



MANNAR THIRUMALAI NAICKER COLLEGE

A Co-educational, Autonomous and Linguistic Minority Institution

Affiliated to Madurai Kamaraj University

Re-accredited with "A" Grade by NAAC

Pasumalai, Madurai – 625 004 Tamil Nadu.

CURRICULUM RELEVANCE TO THE LOCAL, REGIONAL, NATIONAL AND GLOBAL NEEDS

NAME OF THE PROGRAMME: B.SC CHEMISTRY PROGRAMME CODE: UCH

PROGRAMME OUTCOMES

PO1: Demonstrate the knowledge and understanding of Science concepts and its relevant fields.

PO2: Identify, Formulate, analyze complex problems and reach valid conclusions using the methodologies of Science.

PO3: Employ critical and analytical thinking in understanding the concepts and apply them in various problems appearing in different branches of science.

PO4: Communicate the known concepts effectively within the profession/with any forum and Plan, execute, report the results of an experiment.

PO5: Function successfully as a member/ leader in any team and to apply ethics, accountability and equity in their life.

PO6: Use ICT tools in various learning situations, related information sources, suitable software to analyze data and furthermore participating in learning activities throughout life to meet the demands of work place through knowledge /up-skilling / re-skilling.



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PROGRAMME SPECIFIC OUTCOMES

PSO1: Learn various concepts of organic, inorganic, physical chemistry, their biological aspects and their application in day-to-day life.

PSO2: Design towards executing experiments and confident handling of equipment's in Chemistry for industries.

PSO3: Execute new ideas in the field of research and development using principles and techniques of science learned through activities such as expert lecturers, workshops, seminars and field projects.

PSO4: Aspire the knowledge of green environment learned through green chemistry and pollution free scenario

PSO5: Work effectively with a set of teams using modern technical skills and innovative research ideas in Chemistry areas

PSO6: Develop employability and entrepreneurship skills learned through industry-based curriculum



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Sl. No	Course Code	Course Name	Course Outcomes
1.	21UCHC11	Inorganic Chemistry – I	CO1: Recall the general characteristics of sub atomic particles of an atom and periodicity CO2: Discuss the long form periodic table, types of chemical bonds and concept of Acids and Bases. CO3: Prepare the hydrogen, ozone and hydrogen peroxide and compute the properties with alkali metals CO4: Examine the Quantum model of an atom and VSEPR theory to find the geometry of molecules CO5: Apply various types of bonds and quantum model of atom for the geometry of molecules
2.	21UCHCP1	Major Chemistry Practical – I (Inorganic Semi Micro – Qualitative Analysis)	CO1: Identify the basic radical and its group in the given salt mixture. CO2: Understand the qualitative analysis skill of any given inorganic salt mixture. CO3: Develop the acid radicals present in the given inorganic salt mixture. CO4: Analyze the basic radical systematically. CO5: Apply the four radicals with correct procedure during analysis of the salt mixtures
3.	21UCHS11	Cosmetic Chemistry	CO1: Relate the characteristics of tooth pastes, hair care products. CO2: Understand the concepts of manufacture of soaps, detergents, hair care and consumer products. CO3: Compare the milk and sugar products on their composition. CO4: Correlate the consumer products, sugar and food adulteration. CO5: Construct the characteristics and understand the consumer products.



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4.	21UCHS12	Green Chemistry	CO1: List out the twelve principles of Green Chemistry. CO2: Understand the need for green chemistry and goals of Green Chemistry. CO3: Apply Green Chemistry principles to organic synthesis. CO4: Analyze the uses of Microwave and ultrasonic radiations to carry our reaction. CO5: Construct the basic concepts and twelve principles of Green Chemistry in designing green synthesis
5.	21UCHC21	Organic Chemistry – I	CO1: Identify the basic idea of organic compounds and carbohydrates. CO2: Classify the hydrocarbons, alcohols, ethers and carbohydrates. CO3: Determine the preparation of hydrocarbons, alcohols, ethers and the given carbonyl compounds. CO4: Analyze the physical and chemical properties of hydrocarbons, alcohols, ethers and the given carbonyl compounds. CO5: Construct the basic idea of preparation, properties of organic compounds and carbohydrates.
6.	21UCHS21	Dairy Chemistry	CO1: Understand the chemistry of milk products. CO2: Outline the techniques of milk processing. CO3: Construct the flow chart diagram in the manufacture of special milk. CO4: Illustrate the manufacture of various dairy products. CO5: Determine the chemistry of milk products and manufacture of various dairy products.
7.	21UCHS22	Dye Chemistry	CO1: Identify the colour and constitution observed to wavelength of light. CO2: Outline the direct or disperse dyes and applications. CO3: Apply Azine, Oxacine, triazine dyes, pigments towards its applications.



