Sri Adichunchanagiri First Grade College Channarayapatna Est.1979

Jai Sri Gurudev

Sri Adichunachangiri First Grade College,
Channarayapatana
Department of Chemistry

Programme Outcomes

By the end of the program the students will be able to:

1. **PO. 1:** To create enthusiasm among students for chemistry and its application in various fields of life.
2. **PO. 2:** To provide students with broad and balanced knowledge and understanding of key concepts in chemistry
3. **PO. 3:** To develop in students a range of practical skills so that they can understand and assess risks and work safely measures to be followed in the laboratory.
4. **PO. 4:** To develop in students the ability to apply standard methodology to the solution of problems in chemistry
5. **PO. 5:** To provide students with knowledge and skill towards employment or higher education in Analytical chemistry or multi-disciplinary areas involving chemistry.
6. **PO.6:**To provide students with the ability to plan and carryout experiments independently and assess the significance of outcomes and to cater to the demands of chemical Industries of well-trained graduates
7. **PO. 7:** To develop in students the ability to adapt and apply methodology to the solution ofunfamiliar types of problems.
8. **PO. 8:** To instill critical awareness of advances at the forefront of chemical sciences, to prepare students effectively for professional employment or research degrees in chemical sciences and to develop an independent and responsible work ethics.

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LEARNING OUTCOMES / COURSE OUTCOMES

Chemistry as Discipline Specific Course

(DSC)B.Sc. Semester – I

CHEMISTRY: 1

- The concepts of chemical analysis, accuracy, precision and statistical data treatment
- Prepare the solutions after calculating the required quantity of salts in preparing the reagents/solutions and dilution of stock solution.
- Describe the dual nature of radiation and matter; dual behavior of matter and radiation, de Broglie's equations, Heisenberg uncertainty principle and their related problems.
- Quantum mechanics. Derivation of Schrodinger's wave equation. Radial and angular Orbital shapes of s, p, d and f atomic orbital's, nodal planes. Electronic configurations of the atoms.
- Pauli's exclusion principle, Hund's rule, Aufbau's principle and its limitation.
- The concepts of Organic reactions and techniques of writing the movement of electrons, bond breaking, bond forming
- The Concept of aromaticity, resonance, hyper conjugation, etc.
- Explain bond properties, electron displacement effects (inductive effect, electrometric effect, resonance effect and hyper conjugation effect). steric effect and their applications in explaining acidic strength of carboxylic acids, basicity of amines.
- Understand basic concept of organic reaction mechanism, types of organic reactions.
- Understand the preparation and reactions of alkanes.
- Understand the stability and conformational analysis of cycloalkanes.
- Understand the concept of resonance , aromaticity and antiaromaticity.
- Describe relative strength of aliphatic and aromatic carboxylic acids.
- Explain the existence of different states of matter in terms of balance between intermolecular forces and thermal energy of the particles. Explain the laws governing behavior of ideal gases and real gases. Understand cooling effect of gas on adiabatic expansion
- Understand the conditions required for liquefaction of gases. Realize that there is continuity in gaseous and liquid state.
- Understand the properties of liquids in terms of intermolecular attractions.
- Understand the existence of different states of matter in terms of balance between

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CHEMISTRY LAB (volumetric (inorganic) and Organic preparations): P-1

After studying this course and performing the experiments set in it student will be able to:

1. Basic concepts involved in titrimetric analysis, primary standard substances, preparation of standard solutions.
2. Explain the principles of acid-base, redox and iodometric titrations.
3. Work out the stoichiometric relations based on the reactions involved in the titrimetric analysis.
4. Describe the significance of organic quantitative analysis.
5. Understand the preparation of organic compounds involving addition, substitution, hydrolysis, diazotization and condensation reactions.

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LEARNING OUTCOMES / COURSE OUTCOMES

Chemistry as Discipline Specific Course (DSC)

B.Sc. Semester II

CHEMISTRY: 2

- Understand principles of titrimetric analysis.
- Understand principles of different type's titrations. Titration curves for all types of acids
  - base titrations.
- Gain knowledge about balancing redox equations, titration curves, theory of redox indicators and applications.
- Understand titration curves, indicators for precipitation titrations involving silver nitrate- Volhard's and Mohr's methods and their differences.
- Indicators for EDTA titrations - theory of metal ion indicators. Determination of hardness of water.
- Understand periodic table, classification and properties of s p d and f block elements
- Understand different scales for the measurement of electro-negativity and factors affecting it.
- Understand the chemistry of the hydrides, carbides, oxides and halides of group 13 to 17
- Understand nucleophilic substitution at saturated carbon, energy profile diagram stereochemistry and factors affecting S_N^1 and S_N^2 reactions.
- Aromatic electrophilic substitution reactions like nitration sulphonation Friedel-Crafts reactions etc
- Understand liquid crystals, classification with examples
- Understand the different forms of solids, laws of crystallography , miller indices and itscalculation, X-ray diffraction studies. Brags law and its equation.
- Defects in solids , properties of glasses and concept of liquid crystals

