

# BIOLOGY - BIOTECHNOLOGY TRACK, BS

## Introduction

The Biotechnology Track will allow students to master skills used within areas such as biotechnology, medicine, agriculture, and response to climate change. Students in this track will practice employable laboratory and research skills. Example employers for this track include biotechnology companies, Centers for Disease Control and Prevention, hospital laboratories, pharmaceutical research labs, and food science labs.

## Program Delivery

- This is an on-campus program.

## Declaring This Major

- Click here (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/#policiestext>) to go to information about declaring a major.

## General Requirements

To earn a degree, students must satisfy all requirements in each of the three areas below, in addition to their individual major requirements.

- CU Denver General Graduation Requirements (<http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation/>)
- CU Denver Core Curriculum (<http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/>)
- College of Liberal Arts & Sciences Graduation Requirements (<http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-liberal-arts-sciences/#graduationrequirementstext>)
- Click here (<http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/>) for information about Academic Policies

## Program Requirements

- Students must complete a minimum of 36 BIOL credit hours.
- Students must complete a minimum of 18 credit hours in ancillary coursework.
- Students must complete a minimum of 18 upper division (3000- level and above) BIOL credit hours.
- Students must earn a minimum grade of C- (1.7) in all courses that apply to the major and must achieve a minimum cumulative major GPA of 2.0. All graded attempts in required and elective courses are calculated in the major GPA. Courses taken using P+/P/F or S/U grading cannot apply to major requirements.
- Students must complete a minimum of 18 upper division (3000-level and above) BIOL credit hours with CU Denver faculty and at least 6 credits must be at 4000-level or higher.

## Program Restrictions, Allowances and Recommendations

- All upper division biology courses applied to the undergraduate biology major must be completed within 10 years of graduation.

- Undergraduate students may count up to six credit hours of independent study or internship (any combination of BIOL 3840 Independent Study, BIOL 3939 Internship, BIOL 4840 Independent Study, BIOL 4880 Directed Research) toward the upper-division Biology electives requirement in the major.

Code	Title	Hours
<b>Complete the following required biology courses:</b>		<b>20</b>
BIOL 2010	Organisms to Ecosystems (Gen Bio)	
	or BIOL 203C Honors Organisms to Ecosystems (Gen Bio)	
BIOL 2011	Organisms to Ecosystems Lab (Gen Bio)	
	or BIOL 2031 Honors Organisms to Ecosystems Lab (Gen Bio)	
BIOL 2020	Molecules to Cells (Gen Bio)	
	or BIOL 204C Honors Molecules to Cells (Gen Bio)	
BIOL 2021	Molecules to Cells Lab (Gen Bio)	
	or BIOL 2041 Honors Molecules to Cells Lab (Gen Bio)	
BIOL 3124	Introduction to Molecular Biology	
BIOL 3611	General Cell Biology	
BIOL 4024	Introduction to Biotechnology	
BIOL 4125	Molecular Biology Laboratory	
<b>Choose at least one lab class from the following list:</b>		<b>2-3</b>
BIOL 3612	Cell Biology Laboratory	
BIOL 3651	General Microbiology Lab	
CHEM 4828	Biochemistry Lab	
<b>Complete the following required ancillary classes:</b>		<b>8</b>
CHEM 2031	General Chemistry I	
	or CHEM 208H Honors General Chemistry I	
CHEM 2038	General Chemistry Laboratory I	
	or CHEM 203M Majors General Chemistry I Laboratory	
	or CHEM 208 Honors General Chemistry I Laboratory	
CHEM 2061	General Chemistry II	
	or CHEM 209H Honors General Chemistry II Lecture	
CHEM 2068	General Chemistry Laboratory II	
	or CHEM 206M Majors General Chemistry II Laboratory	
	or CHEM 209 Honors General Chemistry II Laboratory	
<b>Choose one biochemistry class from this list (Organic Chemistry I is a prereq):</b>		<b>3-4</b>
CHEM 3810	Biochemistry	
CHEM 4820	General Biochemistry II	
<b>Choose one quantitative class from this list:</b>		<b>3-4</b>
BIOL 3763	Biostatistics	
MATH 1401	Calculus I	
MATH 4830	Applied Statistics	
IWKS 2300	Fundamentals of Computational Innovation	
<b>Choose one writing intensive class from this list:</b>		<b>3</b>
ENGL 3154	Technical Writing (also satisfies CLAS Communicative Skills requirement)	
ENGL 4175	Writing in the Sciences (also satisfies CLAS Communicative Skills requirement)	
ENGL 4180	Argumentation and Logic (also satisfies CLAS Humanities requirement)	
ENGL 4280	Proposal and Grant Writing (also satisfies CLAS Humanities requirement)	
COMM 4550	Rhetorics of Medicine & Health	

