

தரமாய் கற்று வளமாய் வாழ..!



ST ALPHONSA COLLEGE **OF ARTS AND SCIENCE**



An Institution run by the Syro Malabar Catholic Diocese of Thuckalay
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DEPARTMENT OF **CHEMISTRY**

PROGRAMME

&

COURSE OUTCOMES

2024-2025

DEPARTMENT OF CHEMISTRY

Programme Outcomes: B.Sc Chemistry

Chemistry is referred to as the Science that systematically study the composition, properties, and reactivity of matter at atomic and molecular level. The scope of Chemistry is very broad. The key areas of study in Chemistry comprise of Organic Chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry. Organic Chemistry deals with study of substances containing carbon mostly, Inorganic Chemistry deals with study of all other elements/compounds/substances and their chemical properties. Physical Chemistry deals with applications of concepts, laws to chemical phenomena. Analytical Chemistry deals with identification and quantification of materials. Interdisciplinary subjects like nano-materials, biomaterials, etc and their applications from chemistry point of view added new dimension to materials Chemistry. Thus, the degree programme in Chemistry also intended to cover overlapping areas of Chemistry with Physics, Biology, Environmental Sciences. Further, a broad range of subjects such as materials chemistry, biomaterials, nanomaterials, environmental chemistry, etc., can be helpful for students to broaden the scope of their studies and hence applications from job perspective point of view. Therefore, as a part of efforts to enhance employability of graduates of Chemistry, in addition, industrial visits/industrial projects are encouraged and added to the curriculum in order to enhance better exposure to jobs/employment opportunities in industries, scientific projects and allied sectors.

After completion of three-year degree programme in Chemistry a student should be able

- To get exposed to strong theoretical and practical background in fundamental concept.
- To broaden and balance knowledge in Chemistry in addition to understanding of key chemical concepts, principles and theories

- Solve the problem and also think methodically, independently and draw a logical conclusion.
- To employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions
- To understand good laboratory practices and safety.
- To find out the green route for chemical reaction for sustainable development.
- To create an awareness about impact of Chemistry on the environment, society and development outside the scientific community
- To provide knowledge and skill to the students' thus enabling them to undertake further studies in Chemistry related areas or multidisciplinary areas that can be helpful for self-employment/ entrepreneurship.
- To mould a responsible citizen who is aware of most basic domain-independent knowledge, including critical thinking and communication.
- To facilitate the students in pursuing their higher studies in Chemistry, to boost their career and employment options and to apply chemistry in their everyday life.
- Applying subject knowledge for sustainable environment friendly green initiatives
- Applying subject knowledge for new research and technology
- Achieve the skills required to succeed in graduate school, professional school and the chemical industry like Cement industries, Agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc.
- To enable the graduate, prepare for national as well as international competitive examinations, especially UGC-CSIR NET and UPSC Civil Services Examination.

PO1: Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study

PO2: Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups

PO3: Critical thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development

PO 4: Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

PO 5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO 6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation

PO7: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team

PO 8: Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO 9: Reflective thinking: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society

PO 10: Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

PO 11: Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

PO 12: Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

PO 14: Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.

PO 15: Lifelong learning: Ability to acquire knowledge and skills, including „learning how to learn“, that are necessary for participating in learning activities throughout life, through self-paced and meeting economic, social and cultural objectives, and adapting to changing trends and demands of work place through knowledge/skill development.

DEPARTMENT OF CHEMISTRY

Course Outcomes: B.Sc Chemistry

The Chemistry course curriculum for the undergraduates includes the main areas of Chemistry: Organic, Inorganic and Physical Chemistry. The purpose of the program is to provide the key knowledge base and laboratory resources to prepare students for careers as professionals in the field of Chemistry. The department of chemistry works towards the development of a firm foundation in the fundamentals and application of current chemical and scientific theories. The students are taught how to design and carry out scientific experiments as well as accurately record and analyse the results of such experiments. The course is so well designed that the students understand the central role of chemistry in our society and become potent enough to explore new areas of research both in chemistry and in allied fields of research and technology.