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CHEMISTRY LAB (volumetric (inorganic) and Organic preparations): P-11

After studying this course and performing the experiments set in it student will be able to:

1. Basic concepts involved in titrimetric analysis, primary standard substances, preparation of standard solutions.
2. Explain the principles of acid-base, redox and iodometric titrations.
3. Describe the significance of inorganic quantitative analysis.
4. Determine of density followed by the determination of viscosity and surface tension ofdifferent liquid samples.
5. Determination of partition coefficient of different liquid mixtures
6. Determination of rate constant in the decomposition reaction of hydrogen peroxide

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LEARNING OUTCOMES / COURSE OUTCOMES

Chemistry as Discipline Specific Course (DSC)

B.Sc. Semester III

CHEMISTRY: 3

Course Specific outcomes: At the end of the course student would be able to;

1. Know the different analytical techniques.
2. To understand different types of separation techniques.
3. To study principle, construction and working of GC and HPLC.
4. To give an extended knowledge about chromatographic.
5. Learn about geometry and shape of the molecule. Know the concept of electron density and electronegative atom.
6. Learn abouth the concepts of VBT ,VSEPR Theory .
7. Understand the difference between carbocation and carbanion.
8. TO know the methods for Identifying Reaction Mechanism: Product analysis; Isolation and Identification of Intermediates; effect of Catalyst,
9. Discuss different types of rearrangement reactions.
10. Study the rate of reaction, order of reaction and molecularity and their determination parameters.
11. Study of role of electrolytes in Electrochemistry.
12. To know the concept of strong acid and weak acid: Kholrauschs law and Debye huckel theory

CHEMISTRY – III PRACTICALS

Part A: Inorganic Chemistry Practicals

Part B: Physical Chemistry Practicals

Course Specific outcomes: At the end of the course student would be able to;

1. Understand the chemical reactions involved in the detection of cations and anions.
2. Explain basic principles involved in classification of ions into groups in semi-micro qualitative analysis of salt mixture 3. Carryout the separation of cations into groups and understand the concept of common ion effect.
3. Understand the choice of group reagents used in the analysis.
4. Analyze a simple inorganic salt mixture containing two anions and cations

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5. Use instruments like conductivity meter to obtain various physicochemical parameters.
6. Apply the theory about chemical kinetics and determine the velocity constants of various reactions.
7. Learn about the reaction mechanisms.
8. Interpret the behavior of interfaces, the phenomena of physisorption and chemisorption's and their applications in chemical and industrial processes.
9. Learn to fit experimental data with theoretical models and interpret the data.

LEARNING OUTCOMES / COURSE OUTCOMES

Chemistry as Discipline Specific Course (DSC)

B.Sc. Semester IV

CHEMISTRY: IV

Course Specific Outcomes: After the completion of this course, the student would be able to;

1. Understand the importance of fundamental law and validation parameters in chemical analysis.
2. Know how different analytes in different matrices (water and real samples) can be determined by spectrophotometric, nephelometric and turbidimetric methods.
3. Explain the importance of Stereochemistry in predicting the structure and property of organic molecules.
4. Predict the configuration of an organic molecule and able to designate it.
5. Identify the chiral molecules and predict its actual configuration.
6. Write the M.O. energy diagrams for simple molecules.
7. Differentiate bonding in metals from their compounds.
8. Learn important laws of thermodynamics and their applications to various thermodynamic systems.
9. Understand adsorption processes and their mechanisms and the function and purpose of a catalyst.
10. Apply adsorption as a versatile method for waste water purification.

DSC-4: Chemistry-IV Practical

PART-A: Analytical Chemistry Practical

PART-B: Organic Chemistry Practical

Course Specific outcomes: After the completion of this course, the student be able to:

1. Understand the importance of instrumental methods for quantitative applications.
2. Apply colorimetric methods for accurate determination of metal ions and anions in water or real samples.
3. Understand how functional group in a compound is responsible for its characteristic properties.
4. Learn the importance of qualitative tests in identifying functional groups.
5. Learn how to prepare a derivative for particular functional groups and how to purify it.

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