

Holy Cross College (Autonomous), Nagercoil
Kanyakumari District, Tamil Nadu.
Accredited with A⁺ by NAAC - IV cycle – CGPA 3.35

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli



Semester I & II

POs, PSOs & COs

DEPARTMENT OF CHEMISTRY



2023-2026

(With effect from the academic year 2023-2024)

Programme Educational Objectives (PEOs)

PEOs	Upon completion of B.A/B.Sc. Degree Programme, the graduates will be able to	Mapping with Mission
PEO 1	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.	M1& M2
PEO 2	use practical knowledge for developing professional empowerment and entrepreneurship and societal services.	M2, M3, M4 & M5
PEO 3	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.	M3, M4, M5 & M6

Programme Outcomes (POs)

POs	Upon completion of B.Sc. Degree Programme, the graduates will be able to:	Mapping with PEOs
PO1	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.	PEO1
PO2	create innovative ideas to enhance entrepreneurial skills for economic independence.	PEO2
PO3	reflect upon green initiatives and take responsible steps to build a sustainable environment.	PEO2
PO4	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.	PEO1 & PEO3
PO5	communicate effectively and collaborate successfully with peers to become competent professionals.	PEO2 & PEO3
PO6	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	PEO2 & PEO3
PO7	participate in learning activities throughout life, through self-paced and self-directed learning to improve knowledge and skills.	PEO1 & PEO3

Programme Specific Outcomes (PSOs)

PSOs	Upon completion of B.Sc Chemistry programme, the graduates will be able to:	Mapping with POs
PSO - 1	understand the fundamentals, theories and principles of organic, inorganic and physical chemistry.	PO1
PSO - 2	analyze physical and chemical properties of chemical compounds and their uses.	PO1& PO7
PSO - 3	interpret the mechanism of various chemical reactions.	PO3 &PO4
PSO - 4	synthesize organic and inorganic compounds using classical and modern methods.	PO2
PSO - 5	design and carry out scientific experiments, record and interpret the results with accuracy	PO1& PO4
PSO - 6	use concepts, tools and techniques related to chemistry to other branches of science.	PO5
PSO - 7	develop skills in the safe-handling of chemicals and their usage in day today life.	PO1&PO7
PSO - 8	develop entrepreneurial skills, empowered to fulfil the professional requirement and become self-dependent.	PO2& PO6

Mapping of PO'S and PSO'S

POs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
PO1	S	S	S	S	S	S	S	S
PO2	S	S	M	M	S	S	M	S
PO3	M	M	M	S	S	S	S	S
PO4	S	S	S	M	M	S	M	M
PO5	S	M	M	M	S	S	S	S
PO6	M	M	M	M	S	S	S	S
PO7	S	S	S	S	S	S	S	S

Course Outcomes

SEMESTER – I

CORE COURSE – I : GENERAL CHEMISTRY – I

Course Code : CU231CC1

On the successful completion of the course, student will be able to:		
1	remember the atomic structure, periodic properties, bonding, electronic configuration and properties of compounds.	K1
2	understand and classify the elements in the periodic table, types of bonds, reaction intermediates, electronic effects in organic compounds and types of reagents.	K2
3	apply the theories to calculate energy of spectral transition, electronegativity, percentage ionic character and bond order.	K3
4	analyse the relationship existing between electronic configuration, bonding, geometry of molecules, structure reactivity and electronic effects	K4
5	evaluate the trends in periodic properties, assess the properties of elements, and explain hybridization in molecules, nature of H – bonding and organic reaction mechanisms.	K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate

SEMESTER – I

CORE PRACTICAL I : QUANTITATIVE INORGANIC ESTIMATION (TITRIMETRY) AND INORGANIC PREPARATIONS

Course Code : CU231CP1

On the successful completion of the course, student will be able to:		
1	explain the basic principles involved in titrimetric analysis and inorganic preparations.	K1
2	compare the methodologies of different titrimetric analysis.	K2
3	calculate the concentrations of unknown solutions in different ways and develop the skill to estimate the amount of a substance present in a given solution.	K3
4	assess the yield of different inorganic preparations and identify the end point of various titrations	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze

SEMESTER – I
ELECTIVE COURSE I: BOTANY AND ZOOLOGY MAJOR
CHEMISTRY FOR BIOLOGICAL SCIENCES – I

Course Code : CU231EC1

On the successful completion of the course, student will be able to:		
CO1	remember the atomic structure, the preparation and uses of various compounds	K1
CO2	understand the efficiencies and uses of various drugs, fertilizers and fuels.	K2
CO3	explain and apply various theories behind osmosis, catalysis and chromatography	K3
CO4	differentiate the structure and uses of antibiotics, anaesthetics, antipyretics and artificial sugars.	K4
CO5	analyse various methods to separate chemical compounds	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze

SEMESTER – I
ELECTIVE PRACTICAL I: VOLUMETRIC ANALYSIS
(BOTANY AND ZOOLOGY MAJOR)

Course Code : CU231EP1

On the successful completion of the course, student will be able to:		
CO1	understand the principles of titrimetric methods.	K1
CO2	gain knowledge on the usage of standard flask, pipette and burette.	K2
CO3	design, carry out, record and interpret the results of various titrations and apply their skill in the estimation of various compounds.	K3
CO4	analyze the suitable indicators for various titrations	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

SEMESTER – I
NON MAJOR ELECTIVE NME I : FOOD CHEMISTRY
Course Code : CU231NM1

On the successful completion of the course, student will be able to:		
1	remember and recall the different types of adulterants in food, edible oils used in foods and beverages.	K1
2	understand the effect of chemicals in common food and their adverse impact on health.	K2
3	apply various methods to detect various adulterants in food and to determine the values of oils and fats.	K3
4	analyze the effects of contaminants and additives in food.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze;

