ANDHRA MAHILA SABHA
ARTS & SCIENCE COLLEGE FOR WOMEN
Autonomous - NAAC Re-Accredited,
O.U.Campus, Hyderabad – 500 007

Scheme of Instruction, Evaluation And Syllabus of B.Sc (BZC,BtZC)

With effect from Academic Year 2025-2026

Department of Chemistry

Programme Educational Objectives (PEOs)

B.Sc. (BZC, BtZC)

1. **PEO 1 – Foundational Knowledge and Laboratory Skills:**
   To provide students with **comprehensive foundational knowledge and practical skills** in **Botany / Biotechnology, Zoology, and Chemistry**, enabling them to understand, analyze, and apply biological and chemical concepts in research, industry, and higher education.
2. **PEO 2 – Research Orientation and Analytical Skills:**
   To develop students' ability for **scientific investigation, critical thinking, and problem-solving**, preparing them to address real-world challenges in **plant and animal sciences, chemical analysis, and biotechnological applications** through research-based approaches.
3. **PEO 3 – Professional Readiness and Employability:**
   To equip students for diverse career paths in **pharmaceuticals, agriculture, healthcare, environmental management, research laboratories, education, and quality control industries**, while fostering professional ethics, adaptability, and a responsible work attitude.
4. **PEO 4 – Ethical, Environmental, and Social Responsibility:**
   To cultivate **ethical values, environmental awareness, biodiversity conservation, and social responsibility**, encouraging students to apply their scientific knowledge for **sustainable development, ecological balance, and community welfare.**
5. **PEO 5 – Lifelong Learning and Higher Education:**
   To inspire students to pursue **higher education**, including **postgraduate studies and professional courses**, and embrace **lifelong learning** for continual academic and professional development.

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Programme Outcomes (POs)

B.Sc. (BZC, BtZC)

Scientific and Core Knowledge:
Gain strong foundational knowledge in **Botany / Biotechnology, Zoology, and Chemistry,** enabling understanding and application of scientific concepts to solve biological and chemical science problems.

1. **Laboratory and Analytical Skills:**
   Develop proficiency in laboratory techniques, equipment handling, and analytical skills essential for experiments and scientific investigations.
2. **Research and Problem-Solving Ability:**
   Cultivate scientific reasoning, critical thinking, and research aptitude for identifying and solving real-world challenges in life sciences and chemical sciences.
3. **Environmental and Ethical Responsibility:**
   Demonstrate awareness of biodiversity conservation, sustainable development, and ethical responsibilities towards society and the environment.
4. **Communication and Teamwork:**
   Communicate scientific information effectively and work efficiently both independently and within teams, exhibiting leadership where needed.
5. **Technological and Digital Proficiency:**
   Use modern tools, technologies, and ICT resources for data analysis, documentation, and scientific reporting.
6. **Lifelong Learning and Professional Development:**
   Pursue higher studies, professional advancement, and continuous learning for personal and career growth.

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Programme Specific Outcomes (PSOs)

B.Sc. (BZC, BtZC)

1. **PSO 1 – Subject-Specific Knowledge:**
   Apply specialized knowledge of **Botany / Biotechnology, Zoology, and Chemistry** to understand the structure, function, and interaction of biological systems, and chemical processes relevant to life sciences.
2. **PSO 2 – Experimental Competence:**
   Perform subject-specific laboratory techniques, including **plant and animal dissection, microbial handling, biotechnological protocols, and chemical analysis**, ensuring accuracy, safety, and ethical compliance.
3. **PSO 3 – Problem Solving in Applied Sciences:**
   Use theoretical and practical understanding to analyze and solve problems in **plant sciences, animal biology, biotechnology, environmental science, and chemical industries.**
4. **PSO 4 – Research and Innovation:**
   Develop small-scale research projects and contribute to scientific innovation by applying techniques of **molecular biology, analytical chemistry, bioinformatics, and ecological assessment.**
5. **PSO 5 – Industry and Career Readiness:**
   Prepare for employment in **pharmaceutical companies, food industries, clinical labs, agriculture, healthcare, chemical industries, and educational institutions**, or for higher academic pursuits.

