



# SRI VENKATESHWARA GOVERNMENT ARTS & SCIENCE COLLEGE, PALEM

## Department of Chemistry

### PROGRAMME OUTCOMES (POs)

The students at the completion of the programme will be able to

**PO1:** Demonstrate professional responsibility as an individual as well as in multifaceted teams with values and ethics.

**PO2:** Adapt to develop and upgrade skills towards independent and lifelong learning.

**PO3:** Communicate basic concepts of Chemistry with examples

**PO4:** Acquire basic knowledge in chemical principles and higher level of understanding in each of the chemistry sub-disciplines such as organic, Inorganic, Physical and General Chemistry.

**PO5:** Develop the working knowledge of chemical instrumentation and laboratory techniques and be able to apply skills in daily life.

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the students will be able to

**PSO1:** Apply the knowledge gained during the course of the program to identify, formulate and solve real life problems.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team.

**PSO3:** Apply the contextual knowledge of chemistry to function effectively as an individual or a leader in multidisciplinary environment.

**PSO4:** Synthesize, compare, evaluate, classify, interrupt and effectively apply the basic laws, principles, phenomena, processes and mechanisms involved in the domain of chemistry.

**PSO5:** Explicitly communicate and exchange their ideas with regard to theoretical and experimental aspects among the society.

## **COURSE OUTCOMES (COs)**

### **Course outcomes of B.Sc. Chemistry - Semester I**

S1-CO1: Predict the bond order & magnetic behaviour for various molecules on the basis of MOED. In a given, mathematical data, accuracy, precision & error can be explained.

S1-CO2: Describe the synthesis & list the various types of B, C, Si & N compounds.

S1-CO3: Based on bond polarization acidity & basicity & stability of reactive intermediate of different hydrocarbs can be determined.

S1-CO4: Understand physical & chemical reaction of Aliphatic hydrocarbon and aromatic hydrocarbon and the aromaticity of aromatic compounds can be predicted by Huckel's rule.

S1-CO5: Understand Black body radiation, heat capacities of solids, Rayleigh Jeans law, Planck's radiation law, photoelectric effect, Limitations of classical mechanics, Compton effect, de Broglie's hypothesis.

S1-CO6: Acquire Knowledge about Vanderwaal's equation and critical state. Derivation of relationship between critical constants and Vanderwaal's constants.

S1-CO7: Understands how to determine viscosity using Ostwald viscometer and acquire knowledge about Azeotrope mixtures.

S1-CO8: By considering principles of solubility product & common ion effect cation can be discriminated by anions in a salt mixture.

S1-CO9: Classify stereoisomer's based on symmetry criteria and energy criteria. S1CO10:

Interpret E/ Z Configuration.

S1 CO11: Predict the Conformations of simple organic molecules

S1 CO12: By using Bragg's equation various crystal structures can be determined & by qualitative analysis one can determine the weight of chemical substance.

### **Course outcomes of B. Sc. Chemistry – Semester II**

S2-CO1: To understand the physical and chemical properties of oxides Oxy-acids of p elements.

S2-CO2: Defines the properties of d-block elements.

S2-CO3: Defines Structure, bonding and reactivity of Xenon – Oxides, Halides and Oxy-halides and Acquire knowledge about clathrate compounds.

S2-CO4: Explore the methods of preparation and properties of halogen compound and one can express the stereochemistry of SN1 & SN2 reactions.

S2-CO5: Explore the methods of preparation and properties of alcohols, ethers and carbonyl compounds and current applications.

S2-CO6: Acquire knowledge on Hittorf's method, Kohlrausch law, Arrhenius theory, Ostwald dilution law, DebyeHuckle Onsager equation and predicts its applications. Accomplish the Nernst Equation, EMF of a cell, Single electrode potential, Standard hydrogen electrode, and electrochemical series.

S2-CO7: Understand the basic principle of titrations and indicators used for different types of titrations

S2-CO8: Classify stereoisomer's based on symmetry criteria and energy criteria. Interpret R and S configuration, D/L Nomenclature.

### **Course outcomes of B. Sc. Chemistry - Semester III**

S3 CO1: Paper – III defines the properties of f-block elements and non-aqueous solvents

S3CO2: Differentiate the symmetry elements, operations in molecules, lanthanides and actinides

S3CO3: Explore the methods of preparation and properties of alcohols, ethers and carbonyl compounds and current applications

S3CO4: Design the Phase equilibrium of one component and two component system, compound with congruent and incongruent melting point.

S3 CO5: Demonstrate the methods of preparations and properties, of colloids, Analyze adsorption isotherms and its industrial applications to reduce pollution and compute the surface area of adsorbent

S3CO6: Know the synthetic techniques of Nano-structured materials, its current applications.