COURSE OUTCOMES

Academic Year 2024-2025

Sem	Subject No	Subject Status	Subjects	Subject Code	Contact Hrs/Week	Credit
I	3	Core Course I	General Chemistry – I	FCCH11	5	5
	4	Core Practical I	Quantitative Inorganic Estimation	FCCHP1	3	3
	5	Skill Enhancement Course I	Food Chemistry	FSCH11	2	2
	6	Skill Enhancement Course	Foundation Course	FFCH11	2	2
II	9	Core Course II	General Chemistry - II	FCCH21	5	5
	10	Core Practical II	Qualitative Organic Analysis	FCCHP2	3	3
	13	Skill Enhancement Course 2	Dairy Chemistry	FSCH21	2	2
	14	Skill Enhancement Course 3	Role of Chemistry in Daily life	FFCH21	2	2
	15	Common	Naan Mudhalvan-Cambridge course - English / *Cosmetics and personal grooming	FNMCH2	2	2
III	19	Core Course V	General Chemistry - III	EMCH31	4	4
	20	Core Practical III	Qualitative inorganic analysis (simple salt) and determination of physical constant	EMCHP3	2	2
	21	Allied Course I	Allied Chemistry for Physical Sciences - I	EECH11	4	3
	22	Allied Practical I	Allied Chemistry Practical for Physical Sciences - I	EECHP1	2	2
	23	Skill Based Course	Entrepreneurial skills in Chemistry- Practical	ESCHP1	4	4
	24	Skill Based Course	Naan mudhalvan /*Pesticide chemistry	ENMCH3	2	2
	25	EVS	Environmental studies	EEVS31	2	2
IV	28	Core Course VI	General Chemistry - IV	EMCH41	4	4
	29	Core Practical IV	Qualitative Inorganic analysis – mixture of salts	EMCHP4	2	2
	30	Allied Course II	Allied Chemistry for Physical Sciences - II	EECH21	4	3
	31	Allied Practical II	Systematic Analysis of Inorganic Salts	EECHP2	2	2

	32	Skill Based Course	Instrumental methods of chemical analysis	ESCHP2	4	4
	34	Skill Based Course	Naan mudhalvan /* Forensic science	ENMCH4	2	2
	35	Common	Value based education	EEVS41	-	1
V	36	Core Course VII	Organic Chemistry II	CMCH51	6	4
	37	Core Course VIII	Physical Chemistry II	CMCH52	6	4
	38	Major Elective I	Polymer Chemistry	CECH51	4	4
	39	Major Elective -II	Applied Chemistry	CECH54	4	4
	40	Major Practical V	Organic Analysis & Physical Constant determination	CMCHP5	4	4
	41	Major Practical VI	Gravimetric Estimation & Inorganic Preparation	CMCHP6	4	4
	42	Skill Based Common	Personality Development	CCSB51	2	2
VI	43	Core Course IX	Inorganic Chemistry - III	CMCH61	5	4
	44	Core Course X	Organic Chemistry - III	CMCH62	5	4
	45	Core Course XI	Physical Chemistry - III	CMCH63	5	4
	46	Major Elective III	Nano Chemistry	CECH62	4	4
	47	Major Practical VII	Physical Chemistry Experiments	CMCHP7	4	2
	48	Major Project	Group Project	CMCH6P	7	7

SEMESTER - I

Subject Code: FCCH11

Subject: General Chemistry – I

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To recall the structure of atom and explain the theories and concepts that go with it	CHEGC1-01
2	<ul style="list-style-type: none">To identify and classify the elements, as well as knowing the periodic properties	CHEGC1-02
3	<ul style="list-style-type: none">To discuss the theories of chemical bonding and how they are used to explain the structure and properties of various molecules	CHEGC1-03
4	<ul style="list-style-type: none">To evaluate the relationship existing between electronic configuration, bonding, geometry of molecules and reactions; structure reactivity and electronic effects	CHEGC1-04
5	<ul style="list-style-type: none">To construct MO diagrams, predict trends in periodic properties, assess the properties of elements, and explain hybridization in molecules, nature of H – bonding and organic reaction mechanisms	CHEGC1-05

Subject Code: FCCHP1

Subject: Quantitative Inorganic Estimation

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able to understand		
1	<ul style="list-style-type: none">The the basic principles involved in titrimetric analysis	CHEIQEP-01
2	<ul style="list-style-type: none">The preparation of solutions of different Molarity/Normality of titrants	CHEIQEP-02
3	<ul style="list-style-type: none">The methodologies of different titrimetric analysis.	CHEIQEP-03
4	<ul style="list-style-type: none">To 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	CHEIQEP-04
5	<ul style="list-style-type: none">And plan experimental projects and execute them and assess the yield of different inorganic preparations and identify the end point of various titrations.	CHEIQEP-05

