Biotechnology

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Mission

In cooperation with the Department of Integrated Science and Technology and the Department of Chemistry and Biochemistry, the Department of Biology offers a four year, interdisciplinary B.S. degree program for a major in biotechnology. Students may not receive dual credit toward the biotechnology major for 300- and 400-level biology courses that are applied toward the biology major.

Biotechnology majors must complete 47-53 credit hours of science foundation courses, 17 credit hours of biotechnology transition and core courses, and 15 credit hours of concentration courses. With the advice and approval of a concentration adviser, each student selects the courses for his or her concentration area. Three broad areas of concentrations are suggested to serve a spectrum of student needs and desires. A research concentration would prepare students for graduate school or entry into a research laboratory. An industry concentration would prepare students for entry into the biotechnology industry. A custom concentration can be assembled for a specialized area of study such as bioinformatics, genomics or agricultural biotechnology.

Major and Degree Requirements

Bachelor of Science in Biotechnology

Degree Requirements

General Education[1]	41
Quantitative requirement[2]	3
Scientific Literacy requirement[2]	3-4
Major requirements (listed below) and electives	79
	126

1 The General Education program contains a set of requirements each student must fulfill. The number of credit hours necessary to fulfill these requirements may vary.

2 In addition to General Education.

Major Requirements

Science Foundation Courses	Credit Hours
Complete all of the following:	
BIO 114. Organisms	4
BIO 124. Ecology and Evolution	4
BIO 214. Cell and Molecular Biology	4
BIO 224. Genetics and Development	4
CHEM 131. General Chemistry I	3
CHEM 131L. General Chemistry Laboratory	1
CHEM 132. General Chemistry II	3
CHEM 132L. General Chemistry Laboratory	1
CHEM 341. Organic Chemistry Lecture I	3
CHEM 342. Organic Chemistry Lecture II	3
CHEM 346L. Organic Chemistry Laboratory	2
Choose one of the following sets of courses:	
MATH 231. Calculus with Functions I	4
MATH 232. Calculus with Functions II	4
OR MATH 235 Calculus I	4
Choose one of the following courses:	
MATH 220. Elementary Statistics	3
MATH 285. Data Analysis	4
Choose one of the following sets of courses:	
PHYS 125. Principles of Physics with Biological Applications I	4
PHYS 126. Principles of Physics with Biological Applications II	4
OR	
PHYS 140-140L. College of Physics I with Laboratory	4
PHYS 150-150L. College of Physics II with Laboratory	4

Biotechnology Transition & Core Courses	Credit Hours
Complete all of the following:	
BIOT 260. Biotechnology Seminar	1
ISAT 305. Biotechnology Lab	1
CHEM/BIO 361. Biochemistry I	3
CHEM 366L. Biochemistry Lab	2
BIO 480. Advanced Molecular Biology	4
ISAT 451. Biotechnology in Industry and Agriculture	3
ISAT 456. Ethical, Legal and Social Implications of Biotechnology	3

Biotechnology Area Concentration

Students must complete 15 credit hours of courses in one of the biotechnology concentrations areas listed below.

Research Concentration: Preparation for graduate school research program or employment in a research laboratory.
Industry Concentration: Preparation for entry-level positions in the biotechnology industry.
Custom Concentration: Specialized in specific areas of biotechnology, including bioinformatics, genomics and agricultural biotechnology.

Upon declaration of the major, each student will be assigned a concentration adviser. The student and the adviser will define the specific courses taken to fulfill the concentration requirement. The student will choose upper division (300 level or higher) BIO, ISAT, CHEM, PHYS or MATH courses, but other appropriate course offerings from other academic units may be substituted with the approval of the concentration adviser.

Students are highly encouraged to include academic credit for research, up to 8 credits of which may be applied to the concentration requirement.

Recommended Schedule for Majors

First semester, first year biotechnology majors are encouraged to start with a 14-15 hour course load. This will generally include a biology course (four credit hours), CHEM 131 and CHEM 131L, and/or a math course, plus General Education. The work load will then be increased in the second semester based on the level of success during the first semester.

First Year	Credit Hours
BIO 114. Organisms[1]	4
BIO 124. Ecology and Evolution	4
CHEM 131 & CHEM 131L. General Chemistry I[1]	4
CHEM 132 & CHEM 132L. General Chemistry II	4
Quantitative course[1]	4-8
General Education: Cluster One	9
	29-33

1 Fulfill General Education: Cluster Three.

Second Year	Credit Hours
BIOT 260. Biotechnology Seminar	1
ISAT 305. Biotechnology Lab	1
BIO 214. Cell and Molecular Biology	4
BIO 224. Genetics and Development	4
CHEM 341-342. Organic Chemistry Lecture	6
CHEM 346L. Organic Chemistry Laboratory	2
Quantitative course	3-4
General Education: from Clusters Two, Four and Five	9
	30-31

Third Year	Credit Hours
CHEM/BIO 361 and CHEM 366L. Biochemistry Lab	5
BIO 480. Advanced Molecular Biology	4
Concentration Electives	4
Physics courses	8
General Education: from Clusters Two, Four and Five	7
Electives	4
	32

Fourth Year	Credit Hours
ISAT 456. Social and Ethical Issues	3
ISAT 451. Biotechnology in Industry	3
Concentration Electives	11
General Education: from Clusters Two, Four and Five	6
Electives	6
	29