

**SREE KRISHNA COLLEGE GURUVAYUR**  
**AFFILIATED TO UNIVERSITY OF CALICUT**  
**B.Sc. DEGREE PROGRAMME IN CHEMISTRY**  
**(CBCSSUG 2019)**  
**UNDER CHOICE BASED CREDIT AND SEMESTER SYSTEM**  
**2019 ADMISSION ONWARDS**

**PROGRAMME OUTCOME**

At the end of an Undergraduate Programme a student would have obtained the following:

**PO1:** Develop creativity, intellectual curiosity and affinity towards knowledge with scientific temperament.

**PO2:** Develop socially responsible attitude with a democratic standpoint above cast, religion or creed by adhering to the ideals of Indian Constitution.

**PO3:** Identify the lack of objectivity in our thinking and actions, and reframe the thinking process by considering different dimensions of the problems..

**PO4:** Analyse any actions on nature on the basis of environmental contexts and sustainable development.

**PO5:** Problematize different existing value systems, understand the subjectivity of moral rules of the society.

**PO6:** Approach problems especially problems of social concerns with historical, unbiased and peaceful attitude so that issues are solved amicably.

**PO7:** Inculcate research aptitude and to develop and authenticate local knowledge so that self reliance is assured.

## **PROGRAMME SPECIFIC OUTCOME**

After successful completion of three year degree Program in Chemistry, the students will be able to

- PSO1.** Familiarize and acquire a broad and concrete fundamental knowledge in all disciplines of Chemistry
- PSO2.** Understand the major concepts at basic and advanced level.
- PSO3.** Understand the role of chemistry in day to day life.
- PSO4.** Develop analytical and problem solving skills.
- PSO5.** Develop critical thinking and communication skills.
- PSO6.** Compete in National and International graduate level competitive exams.
- PSO7.** Create awareness regarding all aspects of Environment and its sustainability.
- PSO8.** Inculcate scientific temper among the students and thus to society.
- PSO9.** Develop basic skills towards handling Instruments and apparatus used in Qualitative and Quantitative analysis during experimental sessions.
- PSO10.** Acquire basic skills towards scientific research.

## COURSE OUTCOME - CORE COURSE

### SEMESTER I

Course Code: CHE1B01

#### Core Course I: Theoretical and Inorganic Chemistry- I

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To apply the methods of a research project.
CO2	To understand the principles behind volumetry.
CO3	To analyse the characteristics of different elements.
CO4	To distinguish between different acid base concepts.
CO5	To analyse the stability of different nuclei.

### SEMESTER II

Course Code: CHE2B02

#### Core Course II: Theoretical and Inorganic Chemistry- II

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the importance and the impact of quantum revolution in science.
CO2	To understand and apply the concept that the wave functions of hydrogen atom are nothing but atomic orbitals.
CO3	To understand that chemical bonding is the mixing of wave functions of the two combining atoms.
CO4	To understand the concept of hybridization as linear combination of orbitals of the same atom.
CO5	To inculcate an atomic/molecular level philosophy in the mind.

## SEMESTER III

Course Code: CHE3B03

### Core Course III: PHYSICAL CHEMISTRY - I

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the properties of gaseous state and how it links to thermodynamic systems.
CO2	To understand the concepts of thermodynamics and its relation to statistical thermodynamics.
CO3	To apply symmetry operations to categorize different molecules.

## SEMESTER IV

Course Code: CHE4B04

### Core Course IV: ORGANIC CHEMISTRY – I

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To apply the concept of stereochemistry to different compounds.
CO2	To understand the basic concepts of reaction mechanism.
CO3	To analyse the mechanism of a chemical reaction.
CO4	To analyse the stability of different aromatic systems.

## SEMESTER IV

Course Code: CHE4B05(P)

### Core Course V: INORGANIC CHEMISTRY PRACTICAL – I

Total Hours: 128; Credits: 4; Hours/Week: 2 (I, II, III & IV Semesters); Total Marks 100  
(Internal 20 & External 80)

Course outcome (s)	
CO1	To enable the students to develop skills in quantitative analysis and preparing inorganic complexes.
CO2	To understand the principles behind quantitative analysis.
CO3	To apply appropriate techniques of volumetric quantitative analysis in estimations.
CO4	To analyse the strength of different solutions.