Subject Code: FSCH11

Subject: Food Chemistry

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To understand the type of food	CHESFC-01
2	<ul style="list-style-type: none">To know the food adulteration and poison	CHESFC-02
3	<ul style="list-style-type: none">To know the food additives and preservation	CHESFC-03
4	<ul style="list-style-type: none">To understand the beverages and edible oil	CHESFC-04

Subject Code: FFCH11

Subject: Foundation Course

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To understand the atom structure and periodic properties	CHEFC-01
2	<ul style="list-style-type: none">To gain knowledge on types of chemical bonding	CHEFC-02
3	<ul style="list-style-type: none">To explain different states of matter	CHEFC-03
4	<ul style="list-style-type: none">To understand nomenclature and isomerism in organic compounds	CHEFC-04
5	<ul style="list-style-type: none">To acquire knowledge on electromagnetic radiation and its interaction with matter.	CHEFC-05

SEMESTER -II

Subject Code: FCCH21

Subject: General Chemistry – II

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To understand the concept of acids, bases and ionic equilibria; periodic properties of s and p block elements, preparation and properties of aliphatic and aromatic hydrocarbons	CHEGC2-01
2	<ul style="list-style-type: none">To discuss the periodic properties of s and p- block elements, reactions of aliphatic and aromatic hydrocarbons and strength of acids	CHEGC2-02
3	<ul style="list-style-type: none">To classify hydrocarbons, types of reactions, acids and bases, examine the properties s and p-block elements, reaction mechanisms of aliphatic and aromatic hydrocarbons	CHEGC2-03
4	<ul style="list-style-type: none">To explain theories of acids, bases and indicators, buffer action and important compounds of s-block elements	CHEGC2-04
5	<ul style="list-style-type: none">To assess the application of hard and soft acids indicators, buffers, compounds of s and p- block elements and hydrocarbons.	CHEGC2-05

Subject Code: FCCHP2

Subject: Qualitative Organic Analysis

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To learn the basic concept of Quantitative analysis, observe the physical state, odour, colour and solubility of the given organic compound.	CHEQAP-01
2	<ul style="list-style-type: none">To identify the presence of special elements and functional group in an unknown organic compound performing a systematic analysis.	CHEQAP-02
3	<ul style="list-style-type: none">To compare mono and dicarboxylic acids, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non- reducing sugars and explain the reactions behind it.	CHEQAP-03
4	<ul style="list-style-type: none">To exhibit a solid derivative with respect to the identified functional group.	CHEQAP-04
5	<ul style="list-style-type: none">To learn the laboratory safety.	CHEQAP-05

Subject Code: FSCH21

Subject: Dairy chemistry

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To understand about general composition of milk – constituents and its physical properties.	CHESDC-01
2	<ul style="list-style-type: none">To acquire knowledge about pasteurization of Milk and various types of pasteurization -Bottle, Batch and HTST Ultra High Temperature Pasteurization.	CHESDC-02
3	<ul style="list-style-type: none">To learn about Cream and Butter their composition and how to estimate fat in cream and Ghee	CHESDC-03
4	<ul style="list-style-type: none">To explain about Homogenized milk, flavoured milk, vitaminised milk and toned milk.	CHESDC-04
5	<ul style="list-style-type: none">To have an idea about how to make milk powder and its drying process - types of drying.	CHESDC-05

Subject Code: FFCH21

Subject: Role of Chemistry in Evert Day Life

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To understand the importance of chemistry in everyday life	CHEFF21-01
2	<ul style="list-style-type: none">To know the chemistry of building material and food	CHEFF21-02
3	<ul style="list-style-type: none">To understand the chemistry of drugs and Pharmaceuticals	CHEFF21-03

Subject Code: FNMCH2 Subject: Naan Mudhalvan-Cambridge course - English /Cosmetics and Personal Grooming

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To know about the composition of various cosmetic products	CHENM1-01
2	<ul style="list-style-type: none">To understand chemical aspects and applications of hair care and dental care and skincare products.	CHENM1-02
3	<ul style="list-style-type: none">To understand chemical aspects and applications of perfumes and skin.	CHENM1-03
4	<ul style="list-style-type: none">To understand the methods of beauty treatments their advantages and disadvantage	CHENM1-04
5	<ul style="list-style-type: none">To understand the hazards of cosmetic products.	CHENM1-05