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Course Objectives

B.Sc. Chemistry – Semester I

1. **To develop foundational knowledge of P-block elements**, their structure, bonding, and reactivity, including important compounds like diborane, boron-nitrogen compounds, carbides, nitrides, silicones, oxides, oxyacids, interhalogens, pseudohalogens, and xenon derivatives.
2. **To introduce key concepts of organic chemistry**, including structural theory, bond polarization, reaction mechanisms, and the chemistry of alkanes, alkenes, alkynes, and aromatic hydrocarbons with an emphasis on aromaticity and substitution reactions.
3. **To provide understanding of basic physical chemistry principles**, covering quantum mechanics, chemical kinetics, photochemistry, and their practical applications in chemical analysis and reaction dynamics.
4. **To familiarize students with analytical and general chemistry techniques**, including volumetric analysis, titrations, isomerism, stereochemistry, colloids, surface chemistry, and adsorption, highlighting their role in both theoretical understanding and industrial applications.

Course Outcomes (COs)

B.Sc. Chemistry – Semester I

1. **Understand the structure, bonding, and reactivity of P-block elements and their compounds**, including oxides, oxyacids, interhalogens, pseudohalogens, and noble gas derivatives.
2. **Apply structural and mechanistic principles of organic chemistry** to analyze the properties and reactions of alkanes, alkenes, alkynes, and aromatic hydrocarbons.
3. **Explain core concepts of physical chemistry**, including quantum mechanics, chemical kinetics, and photochemistry, and apply them to chemical processes and reaction studies.
4. **Demonstrate knowledge of analytical and general chemistry techniques**, including titration methods, stereochemistry, colloids, and surface phenomena, relevant to industrial and laboratory applications.

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Course Objectives

B.Sc. Chemistry – Semester II
(Paper–II: Chemistry–II)

1. **To develop comprehensive understanding of d-block and f-block elements**, covering their electronic structures, oxidation states, color, magnetic properties, complex formation, and catalytic behavior, including lanthanide and actinide chemistry.
2. **To introduce core concepts of organic chemistry related to halogen compounds, hydroxy compounds, ethers, and carbonyl compounds**, emphasizing their synthesis, reaction mechanisms (SN1, SN2), stereochemistry, and functional group transformations.
3. **To provide foundational knowledge in electrochemistry and chemical bonding**, covering concepts like ionic mobility, conductance, EMF of cells, electrode types, potentiometric titrations, and molecular orbital theory to explain bonding and magnetic properties in molecules.
4. **To enhance understanding of stereoisomerism and colligative properties**, focusing on optical activity, chirality, stereochemical configurations (R, S; D, L), and practical applications of colligative properties like boiling point elevation, freezing point depression, and osmotic pressure.

Course Outcomes (COs)

B.Sc. Chemistry – Semester II
(Paper–II: Chemistry–II)

1. **Understand the chemistry and properties of d-block and f-block elements**, including their electronic structures, oxidation states, complex formation, magnetic properties, lanthanide and actinide contraction, and separation techniques.
2. **Apply concepts of organic chemistry to halogen compounds, alcohols, phenols, ethers, and carbonyl compounds**, including their synthesis, reaction mechanisms (SN1, SN2), stereochemistry, and functional transformations.
3. **Explain principles of electrochemistry and chemical bonding**, including ionic conductance, types of electrodes, EMF calculations, molecular orbital theory, and bonding in homo- and heteronuclear diatomic molecules.
4. **Demonstrate understanding of stereochemistry and colligative properties**, covering optical activity, configurations (R/S, D/L), chiral molecules, and applications of colligative properties like osmotic pressure and boiling point elevation in solution chemistry

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