## SEMESTER V

Course Code: CHE5B06

### Core Course VI: INORGANIC CHEMISTRY – III

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the principles behind qualitative and quantitative analysis.
CO2	To understand basic processes of metallurgy and to analyse the merits of different alloys.
CO3	To understand the applications of different inorganic polymers.
CO4	To analyse different polluting agents.
CO5	To apply the principles of solid waste management.

## SEMESTER V

Course Code: CHE5B07

### Core Course VII: ORGANIC CHEMISTRY – II

Total Hours: 64; Credits: 3; Hours/Week: 4; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the difference between alcohols and phenols.
CO2	To understand the importance of ethers and epoxides.
CO3	To apply organometallic compounds in the preparation of different functional groups.
CO4	To apply different reagents for the inter conversion of aldehydes, carboxylic acids and acid derivatives.
CO5	To apply active methylene compounds in organic preparations.

## SEMESTER V

Course Code: CHE5B08

### Core Course VIII: PHYSICAL CHEMISTRY – II

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To apply the concept of kinetics, catalysis and photochemistry to various chemical and physical processes.
CO2	To characterise different molecules using spectral methods.
CO3	To understand various phase transitions and its applications.

## SEMESTER VI

Course Code: CHE6B09

### Core Course IX: INORGANIC CHEMISTRY – IV

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the principles behind different instrumental methods.
CO2	To distinguish between lanthanides and actinides.
CO3	To appreciate the importance of CFT.
CO4	To understand the importance of metals in living systems.
CO5	To distinguish geometries of coordination compounds.

## SEMESTER VI

Course Code: CHE6B10

### Core Course X: ORGANIC CHEMISTRY – III

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To elucidate the structure of simple organic compounds using spectral techniques.
CO2	To understand the basic structure and tests for carbohydrates.
CO3	To understand the basic components and importance of DNA.
CO4	To understand the basic structure and applications of alkaloids and terpenes.
CO5	To distinguish different pericyclic reactions.

## SEMESTER VI

**Course Code: CHE6B11**

### **Core Course XI: PHYSICAL CHEMISTRY – III**

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the basic concepts of electrochemistry.
CO2	To understand the importance of colligative properties.
CO3	To relate the properties of materials/solids to the geometrical properties and chemical compositions.

## SEMESTER VI

**Course Code: CHE6B12**

### **Core Course XII: Advanced and Applied Chemistry**

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the importance of nanomaterials.
CO2	To appreciate the importance of green approach in chemistry.
CO3	To understand the uses and importance of computational calculations in molecular design.
CO4	To understand the role of chemistry in human happiness index and life expectancy.

## SEMESTER VI

**Course Code: CHE6B13(E3)**

### **Core Course XIII: Elective 3. MEDICINAL AND ENVIRONMENTAL CHEMISTRY**

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the importance of drugs in human health.
CO2	To understand the facts about common diseases and treatment.
CO3	To identify the presence of toxic substances in atmosphere.
CO4	To apply chemistry in treatment of water and sewage.

## SEMESTER VI

Course Code: CHE6B14(P)

### Core Course XIV: PHYSICAL CHEMISTRY PRACTICAL

Total Hours: 80; Credits: 4; Hours/Week: 5 (Semester V); Total Marks 100 (Internal 20 & External 80)

Course outcome (s)	
CO1	To enable the students to develop analytical skills in determining the physical properties (physical constants).
CO2	To develop skill in setting up an experimental method to determine the physical properties.
CO3	To understand the principles of Refractometry, Potentiometry and Conductometry.

## SEMESTER VI

Course Code: CHE6B15(P)

### Core Course XV: ORGANIC CHEMISTRY PRACTICAL

Total Hours: 80; Credits: 4; Hours/Week: 5 (Semester V); Total Marks 100 (Internal 20 & External 80)

Course outcome (s)	
CO1	To enable the students to develop analytical skills in organic qualitative analysis.
CO2	To develop talent in organic preparations to ensure maximum yield.
CO3	To apply the concept of melting or boiling points to check the purity of compounds.
CO4	To analyse and characterise simple organic functional groups.
CO5	To analyse individual amino acids from a mixture using chromatography.