SEMESTER – III

Subject Code: EMCH31

Subject: General Chemistry – III

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To Explain the kinetic properties of gases by using mathematical concepts	CHEGC3-01
2	<ul style="list-style-type: none">To Describe the physical properties of liquid and solids; identify various types of crystals with respect to its packing and apply the XRD method for crystal structure determinations	CHEGC3-02
3	<ul style="list-style-type: none">To Investigate the radioactivity, nuclear energy and its production, also the nuclear waste management	CHEGC3-03
4	<ul style="list-style-type: none">To Write the nomenclature, physical & chemical properties and basic mechanisms of halo organic compounds and alcohols	CHEGC3-04
5	<ul style="list-style-type: none">To Investigate the named organic reactions related to phenol; explain the preparation and properties of aromatic alcohol including thiol.	CHEGC3-05

Subject Code: EMCHP3

Subject: Qualitative inorganic analysis (Simple Salt) and

Determination of Physical constant

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To acquire knowledge on the systematic analysis of simple salts.	CHEIQA-01
2	<ul style="list-style-type: none">To identify the cations and anions in the unknown substance	CHEIQA-02
3	<ul style="list-style-type: none">To identify the cations and anions in the soil and water and to test the quality of water.	CHEIQA-03
4	<ul style="list-style-type: none">To assess the role of common ion effect and solubility product	CHEIQA-04

Subject Code: EECH11

Subject: Allied Chemistry for Physical Sciences - I

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To gain in-depth knowledge about the theories of chemical bonding, nuclear reactions and its applications.	CHEAC1-01
2	<ul style="list-style-type: none">To evaluate the efficiencies and uses of various fuels and fertilizers organic reactions	CHEAC1-02
3	<ul style="list-style-type: none">To explain the type of hybridization, electronic effect and reaction mechanism	CHEAC1-03
4	<ul style="list-style-type: none">To apply various thermodynamic principles, systems and phase rule.	CHEAC1-04
5	<ul style="list-style-type: none">To explain various methods to identify an appropriate method for the separation of chemical components	CHEAC1-05

Subject Code: EECHP1

Subject: Allied Chemistry
Practical for Physical Sciences - I

Sl. No	Course Outcome	Code
Upon successful completion, students should be able		
1	<ul style="list-style-type: none">To gain an understanding of the use of standard flask and volumetric pipettes, burette.	CHEAP1- 01
2	<ul style="list-style-type: none">To design, carry out, record and interpret the results of volumetric titration.	CHEAP1 - 02
3	<ul style="list-style-type: none">apply their skill in the analysis of water/hardness	CHEAP1- 03
4	<ul style="list-style-type: none">To analyze the chemical constituents in allied chemical products	CHEAP1- 04

Subject Code: ESCHP1

Subject: Entrepreneurial skills in
Chemistry- Practical

Sl. No	Course Outcome	Code
After studying this, the students will be able		
1	<ul style="list-style-type: none">To identify adulterated food items by doing simple chemical tests.	CHEP1- 01
2	<ul style="list-style-type: none">To prepare cleaning products and become entrepreneurs	CHEP1 - 02
3	<ul style="list-style-type: none">To educate others about adulteration and motivate them to become entrepreneurs	CHEP1- 03

Subject Code ENMCH3

Subject: Naan mudhalvan /*Pesticide

Chemistry

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To teach about the pesticides and their toxicity with respect to structure and category.	CHEM3 - 01
2	<ul style="list-style-type: none">To explain the preparation and property of pesticides	CHEM3 - 02
3	<ul style="list-style-type: none">To investigate the pesticide residues, prevention and care	CHEM3 - 03
4	<ul style="list-style-type: none">To demonstrate the extraction and analytical methods of pesticide residues	CHEM3 - 04
5	<ul style="list-style-type: none">To make awareness to the public on bio-pesticides	CHEM3 - 05

Subject Code: EEVS31

Subject : Environmental Studies

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To grasp the fundamental concepts of environment	CHEEVS -01
2	<ul style="list-style-type: none">To know the importance of individual efforts to protect and preserve our environment	CHEEVS -02
3	<ul style="list-style-type: none">To judicious the use of our resources	CHEEVS -03
4	<ul style="list-style-type: none">To spread Environmental awareness	CHEEVS -04

