Department of Integrative Biology
COLLEGE OF LIBERAL ARTS AND SCIENCES
UNIVERSITY OF COLORADO **DENVER**

Science Building Room 2071
Campus Box 171
P.O. Box 173364
Phone: 303-315-7600
http://clas.ucdenver.edu/biology

BIOTECHNOLOGY CERTIFICATE

University of Colorado Denver

Why earn a Biotechnology Certificate?

Biotechnology is a rapidly growing field in Colorado and nationally that encompasses many disciplines. Agriculture, biofuels, biomedical biotechnology, pharmaceuticals, microbiology, and medical device development are all well-represented areas of biotechnology in Colorado. The Department of Integrative Biology offers a Certificate program in Biotechnology that allows students to acquire foundational knowledge and specialized skills relevant to these research areas. The certificate is designed to provide a strong background in biochemistry and molecular biology, with an emphasis on applied training via lab work and research experiences. Upon completion of the requirements, students obtain recognition in the form of a Certificate and official designation on their transcript.

Why earn a Biotechnology Certificate at CU Denver?

High-quality, state-of-the-field upper-division courses and the opportunity for experiential learning comprise the core of the Biotechnology Certificate program. The three major components to the Biotechnology Certificate include advanced molecular biology training, directed student research or an internship in a research laboratory either at CU Denver or off-campus, and biochemistry training. An advanced molecular biology laboratory teaches students key techniques, experimental design, trouble-shooting, and how to work independently on research questions spanning the semester. Students receive hands-on experience with cloning, DNA and RNA isolation, gel electrophoresis, PCR, quantitative PCR, and other modern techniques in genetic engineering. The Molecular Biology Laboratory enrolls only 16 students per semester, so that each student has ample opportunity to work with the equipment and complete every experiment.

Learning Outcomes

Upon successful completion of the Biotechnology Certificate:

1. Students will be able to explain the foundational knowledge for key molecular biology concepts and techniques (including recombinant DNA technology, genome editing, gene therapy, stem cell biology, DNA sequencing, bioinformatics, proteomics and genomics) and be able to demonstrate how they are applied to molecular biotechnology.
2. Students will be able to critically interpret and assess the scientific literature in molecular biotechnology, in the context of the applications of a biotechnology company.
3. Students will be able to collect data and effectively analyze and communicate results using state-of-the-field laboratory techniques employed in biotechnology.

BIOTECHNOLOGY CERTIFICATE

University of Colorado Denver

Obtaining the Biotechnology Certificate

In order to declare intent to pursue the Biotechnology Certificate, you should contact the faculty advisor (see below). In order to earn a certificate, students are required to complete 17-20 credits from the required course list. Students must have the prerequisites for each required course. Most students earn the certificate while working on their Bachelor's Degree; alternatively, the courses may be taken through non-degree admission. All CU Denver admissions questions should be directed to the Admissions office (http://www.ucdenver.edu/admissions).

Prerequisites and Certificate requirements

- Individual courses used to earn the Biotechnology Certificate carry prerequisites that must be met before enrolling.
- All courses used to satisfy the requirements for the Certificate must be completed with a grade of C or better.
- All courses used to satisfy the requirements for the Certificate must be completed at CU Denver.
- All courses used to satisfy the requirements for the Certificate must be completed within a five year period.

You must contact the Biotechnology Certificate faculty advisor (see below) early to declare the intent to complete the Biotechnology Certificate, and again upon completion of requirements but before graduation in order for the certificate recognition to appear on your transcripts.

Required Courses

☐		BIOL 4024	3 crs.	Introduction to Biotechnology
☐		BIOL 3124	3 crs.	Introduction to Molecular Biology
☐		BIOL 4125	3 crs.	Molecular Biology Lab
☐	or	CHEM 4820	3 crs.	General Biochemistry II
		CHEM 3810	4 crs.	Biochemistry
☐	or	BIOL 3939	3 crs.	Internship (consult the Experiential Learning Center at 303-315-7258 or Experiential.LearningCenter@ucdenver.edu)
		BIOL 4880	3 crs.	Directed Research (consult the Biotechnology Certificate faculty advisor)

Elective (ONE from among those listed below, or a course pre-approved by the Biotechnology Certificate faculty advisor)

☐	BIOL 3612	3 crs.	Cell Biology Lab
☐	BIOL 3763	4 crs.	Biostatistics
☐	BIOL 4055	3 crs.	Virology
☐	BIOL 4134	3 crs.	Human Genetics
☐	BIOL 4144	3 crs.	Medical Microbiology
☐	BIOL 4225	3 crs.	Genomics and Bioinformatics
☐	BIOL 4622	3 crs.	Topics in Immunology
☐	BIOL 4634	3 crs.	Biology of Cancer
☐	BIOL 4064	3 crs.	Cell Biology of Disease
☐	CHEM 3111	3 crs.	Analytical Chemistry
☐	CHEM 4121	3 crs.	Instrumental Analysis
☐	CHEM 4828	2 crs.	Biochemistry lab
☐	CHEM 4835	3 crs.	Biochemistry of Cancer

For more information

Contact the Biotechnology Certificate faculty advisor, Dr. Chris Miller, at chris.miller@ucdenver.edu.

Revised 2/8/2021