

Biotechnology, BS

Program Description

The Bachelor of Science (BS) in Biotechnology at Utah Tech University (UT) prepares students for careers in the growing biotech industry by building upon UT's existing associate degrees and certificates in biotechnology. This new program allows students to seamlessly stack their Associate of Science (AS), Associate of Applied Science (AAS), and specialized biotech certificates into the BS curriculum. Additionally, a partnership with Dixie Technical College enables students who complete Dixie Tech's biotech certificate to transfer directly into UT's AAS program, advancing their qualifications through a streamlined pathway. The BS program integrates foundational courses in biology and chemistry with advanced coursework, lab techniques, and internships to provide students with practical, industry-relevant skills. Endorsed by local biotech companies, the program offers mentorship, internships, and direct career opportunities to address workforce demands in the regional biotech sector. Graduates will be well-equipped for roles in the biotech industry, research, and medical fields, or for pursuing advanced degrees.

Admission Requirement

The proposed Bachelor of Science in Biotechnology at Utah Tech University aligns with our open enrollment policy, requiring no additional admissions criteria. This degree will be accessible to all students, reflecting our commitment to inclusivity and educational opportunity.

Program Curriculum

120 Credits

Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements (<https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext>)

Code	Title	Hours
English		3-7
Mathematics		3-5
American Institutions		3-6
Life Sciences		3-10
Physical Sciences		3-5
Fine Arts		3
Literature/Humanities		3
Social & Behavioral Sciences		3

Biotechnology Required Courses

Code	Title	Hours
BTEC 1010	Fundamentals of Biotechnology ¹	3
BTEC 2030	Cell Culture Techniques ¹	2
BIOL 1610 & BIOL 1615	Principles of Biology I (LS) and Principles of Biology I Lab (LAB) ¹	5
BIOL 1620 & BIOL 1625	Principles of Biology II and Principles of Biology II Lab ¹	5
CHEM 1210 & CHEM 1215	Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB) ¹	5
CHEM 1220	Principles of Chemistry II ¹	4
MATH 1050	College Algebra / Pre-Calculus (MA) ¹	4
BIOL 3010 or BIOL 4010	Evolution Molecular Evolution	3

BIOL 3030	Principles of Genetics	3
PHIL 3555	Tech Ethics	3
BIOL 4300 & BIOL 4305	Molecular Biology and Molecular Biology Laboratory ¹	4
BIOL 3550 & BIOL 3555 or BIOL 3450 & BIOL 3455	Eukaryotic Cell Biology and Eukaryotic Cell Biology Lab ¹ General Microbiology and General Microbiology Lab	4
PHYS 1010 & PHYS 1015 or PHYS 2010 & PHYS 2015	Elementary Physics (PS) and Elementary Physics Lab (LAB) ¹ College Physics I (PS) and College Physics I Lab	4-5
CHEM 2310 & CHEM 2315	Organic Chemistry I and Organic Chemistry I Lab ¹	5
CHEM 2320 & CHEM 2325	Organic Chemistry II and Organic Chemistry II Lab ¹	5
BTEC 4810R or BTEC 4890R	Independent Research Biotechnology Internship	1-6

Biotechnology Elective Courses

BTEC/BIOL/CHEM Upper Division Courses		10
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Emphasis Courses

Code	Title	Hours
Complete three (3) of the five (5) Biotechnology Tracks listed below:		
Functional Genomics		
BTEC 2050	Zebrafish Maintenance & Methodology ¹	2
BTEC 3050	CRISPR/Cas9 Techniques ¹	1
BTEC 4040	Techniques in Functional Genomics ¹	1
BTEC 4050	In Situ Hybridization ¹	1
Protein Characterization		
BTEC 2020	Protein Purification and Analysis ¹	2
BIOL 4300 & BIOL 4305	Molecular Biology and Molecular Biology Laboratory ¹	4
BTEC 4020	Advanced Protein Characterization ¹	1
Genetic Sequencing		
BTEC 2010	DNA Methods and Analysis ¹	2
BIOL 3030	Principles of Genetics	3
BTEC 3010	Sequencing Methods and Techniques ¹	1
Bioinformatics		
BIOL 2300	Fundamentals of Bioinformatics	2
CS 1400	Fundamentals of Programming ¹	3
BIOL 3300	Introduction to Bioinformatics	3
Machine Learning		
BIOL 2070	Introduction to Machine Learning in Biology and Medicine	3
CS 1400	Fundamentals of Programming	3
BIOL 3070	Applied Machine Learning in Biology and Medicine	1

1. Course Fee Required. See Course Fee Tab for details.

Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).

3. Complete at least 30 upper-division credits at Utah Tech for institutional residency.
4. Cumulative GPA 2.0 or higher.
5. Grade C- or higher required in each of the Biotechnology Core courses and Program Elective courses

Graduation Plan

1st Year

Fall Semester	Hours Spring Semester	Hours
BIOL 1610 & BIOL 1615	5 BIOL 1620 & BIOL 1625	5
BTEC 1010	3 ENGL 2010	3
ENGL 1010	3 MATH 1050 ^{or higher}	4
SSC 1010	2 BTEC Entry Level Track Course (1)	2
BTEC 1015R	1 BTEC 1015R	1
	14	15

2nd Year

Fall Semester	Hours Spring Semester	Hours
CHEM 1210 & CHEM 1215	5 BTEC 2030	2
BTEC Entry Level Track Course (2)	2 BTEC 3015R	1
BTEC 1015R	1 CHEM 1220 & CHEM 1225	5
BTEC 2nd Level Track Course (1)	1 BTEC 2nd Level Track Course (2)	1
GE Fine Arts	3 BTEC 3rd Level Track Course (1)	1
GE American Institution	3 GE Social & Behavioral Sci. GE Literature/Humanities	3 3
	15	16

3rd Year

Fall Semester	Hours Spring Semester	Hours
CHEM 2310 & CHEM 2315	5 CHEM 2320 & CHEM 2325	5
BIOL 3030	3 BIOL 3010 or 4010	3
BTEC 3015R	1 BIOL 4300 & BIOL 4305	4
BTEC 3rd Level Track Course (2)	1 BTEC 3015R	1
PHYS 1010 & PHYS 1015	4 BTEC/BIOL/CHEM Upper Division EL	2
PHYS 2010 & PHYS 2015	5	
	19	15

4th Year

Fall Semester	Hours Spring Semester	Hours
BTEC 4810R or 4890R	3 BTEC 4810R or 4890R	3
BIOL 3450 & BIOL 3455	4 BTEC/BIOL/CHEM Upper Division EL	2
GE Upper Division Elective	3 GE Upper Division Elective	3
GE Elective	2-3 PHIL 3555	3
BTEC/BIOL/CHEM Upper Division EL	3 GE Elective	3
	15-16	14

Total Hours 123-124

BS Biotechnology Program Learning Outcomes

At the successful conclusion of this program, students will be able to:

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1. Outline the foundational concepts of biotechnology, including the central dogma of molecular biology, bioethics, industry, and careers in biotechnology.
2. Apply laboratory techniques in DNA methods, cell culture, protein purification, protein analysis, advanced nucleic acid technologies, and microbial culture.
3. Analyze scientific data and interpret results.
4. Integrate knowledge of biology in oral and written assignments.
5. Apply critical thinking to assess existing and emergent biotechnology techniques, protocols, and discoveries.