SEMESTER – IV

Subject Code: EMCH41

Subject: General Chemistry - IV

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To explain the terms and processes in thermodynamics; discuss the various laws of thermodynamics and thermochemical calculations	CHEIC2-01
2	<ul style="list-style-type: none">To discuss the second law of thermodynamics and its application to heat engine; discuss third law and its application on heat capacity measurement	CHEIC2-02
3	<ul style="list-style-type: none">To investigate the chemistry of transition elements with respect to various periodic properties and group wise discussions.	CHEIC2-03
4	<ul style="list-style-type: none">To discuss the fundamental organic chemistry of ethers, epoxides and carbonyl compounds including named organic reactions	CHEIC2-04
5	<ul style="list-style-type: none">To discuss the chemistry and named reactions related to carboxylic acids and their derivatives; discuss chemistry of active methylene compounds, halogen substituted acids and hydroxyl acids.	CHEIC2-05

Subject Code: EMCHP4

Subject: Qualitative Inorganic analysis – mixture of salts

Sl. No	Course Outcome	Code
Upon successful completion students should be able		
1	<ul style="list-style-type: none">To acquire knowledge on the systematic analysis of Mixture of salts.	CHEQAP-01
2	<ul style="list-style-type: none">To identify the cations and anions in the unknown substance	CHEQAP-02
3	<ul style="list-style-type: none">To identify the cations and anions in the soil and water and to test the quality of water	CHEQAP-03
4	<ul style="list-style-type: none">To assess the role of common ion effect and solubility product	CHEQAP-04

Subject Code: EECH2

Subject: Allied Chemistry for Physical Sciences - II

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology	CHEAC2-01
2	<ul style="list-style-type: none">To explain the preparation and property of carbohydrate	CHEAC2-02
3	<ul style="list-style-type: none">To enlighten the biological role of transition metals, amino acids and nucleic acids	CHEAC2-03
4	<ul style="list-style-type: none">To apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells	CHEAC2-04
5	<ul style="list-style-type: none">To outline the various type of photochemical process	CHEAC2-05

Subject Code: EECHP2

Subject: Systematic Analysis of Inorganic Salts

Sl. No	Course Outcome	Code
Students will gain an understand		
1	<ul style="list-style-type: none">Systematic qualitative analysis of Inorganic compounds	CHEAP2 - 01
2	<ul style="list-style-type: none">The ability to find out an acid radical and basic radical present in the given substance	CHEAP2 - 02
3	<ul style="list-style-type: none">To illustrate interfering radicals and to carry out systematic analysis and identifying the cations given in the simple salt	CHEAP2 - 03

Subject Code: ESCHP2

Subject: Instrumental Methods of Chemical Analysis

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To apply error analysis in the calibration and use of analytical instruments, explain theory, instrumentation and application of flame photometry and Atomic Absorption spectrometry	CHEP2-01
2	<ul style="list-style-type: none">To explain theory, instrumentation and application of UV visible and Infrared spectroscopy	CHEP2-02
3	<ul style="list-style-type: none">To able to discuss instrumentation, theory and applications of thermal and electrochemical techniques	CHEP203
4	<ul style="list-style-type: none">To explain the use of chromatographic techniques in the separation and identification of mixtures	CHEP2-04
5	<ul style="list-style-type: none">To explain preparation of solutions, stoichiometric calculations	CHEP2-05

Subject Code: ENMCH4

Subject: Naan mudhalvan /* Forensic science

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To learn about the Poisons-types and classification of poisons in the living and the dead organisms and also get information about Postmortem.	CHENM4-01
2	<ul style="list-style-type: none">To get awareness on Human bombs, possible explosives (gelatin sticks and RDX)and metal detector devices and other security measures for VVIP – composition of bullets and detecting powder burns	CHENM4-02
3	<ul style="list-style-type: none">To detect the forgery documents, different types of forged signatures	CHENM4- 03
4	<ul style="list-style-type: none">To have an idea about how to tracks and trace using police dogs, foot prints identification and gain the knowledge in analyzing biological substances - blood, semen, saliva, urine and hair-DNA Finger printing for tissue identification in dismembered bodies	CHENM4- 04
5	<ul style="list-style-type: none">get the awareness on Aids-causes and prevention and also have an exposure on handling fire explodes	CHENM4- 05

Subject Code: EEVS41

Subject: Value Based Education

Sl. No	Course Outcome	Code
Upon successful completion students should be able		
1	<ul style="list-style-type: none">To create an awareness to values among learners and help them adopt them in their lives	CHEEVS4-01
2	<ul style="list-style-type: none">To develop a critical ability to distinguish between essence and form or between what is of value and what is superficial in life	CHEEVS4-03
3	<ul style="list-style-type: none">To demonstrate the skills necessary to achieve	CHEEVS4-03
4	<ul style="list-style-type: none">To develop commitment and courage to act on one's beliefs in real life situations	CHEEVS4-04