## SEMESTER VI

Course Code: CHE6B16(P)

### Core Course XVI: INORGANIC CHEMISTRY PRACTCAL-II

Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal 20 & External 80)

Course outcome (s)	
CO1	To enable the students to develop analytical skills in inorganic quantitative analysis.
CO2	To understand the principles behind gravimetry and to apply it in quantitative analysis.
CO3	To understand the principles behind colorimetry and to apply it in quantitative analysis.

## SEMESTER VI

Course Code: CHE6B17(P)

### Core Course XVII: INORGANIC CHEMISTRY PRACTCAL-III

Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal 20 & External 80)

Course outcome (s)	
CO1	To enable the students to develop skills in inorganic quantitative analysis.
CO2	To understand the principles behind inorganic mixture analysis and to apply it in quantitative analysis.
CO3	To analyse systematically mixtures containing two cations and two anions.

## SEMESTER VI

Course Code: CHE6B18(Pr)

### Core Course XVIII: PROJECT WORK

Total Hours: 32; Credits: 2; Hours/Week: 2 (Semester V); Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the scientific methods of research project.
CO2	To apply the scientific method in life situations.
CO3	To analyse scientific problems systematically.

## COURSE OUTCOME-COMPLEMENTARY COURSE

### SEMESTER I

**Course Code: CHE1C01 Complementary Course I: GENERAL CHEMISTRY**

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand and to apply the theories of quantitative and qualitative analysis.
CO2	To understand the theories of chemical bonding.
CO3	To appreciate the uses of radioactive isotopes.
CO4	To understand the importance of metals in biological systems.

### SEMESTER II

**Course Code: CHE2C02 Complementary Course II: PHYSICAL CHEMISTRY**

Total Hours: 32; Credits: 2; Hours/Week: 2; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the importance of free energy in defining spontaneity.
CO2	To realise the theories of different states of matter and their implication.
CO3	To understand the basic principles of electrochemistry.

### SEMESTER III

**Course Code: CHE3C03 Complementary Course III: ORGANIC CHEMISTRY**

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the basic concepts involved in reaction intermediates.
CO2	To realise the importance of optical activity and chirality.
CO3	To appreciate the importance of functional groups and aromatic stability.
CO4	To understand the basic structure and importance of carbohydrates, nucleic acids, alkaloids and terpenes.

## SEMESTER IV

**Course Code: CHE4C04**

### **Complementary Course IV: PHYSICAL AND APPLIED CHEMISTRY**

Total Hours: 48; Credits: 2; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

Course outcome (s)	
CO1	To understand the basic concepts behind colloidal state and nanochemistry.
CO2	To understand the importance of green chemistry and pollution prevention.
CO3	To appreciate the importance of different separation methods and spectral techniques.
CO4	To understand the extent of chemistry in daily life.

## SEMESTER IV

**Course Code: CHE4C05(P) Complementary Course V: CHEMISTRY PRACTICAL**

Total Hours: 128; Credits: 4; Hours/Week: 2 (I, II, III & IV Semesters); Total Marks 100(Internal 20 & External 80)

Course outcome (s)	
CO1	To understand the basic concepts of inter group separation.
CO2	To enable the students to develop analytical and preparation skills.

## **COURSE OUTCOME - OPEN COURSE**

**(FOR STUDENTS OTHER THAN B.Sc. CHEMISTRY) Total Credits: 3 (Internal 20%; External 80%)**

**SEMESTER V**

**Course Code: CHE5D02**

**Open Course 2: CHEMISTRY IN DAILY LIFE**

Total Hours: 48; Credits: 3; Hours/Week: 3; Total Marks 75 (Internal 15 & External 60)

### **Course outcomes**

At the end of the course, students will be able to:

**CO1:** Understand the basics of polymer chemistry.

**CO2:** Explain the functions of biomolecules, vitamins, enzymes, hormones and nucleic acid.

**CO3:** Describe food additives and food habits.

**CO4:** Explain the uses of pesticides and fertilizers and their impacts on the environment.

**CO5:** Understand advantages and disadvantages of cleansing agents and cosmetics.

**CO6:** Recognize the common classes of drugs in pharmaceutical industry and their application.

**CO7:** Understand the basic concepts and processes in petroleum industry.