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			CO4: Classify the Nitro, Nitroso, Triphenyl methane, Azo and Phthalein dyes. CO5: Determine the properties of dyes and apply in medicine, cosmetics, food and beverages.
8.	21UCHC31	Physical Chemistry – I	CO1: Recall the postulates of kinetic theory of gases and classification of colloids CO2: Discuss the gaseous state and types of adsorptions CO3: Enumerate the properties of gaseous state, colloids, adsorption and catalysis CO4: Examine the characteristics of adsorption and catalysis CO5: Apply the order and molecularity of the reaction and derivation of order of the reactions
9.	21UCHC32	Inorganic Chemistry – II	CO1: Relate the general characteristics of s-block, p-block elements. CO2: Understand the concepts of important compounds of s-, p- block and naming the coordination compounds. CO3: Compare the isomerism of coordination compounds. CO4: Correlate the diagonal relationship and anomalous properties of each group elements CO5: Construct the EAN rule, VBT, CFT on the basis of coordination compounds.
10.	21UMCA32	Allied Mathematics – I	CO1: Learn and solve system of linear equations. CO2: Develop and maintain problem solving skills in Numerical Equations. CO3: Solve the exponential and trigonometric equations CO4: Recognize the relationship



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			between $\sin \theta$, $4 \cos \theta$ and $\tan \theta$. CO5: Understand the ideas about the Hyperbolic functions and Inverse Hyperbolic Functions
11.	21UMBS32	Allied Microbiology – I: Fundamentals of Microbiology	CO1: Describe the knowledge and historical perspective of microbiology. CO2: Determine about the structure and classification of Bacteria. CO3: Illustrate about the Fungi classification, Structure and reproduction. CO4: Differentiate the different types of Virus structure, classification and reproduction. CO5: Identify the structural organization of Algae and Protozoa.
12.	21UCHN31	Basic Concepts in Chemistry	CO1: Ability to remember the basic concepts of atoms, molecules, fuels, catalysis. CO2: Discuss the composition of the solutions and mixtures and type of catalysts. CO3: Interpret the knowledge of atoms, molecules, fuels and catalysts. CO4: Examine the properties of metals and non-metals and role of catalysts. CO5: Distinguish between pure substance and mixtures, various types of catalysts.
13.	21UCHC41	Organic Chemistry – II	CO1: Recall the general characteristics of aromatic compounds and discuss the reaction CO2: Prepare the aromatic compounds like aromatic hydrocarbons, halogen, amino, substituted CO3: Examine the effect of substituents on acidic/basic character of aromatic compounds. CO4: Interpret the directive influence of



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			substituent on electronic effects and properties of aromatic compounds. CO5: Integrate the reaction mechanism of aromatic compounds and formulate in the synthetic applications.
14.	21UCHC42	Physical Chemistry – II	CO1: Outline the basic principles and applications of chemistry in detail. CO2: Apply the concept of duality, spectroscopic techniques, symmetry aspects, theory of dilute solutions and phase equilibrium for chemical systems. CO3: Analyze the concept of quantum theory, the physical properties of various equilibria and spectroscopic parameters. CO4: Evaluate the practical utility of complicated problem-solving skill aspects. CO5: Develop a strategy to acquire advanced knowledge in various analytical techniques.
15.	21UCHCP2	Major Chemistry Practical – II (Volumetric Analysis)	CO1: Discuss the theory of safety measures in chemistry laboratory. CO2: Understand the quantitative analysis in practical chemistry. CO3: Apply the theory on quantitative titration methods. CO4: Analyze the titrated values in tabular format. CO5: Construct the estimated value of the given compounds.
16.	21UMCA43	Allied Mathematics – II	CO1: Develop the notions about Mathematical formulation and Solving Linear Programming Problem. CO2: Acquire the knowledge about the view of transportation and assignment problems. CO3: Identify and develop the real life problems into network problems CO4: Distinguish a game situation from