SEMESTER – V

Subject Code: CMCH51

Subject: Organic Chemistry-II

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To understand stereochemistry and conformational analysis	CHEOC2 - 01
2	<ul style="list-style-type: none">To study about amino acids and carbohydrates	CHEOC2 - 02
3	<ul style="list-style-type: none">To learn about aromaticity and aromatic substitution	CHEOC2 - 03
4	<ul style="list-style-type: none">To learn the structure and isomerism of compounds	CHEOC2 - 04
5	<ul style="list-style-type: none">To gain knowledge on heterocyclic compounds.	CHEOC2 - 05

Subject Code: CMCH52

Subject: Physical Chemistry-II

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To understand the basic concept of I and II law of thermodynamics	CHEPC2 - 01
2	<ul style="list-style-type: none">To understand the chemical equilibria and phase equilibria	CHEPC2 - 02
3	<ul style="list-style-type: none">To Know about conductance and its application.	CHEPC2 - 03
4	<ul style="list-style-type: none">To Acquire knowledge in various molecular spectroscopy	CHEPC2 - 04

Subject Code: CECH51

Subject: Polymer Chemistry

Sl. No	Course Outcome	Code
Upon successful completion, students should be able		
1	<ul style="list-style-type: none">To know the concept of polymerization and types of polymers and to understand the characteristics of polymers	CHEPOC - 01
2	<ul style="list-style-type: none">To acquire knowledge about the polymerization techniques and polymer processing	CHEPOC - 02
3	<ul style="list-style-type: none">Know the details of organic and inorganic polymers	CHEPOC - 03
4	<ul style="list-style-type: none">To understand the processing of polymer and polymer degradation.	CHEPOC - 04
5	<ul style="list-style-type: none">To have an idea about the familiarize about advances in polymers	CHEPOC - 05

Subject Code: CECH54

Subject: Applied Chemistry

Sl. No	Course Outcome	Code
On completion of this course, the students will be able		
1	<ul style="list-style-type: none">To gain knowledge on fuels	CHEAC - 01
2	<ul style="list-style-type: none">To study about industrially important compounds.	CHEAC - 02
3	<ul style="list-style-type: none">To acquire knowledge about basic needs of agriculture developments	CHEAC - 03
4	<ul style="list-style-type: none">To learn the substances useful for human life.	CHEAC - 04
5	<ul style="list-style-type: none">To study on match and silicate industries.	CHEAC - 05

Subject Code: CMCHP5

Subject: Organic Analysis & Physical
Constant Determination

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To understand the various procedures in organic analysis	CHEOAP - 01
2	<ul style="list-style-type: none">To create an awareness on microscale experiments in organic chemistry practical's	CHEOAP - 02
3	<ul style="list-style-type: none">To determine physical constants of organic liquid & solid substances	CHEOAP - 03
4	<ul style="list-style-type: none">To detect N, S, halogens and test for functional groups	CHEOAP - 04
5	<ul style="list-style-type: none">To develop the skill of learning by doing	CHEOAP - 05

Subject Code: CMCHP6

Subject: Gravimetric Estimation & Inorganic
Preparation

Sl. No	Course Outcome	Code
Upon successful completion, students should be able		
1	<ul style="list-style-type: none">To understand the various techniques in gravimetric estimation	CHEGEP - 01
2	<ul style="list-style-type: none">To get well exposure about Inorganic preparation	CHEGEP - 02
3	<ul style="list-style-type: none">To determine the identity, purity, and yield of products.	CHEGEP - 03
4	<ul style="list-style-type: none">To engage in safe laboratory practices handling laboratory glassware, equipment, and chemical reagents	CHEGEP - 04

Subject Code: CCSB51

Subject: Personality Development

Sl. No	Course Outcome	Code
On successful completion of the course students will be able		
1	<ul style="list-style-type: none">• To understand the self-awareness	CHEPD-01
2	<ul style="list-style-type: none">• To know a strong sense of wellbeing	CHEPD-02
3	<ul style="list-style-type: none">• To learn the leadership and confident	CHEPD-03
4	<ul style="list-style-type: none">• To understand the importance of effective communication	CHEPD-04

