

## Department of Chemistry and Biochemistry Undergraduate Program Learning Outcomes

Students seeking a bachelor's degree in chemistry or biochemistry will apply and integrate foundational knowledge and critical thinking skills to identify and solve scientific problems. Majors will develop the ability to become contributing members of the scientific community, both as individuals and while working in teams, and will develop the creativity to generate solutions to societal needs.

Students will be prepared to enter careers in chemical, materials science, pharmaceutical, biochemical and molecular life sciences industries; careers in government, education, and academic laboratories; and to pursue advanced education in graduate and professional schools.

Specifically, graduates in chemistry or biochemistry will:

- I. Demonstrate fundamental knowledge, including chemical and biochemical theories, concepts, and laboratory methods
  - Conceptualize, model, and explain chemical and life processes at the molecular level
  - Manipulate, synthesize, and analyze molecules and their properties using contemporary laboratory equipment and methods
  - Practice safe handling of equipment, molecules, and organisms
  - Recognize the relationships between the traditional sub-disciplines within chemistry and the connections between chemistry and other disciplines
  
- II. Understand and use scientific processes to create knowledge of molecular properties and behavior
  - Develop and evaluate scientific questions and hypotheses
  - Design methods, including use of appropriate equipment, instrumentation, and computer software, for investigating scientific questions and hypotheses
  - Recognize limitations of experimental methodologies
  - Generate and record quantitative and qualitative data
  - Apply concepts of approximation, estimation, precision, and accuracy in data acquisition and problem solving
  - Quantitatively analyze data, evaluate validity of data, and interpret meaning from data to generate scientific results
  - Generate conclusions supported by results
  - Model ethical behavior intrinsic to the scientific process of knowledge generation

- III. Demonstrate the ability to effectively communicate science
  - Employ technical and ethical conventions for written and oral reports
  - Place findings within the context of current scientific knowledge by locating, retrieving, understanding, evaluating, and citing relevant scientific literature
  - Gain familiarity and practice with the process of working in teams and peer evaluation
  
- IV. Understand and appreciate the importance of chemistry and biochemistry to society as a whole
  - Explain how scientific reasoning and processes can inform policy decisions
  - Provide examples of scientific discoveries that have improved society
  - Recognize how chemistry and biochemistry work with other scientific disciplines to address societal needs

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