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			a pure individuals decision problems CO5: Understand the Mathematical tools that are needed to solve various optimization problems.
17.	21UMBA42	Allied Microbiology – II: Applied Microbiology	CO1: Recognize the Beneficial microorganism in agriculture CO2: Experiment with the role of microbes present in air and water. CO3: Analyze and compare the important microorganisms in food CO4: Examine the Industrially important microorganisms and its products. CO5: Summarize the importance of microbes in human diseases
18.	21UCHN41	Water Treatment	CO1: Recall the general characteristics of hardness of water and its estimation. CO2: Discuss the sterilization methods and comparison of sludge and scale. CO3: Understand the concepts of internal conditioning and external conditioning. CO4: Examine the boiler corrosion and demineralization processes. CO5: Apply the domestic water treatment and ultraviolet treatment on water analysis.
19.	21UCHC51	Organic Chemistry – III	CO1: Reminisce the alicyclic compounds, free radicals and proteins and deliberate the reaction mechanism of aromatic compounds. CO2: Prepare the heterocyclic compounds, short lived and long-lived free radicals. CO3: Differentiate between configuration and conformation and distinguish between proteins and nucleic acids. CO4: Interpret the directive influence of substituents on electronic effects and properties of aromatic compounds.



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			CO5: Integrate the reaction mechanism of aromatic compounds and formulate in the synthetic applications.
20.	21UCHE51	Analytical Chemistry	CO1: Ability to understand the concept of chromatography. CO2: Discuss the interplanar spacing and principles of gravimetric analysis. CO3: Interpret the methods of obtaining precipitate and types of errors CO4: Examine the experimental analysis of methods CO5: Analyze the chromatographic technique and applications
21.	21UCHE54	Bioinorganic Chemistry	CO1: Identify the fundamentals of biomolecules in biological systems and their structures CO2: Remember the structures of myoglobin & hemoglobin, copper & nitrogen enzymes. CO3: Compare the behavior of dioxygen bound to metals and role of metals in medicine CO4: Perform the structure of the active site in myoglobin & hemoglobin CO5: Determine the metals containing proteins and enzymes and metal toxicity
22.	21UCHS51	Drug Chemistry	CO1: Ability to know the basic of anaesthetics and chemotherapy CO2: Discuss various synthetic drugs, gaseous anaesthetics, chemotherapy and its uses CO3: Interpret the different systems of medicines and its drug actions CO4: Examine the antibiotics and indole derivatives CO5: Analyze the therapeutic function of synthetic drugs
23.	21UCHCP3	Major Chemistry Practical – III(Physical Chemistry experiments)	CO1: Determination of molecular weight by Transition Temperature method and Rast macro method. CO2: Involvement of phase diagram and CST. CO3: Analyze the relative strength of acids by hydrolysis of ester. CO4: Interpret the equilibrium constant



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			for the reaction CO5: Determine the cell constant and conductivity titration between as acid and a base.
24.	21UCHC61	Physical Chemistry – III	CO1: To acquire elaborate the basic knowledge in thermodynamics. CO2: To get more knowledge second law of thermodynamics, entropy. CO3: To learn about the photochemical reactions and photochemical processes. CO4: To determine the concept of conductance and conductometric titrations. CO5: To analysis the basic knowledge in electrodes, electrode potentials and potentiometric titrations
25.	21UCHE61	Applied Chemistry	CO1: Define insecticides, pesticides, petrochemicals and fertilizers and discuss their classification. CO2: Determine water quality, raw materials needed for match and silicate industries. CO3: Distinguish between water and sewage treatment and chemicals used between petrochemicals and paints and lacquers. CO4: Interpret the preparation of domestically useful chemical products. CO5: Integrate the method of sewage treatment and fertilizer industries in India.
26.	21UCHE64	Nano Chemistry	CO1: Define nanomaterials and its types of nanomaterials CO2: Understand the nanoparticles and synthetic methods of nanomaterials CO3: Analyze the classical colloid theory on nanomaterials CO4: Interpret the optical characterization of prepared nanomaterials CO5: Distinguish the application of nanomaterials
27.	21UCHCP4	Major Chemistry	CO1: Relate and classify between gravimetric analysis and organic



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		Practical – IV(Gravimetric Analysis and Organic Preparation)	preparation CO2: Estimate lead, barium, calcium, copper and nickel. CO3: Analyze the various types of organic preparation. CO4: Interpret the organic preparation like nitration, bromination, hydrolysis, oxidation, benzylation and acetylation. CO5: Assemble the analyzed and prepared organic compounds samples.
28.	21UCHCP5	Major Chemistry Practical – V(Organic Analysis and Estimation)	CO1: Relate and classify between organic analysis and estimation of organic compounds CO2: Estimate the phenol, aniline and glucose CO3: Analyze the one or two functional groups of organic compounds CO4: Interpret the organic analysis and estimation of organic compounds CO5: Distinguish between analysis and estimation of one or two functional groups of organic compounds