University of Colorado Denver
College of Liberal Arts and Sciences

Department of Integrative Biology
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BIOTECHNOLOGY CERTIFICATE

University of Colorado Downtown Denver Campus

Why earn a Biotechnology Certificate?

Biotechnology is a rapidly growing field in Colorado, and nationally. Biotechnology is a broad term covering many disciplines. Agriculture, pharmaceuticals, microbiology, and medical device development are a few of the thriving areas of biotechnology in Colorado. Those wishing to pursue a career in biotechnology need to have a strong knowledge of biology and chemistry. The Department of Integrative Biology offers a Certificate program in Biotechnology that allows students to acquire special skills in research-based biology and chemistry. The certificate is designed to provide a strong background in chemistry, including organic and biochemistry, and in Biology, including both prokaryotic and eukaryotic molecular biology and gene regulation. Upon completion of the requirements, the student will obtain recognition in the form of a Certificate and designation on their transcript.

Why earn a Biotechnology Certificate at the Downtown Campus?

The quality upper division courses and opportunity for experiential learning at the Downtown Campus together ensure that the Biotechnology Certificate program is a current and highly relevant program. Upper division courses are small (20 to 50 students), providing greater interaction between the students and faculty, high rigor, and many opportunities for critical thinking and discussion. The three major components to the Biotechnology Certificate include: an emphasis on upper level chemistry; Independent Study or Internship in a research laboratory either at UCD or off-campus; and an advanced Molecular Biology Techniques Laboratory. This latter course is designed to teach students basic "laboratory math", experimental design, trouble-shooting problems, as well as how to work independently on a genomics problem during the semester. The students receive hands-on experience with DNA and RNA isolation, gel electrophoresis, Northern and Western blots, PCR, and Real Time-PCR, which all comprise the basic skills required in most molecular biology research labs. The Molecular Biology Techniques Laboratory enrolls only 16 students per semester, so that each student has ample opportunity to work with the equipment and complete every experiment.

How to apply?

The Biotechnology Certificate is not a degree and not a program that requires special admission. In order to earn a certificate, students are required to complete [with a grade of B- (2.7) or better] 21-22 credits from the required course list (see reverse side). Please note: students must have the prerequisites for each course. Students may earn the certificate while working on their Bachelors or Masters Degree; or, the courses may be taken through non-degree admission. All admissions questions should be directed to the Registrar's office (303-556-2389). All questions regarding tuition and fees should be directed to the Bursar's office (303-556-2710).

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Prerequisites:

- One year of General Biology and one semester of General Microbiology, both with labs
- Cumulative GPA of 2.75 or better
- All courses (21-22 credits) used to satisfy the requirements for the Biotechnology Certificate must be completed with a grade of B- (2.7) or better.
- No fewer than 14 credits of those used to satisfy the requirements for the Biotechnology Certificate must be completed at UCD.
- All Courses used to satisfy the requirements for the Biotechnology Certificate must be completed within a five year period

Students interested in completing the Biotechnology certificate should contact the Department of Integrative Biology. A certificate will be issued and noted on your transcript upon proof of satisfactory completion of the course work. **You must contact the program advisor when you have completed all the requirements, the semester you are going to graduate, in order for the certificate recognition to appear on your transcripts.**

Required Courses (completed with a grade of B- (2.7) or better):

• BIOL 4024/5024	3 crs.	Biotechnology
• BIOL 4128 or BIOL 3124	3 crs.	Topics in Molecular Biology (replaces 4124/5124) Introduction to Molecular Biology
• BIOL 4125/5125	3 crs.	Molecular Biology Lab
• CHEM 4810/5810	3 crs.	General Biochemistry I
and CHEM 4820/5820	3 crs.	General Biochemistry II
- Or -		
CHEM 3810	4 crs.	Biochemistry
and CHEM 3111	3 crs.	Analytical Chemistry
• BIOL 3939/5939	3 crs.	Internship (consult the Experimental Learning Center at 303.556.2250)
- Or -		
BIOL 4840/5840	3 crs.	Independent Study (consult a Biology Advisor)

Elective (**ONE** from among those listed below or a course pre-approved by Dr. Johansen)

• BIOL 4051/5051	3 crs.	Virology
• BIOL 4144/5144	3 crs.	Medical Microbiology
• BIOL 4621/5621	3 crs.	Immunology
• CHEM 3111	3 crs.	Analytical Chemistry (if not applied above)
• CHEM 4121	3 crs.	Instrumental Analysis
• CHEM 4828	2 crs.	Biochemistry lab
• BIOL 4126/5126	3 crs.	Molecular Genetics

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