or Unsaturated. CO 3. Perform the confirmatory test for various functional groups present in the given organic compound. CO 4. Recognize the usage of apparatus and laboratory reagents. CO 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.	CO 1. Understand the periodicity in periodic table CO 2. Understand the different types of condutances and their relations and the effect of dilution. CO 3. Use Nernst equation to calculate the electrode potential and emf of electrochemical cells. Study the applications of electrochemical measurements CO 4. Understand the basics of photochemistry using laws of photochemistry and Jablonsky diagram CO 5. Derive the rate constants o certain photochemical reactions.
19P4ACC4	Allied Chemistry Practicals	National	This course trains the students to estimate	CO 1. Gain the knowledge of appearance, colour, physical

			the solutions quantitatively by different techniques.	state and odour of organic substances. CO 2. Distinguish whether the given compound is Aliphatic or Aromatic and Saturated or Unsaturated. CO 3. Perform the confirmatory test for various functional groups present in the given organic compound. CO 4. Recognize the usage of apparatus and laboratory reagents. CO 5. Relate the experimental observations with theory behind practicals.
19C5CC13	Organic Chemistry –III (Aldehydes And Ketones, Carboxylic Acids And Their Derivatives, Steroisomerism,	Regional	This course provides an elaborate study of the preparation, reactions and synthetic application	CO 1.To analyze the synthetic importance of reactive methylene compounds CO 2.To generalize the characteristic features of optical

	Amines And Diazo Compounds And Carbohydrates)		of organic compounds	isomers and geometrical isomers
19C5CC14	Physical Chemistry –III (Thermodynamics, Phase Rule & Group Theory)	Global	This course provides an elaborate study of the thermodynamics, Phase Rule and Group theory	CO 1. To predict the feasibility of chemical reactions applying II law of thermodynamics CO 2. To explain the absolute 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	CO 1. Acquire the knowledge of concept of gravimetric estimations. CO 2. Recognise the role of reagents in chemistry.
22C5CC16	Conventional And Green Synthesis	Global	This paper deals with the preparation of some organic Compounds via greener routes	CO 1. Recognize the usage of apparatus and laboratory reagents. CO 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 higher studies.	CO 1. To identify various functional groups present in organic molecules using IR frequency. CO 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	CO 1.To identify the various metabolic reactions CO 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	CO 1.To study the mechanism of drug action CO 2.To determine the designing and binding of drugs with receptors

19C5SB4	Nano Chemistry	Global	This paper deals with study of synthesis, properties, structure and applications of nano particles.	CO 1. Learn about the background on Nanoscience . CO 2. Understand the synthesis of nanomaterials and their 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.	CO 1. To explicate the structures of Citral, Dipentene and Camphor. CO 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	CO 1. Calculate the cell potential for a nonstandard cell. CO 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 organic chemistry.	CO 1. To sketch Frontier molecular orbitals in photochemistry. CO 2. To differentitate the 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	CO 1. To understand the theories and mechanism of different types of polymerisation processes. CO 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.	CO 1. To understand the theories behind the spectral techniques like MW.IR,NMR and ESR CO 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 the advanced topics in the field of Bioinorganic chemistry.	CO 1. To understand the theories behind inorganic photochemistry and electroanalytical techniques. CO 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 modellingand drug design and also covers the use of internet and its application in data search.	CO 1. To write programs to determine lattice energy, half-life, normality, molarity, molality CO 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	CO 1. To differentiate between yield and atom economy CO 2. To interpret the concept

			hour to protect the environment from hazardous chemical pollution.	of Stereo selectivity, Chemo selectivity and Regio selectivity
19C6CC19	Physical Practicals	Global	This paper involves the experimental studies on Rast method, determination of transition temperature, phase diagrams, &electro chemistry	CO 1.Experience in some scientific methods employed in basic and applied physical chemistry CO 2. Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry