Program Outcomes (PO'S) and Course Outcomes (CO'S)

CHEMISTRY

JANUARY 1, 2024

L.N.D. COLLEGE, MOTIHARI, EAST CHAMPARAN,
BIHAR-845401

CHEMISTRY

Upon successful completion of the undergraduate course in Chemistry, covering a diverse syllabus including Atomic Structure, Chemical Bonding, Inorganic Chemistry, Stereochemistry, Ionic Equilibria, Chemical Thermodynamics, Coordination Chemistry, Hydrocarbons, Biomolecules, Quantum Chemistry, Spectroscopy, and Organometallic Chemistry, students can expect to achieve the following learning outcomes:

1. **Atomic Structure Proficiency:** Develop a deep understanding of atomic structure, including the principles of quantum mechanics, electron configuration, and the behaviour of subatomic particles.
2. **Chemical Bonding Mastery:** Gain expertise in chemical bonding theories, including covalent, ionic, and metallic bonding. Understand molecular shapes, hybridization, and the factors influencing bond strength.
3. **Inorganic Chemistry Knowledge:** Acquire a comprehensive understanding of inorganic chemistry, including the properties and reactions of elements and inorganic compounds. Explore periodic trends and the chemistry of main group and transition elements.
4. **Stereochemistry Competence:** Understand the spatial arrangement of atoms in molecules and its impact on the properties and reactivity of compounds. Analyse stereoisomerism and geometric isomerism.
5. **Ionic Equilibria Understanding:** Explore the principles of ionic equilibria, including acid-base equilibria, solubility equilibria, and the behaviour of electrolytes in solution.
6. **Chemical Thermodynamics Mastery:** Gain proficiency in chemical thermodynamics, including the study of energy changes in chemical reactions, entropy, enthalpy, and Gibbs free energy. Apply thermodynamic principles to analyse reaction spontaneity and equilibrium.
7. **Coordination Chemistry Expertise:** Understand the structure, bonding, and reactivity of coordination compounds. Explore the principles of ligand field theory and the application of coordination chemistry in catalysis and materials science.
8. **Hydrocarbons Knowledge:** Acquire a comprehensive understanding of the structure, properties, and reactions of hydrocarbons, including alkanes, alkenes, alkynes, and aromatic compounds.
9. **Biomolecules Competence:** Explore the structure and function of biomolecules, including proteins, nucleic acids, carbohydrates, and lipids. Understand the biochemical processes essential for life.
10. **Quantum Chemistry Understanding:** Develop a deep understanding of quantum chemistry principles, including the mathematical foundations of quantum mechanics and their application to chemical systems.
11. **Spectroscopy Proficiency:** Gain expertise in spectroscopic techniques, including UV-Visible, IR, NMR, and mass spectrometry. Interpret spectroscopic data to identify molecular structures.
12. **Organometallic Chemistry Knowledge:** Understand the bonding and reactivity of compounds containing metal-carbon bonds. Explore the applications of organometallic compounds in catalysis and synthesis.
13. **Laboratory Techniques:** Acquire practical skills in laboratory techniques, including safe handling of chemicals, use of instrumentation, and experimental design.
14. **Data Analysis and Interpretation Skills:** Develop skills in analysing and interpreting experimental data, including statistical methods and graphical representation of results.

15. **Communication Skills:** Enhance written and oral communication skills to effectively convey scientific concepts, research findings, and experimental results.
16. **Research and Problem-Solving Skills:** Hone research and problem-solving skills to design experiments, analyse scientific literature, and address complex chemical challenges.
17. **Ethical and Safety Considerations:** Understand the importance of ethical conduct in scientific research and adhere to safety protocols in laboratory environments.
18. **Preparation for Further Studies and Careers:** Prepare for advanced studies in chemistry or related fields, or enter the workforce with a solid foundation in chemistry applicable to careers in research, industry, education, and healthcare.

These learning outcomes aim to provide students with a comprehensive education in chemistry, covering various subfields and preparing them for both advanced studies and diverse career opportunities in the field.