SEMESTER – VI

Subject Code: CMCH61

Subject: Inorganic Chemistry - III

Sl. No	Course Outcome	Code
On successful completion of the course students will be able		
1	<ul style="list-style-type: none">To study on nomenclature and theories of coordination compounds	CHEIC3-01
2	<ul style="list-style-type: none">To gain the knowledge on stability and mechanisms of substitution reactions of complexes.	CHEIC3-02
3	<ul style="list-style-type: none">To know various organometallic compounds and its uses.	CHEIC3-03
4	<ul style="list-style-type: none">To study the application of spectra to metal complexes.	CHEIC3-04
5	<ul style="list-style-type: none">To understand the metal ions and its compounds to biological system.	CHEIC3-05

Subject Code: CMCH62

Subject: Organic Chemistry- III

Sl. No	Course Outcome	Code
On successful completion of this course, students will be able		
1	<ul style="list-style-type: none">To study about the aromatic alcohols, aldehydes, ketones and acids.	CHEOC3-01
2	<ul style="list-style-type: none">To gain knowledge on rearrangements	CHEOC3-02
3	<ul style="list-style-type: none">To know the aromatic hydrocarbons and dyes.	CHEOC3-03
4	<ul style="list-style-type: none">To interpret the classification and structural elucidation of selected alkaloids and terpenes	CHEOC3-04
5	<ul style="list-style-type: none">To understand the basic concept of spectroscopy and interpretation of spectra	CHEOC3-05

Subject Code: CMCH63

Subject: Physical Chemistry - III

Sl. No	Course Outcome	Code
Upon successful completion, students should be able		
1	<ul style="list-style-type: none">To study on EMF and its applications	CHEPC3-01
2	<ul style="list-style-type: none">To understand the chemical equilibrium and interface chemistry	CHEPC3-02
3	<ul style="list-style-type: none">To gain Knowledge on rate of the reaction.	CHEPC3-03
4	<ul style="list-style-type: none">To understand the basics of group theory.	CHEPC3-04
5	<ul style="list-style-type: none">To acquire knowledge in NMR, ESR and NQR Spectroscopy.	CHEPC3-05

Subject Code: CECH62

Subject: Nano Chemistry

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To know the fundamentals of nano chemistry	CHENC-01
2	<ul style="list-style-type: none">To study the methods of preparation of nanomaterial.	CHENC-02
3	<ul style="list-style-type: none">To acquire the knowledge on characterization of nanoparticles	CHENC-03
4	<ul style="list-style-type: none">To know the important applications of nanomaterials in various fields.	CHENC-04
5	<ul style="list-style-type: none">To gain the knowledge on the nano materials and its uses.	CHENC-05

Subject Code: CMCHP7

Subject: Physical Chemistry Experiments

Sl. No	Course Outcome	Code
After completion of the course, the learner shall be able		
1	<ul style="list-style-type: none">To understand the breadth and concepts of Physical Chemistry	CHEPCE - 01
2	<ul style="list-style-type: none">To understand the principles of physical chemistry experiments	CHEPCE - 02
3	<ul style="list-style-type: none">To learn to find the molar mass of unknown substance	CHEPCE - 03
4	<ul style="list-style-type: none">To study the adsorption of oxalic acid on charcoal	CHEPCE - 04
5	<ul style="list-style-type: none">To learn to construct the phase diagram of two component system	CHEPCE - 05
6	<ul style="list-style-type: none">To enable the C.S.T of Phenol Water system	CHEPCE - 06
7	<ul style="list-style-type: none">To study the kinetics of acid catalysed hydrolysis	CHEPCE - 07
8	<ul style="list-style-type: none">To know to find out the strength of given substance using Conductometric and Potentiometric methods	CHEPCE - 08
9	<ul style="list-style-type: none">To know to develop skills in scientific method of planning, developing, conducting, reviewing and reporting experiments	CHEPCE - 09

Subject Code: CMCH6P

Subject: Group Project

Sl. No	Course Outcome	Code
This course develops		
1	<ul style="list-style-type: none">• A foundation of concepts and solutions	CHEGRP - 01
2	<ul style="list-style-type: none">• The planning, scheduling	CHEGRP - 02
3	<ul style="list-style-type: none">• The Management of scope, cost, timing, and quality of the project	CHEGRP - 03
4	<ul style="list-style-type: none">• A strong working knowledge of ethics and professional responsibility	CHEGRP - 04