**Choose at least two upper division BIOL 4000 level classes from this list, must be from UCD faculty:** **6**

BIOL 4055	Virology
BIOL 4064	Cell Biology of Disease
BIOL 4126	Molecular Genetics
BIOL 4128	Topics in Molecular Biology
BIOL 4134	Human Genetics
BIOL 4144	Medical Microbiology
BIOL 4225	Genomics and Bioinformatics
BIOL 4335	Plant Structure and Development
BIOL 4415	Applied Microbial Ecology
BIOL 4475	Mechanisms of Human Pathology
BIOL 4550	Cell Signaling
BIOL 4634	Biology of Cancer
BIOL 4674	Endocrinology
BIOL 4815	Structural Biology of Neurodegenerative Diseases
BIOL 4825	Biochemistry of Metabolic Disease
BIOL 4835	Biochemistry of Gene Regulation and Cancer

**Choose at least two from the following list that have not already been used anywhere above (be sure to reach 36 credits in BIOL):**

Internship, Directed Research, or Independent Study is highly recommended

BIOL 3010	Biology Career and Professional Development Seminar
BIOL 3134	Advanced Topics
BIOL 3137	Advanced Special Topics with Lab
BIOL 3445	Introduction to Evolution
BIOL 3611	General Cell Biology
BIOL 3621	Introduction to Immunology
BIOL 3650	General Microbiology
BIOL 3612	Cell Biology Laboratory
BIOL 3804	Developmental Biology
BIOL 3832	General Genetics
BIOL 3840	Independent Study
BIOL 3939	Internship
BIOL 4050	Advanced Biology Topics
BIOL 4055	Virology
BIOL 4064	Cell Biology of Disease
BIOL 4126	Molecular Genetics
BIOL 4128	Topics in Molecular Biology
BIOL 4134	Human Genetics
BIOL 4144	Medical Microbiology
BIOL 4225	Genomics and Bioinformatics
BIOL 4335	Plant Structure and Development
BIOL 4415	Applied Microbial Ecology
BIOL 4475	Mechanisms of Human Pathology
BIOL 4550	Cell Signaling
BIOL 4634	Biology of Cancer
BIOL 4674	Endocrinology
BIOL 4815	Structural Biology of Neurodegenerative Diseases
BIOL 4825	Biochemistry of Metabolic Disease
BIOL 4835	Biochemistry of Gene Regulation and Cancer
BIOL 4840	Independent Study

BIOL 4880	Directed Research
CHEM 4121	Instrumental Analysis
CHEM 4128	Instrumental Analysis Laboratory
CHEM 4221	Practical Applications of Spectroscopy
CHEM 4388	Nucleic Acid Technologies I
CHEM 4411	Bioconjugate Techniques and Theranostic Nanomedicine
CHEM 4580	Molecular Informatics
CHEM 4630	Programming for Data Analysis in the Physical Sciences
CHEM 4845	Molecular Modeling and Drug Design
CHEM 4860	Bioinorganic Chemistry: Bioinorganic compounds in medicine

**Total Hours** **45-48**

To learn more about the Student Learning Outcomes for this program, please visit our website. ([https://clas.ucdenver.edu/integrative-biology/academics/undergraduate-programs/#biology\\_major-73](https://clas.ucdenver.edu/integrative-biology/academics/undergraduate-programs/#biology_major-73))

To review the Degree Map for this program, please visit our website (<https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/clas/>).