S3 CO7: Classify stereoisomer's based on symmetry criteria and energy criteria.

S3CO8: Interpret R and S configuration, D/L Nomenclature and E/ Z Configuration.

S3 CO9: Predict the Conformations of simple organic molecules

### **Course outcomes of B.Sc. Chemistry - Semester IV**

S4CO1: Describe the postulates and limitations of Werner's theory, Sidwicks and VBT theory.

S4CO2: Acquire knowledge on the IUPAC Nomenclature and solve the EAN of coordination compounds.

S4CO3: Categorise the Organo metallic compounds of Li Mg Al and Metal carbonyls. Discuss its applications.

S4CO4: Understand the preparation methods and its synthetic applications in industry of carboxylic acids and carbon ions.

S4CO5: Have an idea on all named reactions and mechanisms of carboxylic acids and nitro hydro compounds and focus on its industrial applications.

S4CO6: Acquire knowledge on Hittof's method, Kholrausch law, Arrhenius theory, Ostwald dilution law, Debye Huckle Onsager equation and predicts its applications.

S4CO7: Accomplish the Nernst equation, EMF of a cell, Single electrode potential, Standard hydrogen electrode, and electro chemical series.

### **Course outcomes of B. Sc. Chemistry - Semester V**

S5CO1: Understand the theories of coordination compounds and stability of metal complexes.

S5CO2: List and judge the applications of coordination compounds in various fields

S5CO3: Know about the clusters with the examples of Borane and carborane

S5CO4: Compare the property and reactivity of different class of amines and design the synthesis pathway of different organic compounds using amines

S5CO5: Classify heterocyclic compounds and compare their aromatic character and reactivity

S5CO6: Develop concept on reaction kinetics with special reference to factors influencing the rate and evaluate the merits of different theories of reaction rate

S5CO7: Know about electromagnetic radiation and understand the interaction of electromagnetic radiation with molecules - various types of molecular spectra

S5CO8: Learn to analyze the consequences of light absorption with reference to various photo physical processes and photochemical reactions with normal and abnormal quantum yield.

### **Course outcomes of B. Sc. Chemistry - Semester VI**

S6CO1: Acquire the knowledge of principle and methods of solvent extractions and their application.

S6CO2: Understand the classification of Chromatographic methods, principle, nature of adsorbents and solvent systems.

S6CO3: Understand and evaluate Principle, Instrumentation and application of TLC, Paper chromatography, Column chromatography, IEC, GC, HPLC techniques.

S6CO4: Illustrate general features of absorption, its laws.

S6CO5: Acquire the Knowledge of Instrumentation of Spectrophotometry, its principle and with their application in estimation of Iron, Chromium and Manganese in Steel.

S6CO6: Know about the types of electro analytical methods.

S6CO7: Analyze the principles, types of electrodes used and applications of potentiometry, Voltametry and conductometry.

## **Course outcomes of B. Sc Chemistry - Semester VI**

S7CO1: Understand the concept of Inorganic reaction mechanism with respect to octahedral and tetrahedral complexes

S7CO2: Know about the Biological significance of essential elements and toxicity of heavy metals

S7CO3: Acquire knowledge about carbohydrate chemistry with reference to definition, classification and evaluation of structure from reactions.

S7CO4: Acquire knowledge about chemistry of amino acids – essential amino acids, Biological importance. Learn to relate the peptide bond formation for the synthesis of protein

S7CO5: Have an extensive knowledge on Thermodynamics with reference to different Thermodynamic functions, processes, work of expansion and laws of Thermodynamics

S7CO6: Understand the applications of Thermodynamics in basic sciences for deriving equations, in engineering science for calculating efficiency of machine and evaluation of spontaneity of process. Learn to derive the equation of spontaneity, Gibb's equation and Maxwell's relations

S7CO7: Understand the principle of Nuclear Magnetic Resonance, concept of chemical shift and splitting of signals – spin –spin coupling. Implement the concept in analyzing the NMR spectrum for identification of organic compounds

S7CO8: Understand the basic principle of mass spectrometry and learn to determine the mass spectral pattern of different organic compounds.

## **Course outcomes of B. Sc Chemistry - Semester VI**

S8CO1: Recalling Infective and hereditary diseases.

S8CO2: Know about the terminology in medicinal chemistry and Nomenclature of Drugs.

S8CO3: Understand ADME of Drugs.

S8CO4: Acquire the knowledge of mechanism of action of drugs and factors effecting action of Enzyme and Receptors.

S8CO5: Evaluate the Synthesis and therapeutic activity of Drugs related to Chemotherapeutics, acting on metabolic disorders and acting on nervous system.

S8CO6: Analyzing the function of molecular messengers and health promoting drugs.