A minor is offered in biochemistry. Declaration of a biochemistry minor is open to any student enrolled at CU Boulder, regardless of college or school.

**Requirements**

A minimum of 21 credits is required for the minor, at least 9 of which must be upper-division. The College of Arts & Sciences will allow a maximum of 9 hours of transfer credit, including 6 upper-division credit hours to count toward a minor. Students may transfer courses through organic chemistry only. All courses required for the minor must be completed with a grade of C- or better, and the overall GPA in all BCHM and CHEM courses taken must be a 2.00.

Students who have taken CHEN 1211/CHEM 1221 may substitute them for CHEM 1113/CHEM 1114.

**Learning Outcomes**

Upon completing the program, students will be able to:

- Master the foundational concepts of general and organic chemistry, including equilibrium, kinetics, bonding (covalent and non-covalent) and reactivity and apply these concepts to biological systems.
- Explain how biomolecules (DNA, RNA, proteins, lipids, carbohydrates and metabolites) are synthesized and control biological processes.
- Identify the factors that determine the three-dimensional structures of biological macromolecules (DNA, RNA, proteins), and membranes (including organelles) and explain how structure relates to function.
- Describe how cells sense their environment and use this information to regulate cellular functions such as DNA replication, gene expression, signal transduction, cell division and cell death.
- Develop a conceptual, mechanistic and mathematical understanding of biomolecular interactions, including binding and catalysis.
- Explain how energy is stored, transformed and harnessed in biological systems.
- Analyze data, interpret graphs, solve quantitative problems to interpret results of scientific studies. Evaluate the rigor and reproducibility of scientific results.
- Learn and apply the rigorous scientific methods on which (bio)chemical knowledge is built: making observations, formulating hypotheses, executing experiments, evaluating rigor and reproducibility.
- Effectively communicate scientific information in oral, written and visual formats to specialized and general audiences.

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**Code** | **Title** | **Credit Hours**
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**General Chemistry**<br>5-10<br> Select one of the following two options:<br><br>**Option 1:**<br>Chemistry 1113 & Chemistry 1114 & Chemistry 1133 & Chemistry 1134<br>General Chemistry 1 and Laboratory in General Chemistry 1<br>General Chemistry 2 and Laboratory in General Chemistry 2<br><br>**Option 2:**<br>Chemistry 1400 & Chemistry 1401<br>Foundations of Chemistry and Foundations of Chemistry Lab<br><br>**Organic Chemistry**<br>10-11<br>Chemistry 3311 (or Chemistry 3451) & Chemistry 3321<br>Organic Chemistry 1 (or Organic Chemistry 1 for Chemistry and Biochemistry Majors) and Laboratory in Organic Chemistry 1<br>Chemistry 3331 (or Chemistry 3471 & Chemistry 3491) & Chemistry 3341 (or Chemistry 3381)<br>Organic Chemistry 2 (or Organic Chemistry 2 for Chemistry Majors) and Laboratory in Organic Chemistry 2 (or Laboratory in Advanced Organic Chemistry)<br>Chemistry 4850<br>Therapeutic and Diagnostic Nucleic Acids<br>Total Credit Hours 21-29

Must be completed at CU Boulder.