SEMESTER I
FOUNDATION COURSE: BASICS OF CHEMISTRY
Course Code : CU231FC1

On the successful completion of the course, student will be able to:		
CO 1	remember the basic concepts of periodic classification, chemical bonding, nomenclature of organic compound, isomerism and state of matter.	K1
CO 2	understand the periodic properties, types of bonding, hybridization, stereo isomerism, properties of matter and spectroscopy.	K2
CO 3	apply the concepts of valence bond theory, hybridization, isomerism IUPAC nomenclature and spectroscopy to chemical compounds.	K3
CO 4	analyze the periodic properties of elements, magnetic properties, characteristic of solids and types of spectroscopic techniques.	K4
CO 5	evaluate quantum numbers and their significance and percentage of ionic character of compounds.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** – Evaluate

SEMESTER I
SPECIFIC VALUE ADDED COURSE – ARTICLES IN EVERY DAY LIFE
Course Code : CU231V01

On the successful completion of the course, student will be able to:		
CO 1	know about oils, fats and soaps	K1
CO 2	understand the methods to prepare some articles in daily use	K2
CO 3	apply the prepared things in daily life	K3
CO 4	remember the hazards of chemicals	K2
CO 5	analyze and use the safety compounds for their use	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze

SEMESTER II

CORE COURSE II: GENERAL CHEMISTRY - II

Course Code : CU232CC1

On the successful completion of the course, students will be able to:		
1.	explain the concept of acids, bases and ionic equilibria; periodic properties of s and p-block elements, preparation and properties of aliphatic and aromatic hydrocarbons	K1
2.	discuss the periodic properties of s and p- block elements, reactions of aliphatic and aromatic hydrocarbons and strength of acids	K2
3.	classify hydrocarbons, types of reactions, acids and bases, examine the properties s and p-block elements, reaction mechanisms of aliphatic and aromatic hydrocarbons	K3
4.	explain theories of acids, bases and indicators, buffer action and important compounds of s-block elements	K3
5.	assess the application of acids, indicators, buffers, compounds of s and p- block elements and hydrocarbons	K4

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4**-Analyze

SEMESTER – II

CORE LAB COURSE II: ORGANIC ESTIMATION AND PREPARATION OF ORGANIC COMPOUNDS

Course Code : CU232CP1

On the successful completion of the course, student will be able to:		
1.	explain the basic principles involved in organic estimation	K1
2.	know the methods of preparing organic compounds.	K2
3.	assess the yield of different organic preparations	K3
4.	compare the methodologies in preparing various compounds	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4**-Analyze

SEMESTER – II
ELECTIVE COURSE II:
CHEMISTRY FOR BIOLOGICAL SCIENCES – II
BOTANY AND ZOOLOGY MAJOR
Course Code : CU232EC1

On the successful completion of the course, student will be able to:		
CO1	remember the importance of amino acids and learn the . basic concepts of Ayurveda	K1
CO2	understand the importance of nucleic acids and vitamins	K2
CO3	know the biological functions of lipids, oils and fats	K1
CO4	understand the function and deficiency of metals in human system	K2
CO5	outline the various type of photochemical process.	K3

K1 - Remember; K2 - Understand; K3 - Apply

SEMESTER – II
ELECTIVE LAB COURSE II : SYSTEMATIC ANALYSIS OF ORGANIC
COMPOUNDS
BOTANY AND ZOOLOGY MAJOR
Course Code : CU232EP1

On the successful completion of the course, student will be able to:		
1	learn to test the organic substances	K1
2	identify the functional group present in the organic compounds	K2
3	detect the elements present	K3
4	distinguish between aliphatic, aromatic, saturated and unsaturated compounds	K3
5	analyze the given organic substance	K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze

SEMESTER – II

NON MAJOR ELECTIVE NME II : COSMETICS AND PERSONAL GROOMING

Course Code : CU232NM1

On the successful completion of the course, student will be able to:		
1.	remember the composition of various chemicals in cosmetic products	K1
2.	understand the methods of beauty treatments and their advantages and disadvantages	K2
3.	apply the functions of various chemicals in cosmetics	K3
4.	analyze the advantages and hazards of cosmetics	K4
5.	evaluate the quality of cosmetics on the basis of their chemical composition	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

SEMESTER II

SKILL ENHANCEMENT COURSE SEC I: DAIRY CHEMISTRY

Course Code : CU232SE1

On the successful completion of the course, student will be able to:		
1	remember the composition of milk and its processing.	K1
2	understand the physio-chemical properties, pasteurization process and manufacture of milk and milk products	K2
3	apply the procedure for milk processing and determine the adulterants present in dairy products	K3
4	analyze the ingredients, nutritive values and manufacture of special milks and dairy products.	K4
5	evaluate fat, SNF, specific gravity, acidity, pH, surface tension, viscosity and physio-chemical properties of milk and milk products.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

SEMESTER I & II
Life Skill Training I: Catechism
Course Code: UG232LC1

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values

SEMESTER I & II
Life Skill Training I: Moral
Course Code: UG232LM1

Course Outcome	Upon completion of this course the students will be able to
CO-1	understand the aim and significance of value education
CO-2	develop individual skills and act confidently in the society
CO-3	learn how to live lovingly through family values
CO-4	enhance spiritual values through strong faith in God
CO-5	learn good behaviours through social values