

Molecular Biosciences and Biotechnology, B.S.

Visit the Biology Department page (<https://www.uvu.edu/college-of-science/biology/>) for more information on the program and access to advising.

Program Description

The Molecular Biosciences and Biotechnology, B.S. provides students with a comprehensive foundation in molecular biology, biotechnology, and related fields. This program equips graduates with the skills and knowledge necessary for careers in research, pharmaceuticals, health-related fields, biomanufacturing, education, and more. This program also offers excellent preparation for advanced studies in the sciences, fostering critical thinking, technical expertise, and hands-on experience in cutting-edge scientific fields.

Program Requirements

Code	Title	Credit Hours
Total Credit Hours		120
General Education Requirements		33 Credits
Students must successfully complete one G/I course to meet graduation requirements		
ENGL 1010 or ENGL 1005	Introduction to Academic Writing Foundations of Academic Writing	3
ENGL 2010	Intermediate Academic Writing	3
MATH 1050 or MATH 1055	College Algebra College Algebra with Preliminaries	4
Complete one of the following:		3
HIST 2700 & HIST 2710	US History to 1877 and US History since 1877 (6)	
HIST 1700	American History (3)	
HIST 1740	US Economic History (3)	
POLS 1000	American Heritage (3)	
POLS 1100	American National Government (3)	
Distribution Courses:		
BIOL 1610 or BIOL 1610H	College Biology I College Biology I	4
CHEM 1210	Principles of Chemistry I	4
Humanities Distribution		3
Personal, Professional, and Civic Growth GE class <small>Recommend PHIL 2050G</small>		3
Fine Arts Distribution		3
Social/Behavioral Science		3
Discipline Core Requirements		78 Credits
BIOL 1615	College Biology I Laboratory	1
CHEM 1220	Principles of Chemistry II	4
BIOL 3400	Cell Biology	3
BIOL 3500	Genetics	3
BIOL 3550	Molecular Biology	3
BIOL 3600	Biological Chemistry	3
BIOL 4550	Molecular Evolution and Bioinformatics	3
Take one of the following:		2
BTEC 4940R	Student Seminar (2)	
BIOL 4940	Student Seminar (2)	
BIOL 4260	Ethical Issues in Biology (2)	
MICR 4940R	Student Seminar (2)	
Choose any 2 from the following <small>Student must complete at least 2 of the courses listed even if it exceeds the required 3 credit hours</small>		3
BIOL 3100	Introduction to Data Analysis for Biologists (3)	

BIOL 3200	Guided Research Experience (1-3)	
BIOL 3515	Advanced Genetics Laboratory (1)	
BIOL 3605	Biological Chemistry Lab (1)	
BIOL 3405	Cell Biology Laboratory (1)	
BIOL 3555	Experiments in Molecular Biology (1)	
BIOL 3690R	Introduction to Undergraduate Research (1)	
BIOL 4300	Phylogenetics (4)	
BIOL 4700	Proteomics (3)	
CHEM 3000	Analytical Chemistry (2)	
CHEM 3005	Analytical Chemistry Laboratory (2)	
CHEM 3410	Introduction to Formulations I (3)	
CHEM 3420	Introduction to Formulations II (3)	
BTEC 3300	Biomolecular Modeling and Simulations (4)	
BOT 3210	Controlled Environment Experiments in Horticulture (3)	
BOT 3710	Plant Propagation (3)	
BOT 3800	Ethnobotany (4)	
BOT 4650	Greenhouse Management (3)	
BOT 4700	Plant Tissue Culture (4)	
MICR 4300	Pathogenic Microbiology (4)	
MICR 4505	Applied Virological Methods (3)	
Complete 8 credits from any of the following:		8
BTEC 4810R	Biotechnology Internship (1-10)	
BIOL 4810R	Biology Internship (1-5)	
BOT 4810R	Botany Internship (1-5)	
BIOL 4890R	Student Research (1-4)	
BOT 4890R	Student Research (1-4)	
MICR 4890R	Student Research (1-4)	
BTEC 4890R	Student Research (1-4)	
BTEC 4990R	Senior Thesis (1-2)	
HONR 4990R	Honors Project (3)	
Choose from 1 MICR course and accompanying lab from the following:		4
MICR 3450	General Microbiology (3) (**Recommended**)	
MICR 3455	General Microbiology Laboratory (1)	
MICR 2060	Microbiology for Health Professions (3)	
MICR 2065	Microbiology for Health Professions Laboratory (1)	
STAT 2040	Principles of Statistics	4
PHYS 2010	College Physics I	4
PHYS 2015	College Physics I Lab	1
PHYS 2020	College Physics II	4
PHYS 2025	College Physics II Lab	1
CHEM 1215	Principles of Chemistry I Laboratory	1
CHEM 1225	Principles of Chemistry II Laboratory	1
CHEM 2310	Organic Chemistry I	4
CHEM 2315	Organic Chemistry I Laboratory	1
CHEM 2320	Organic Chemistry II	4
CHEM 2325	Organic Chemistry II Laboratory	1
BTEC 1010	Fundamentals of Biotechnology I Career Survey	3
BTEC 2010	DNA Manipulation and Analysis	3
BTEC 2020	Protein Purification and Analysis	3
BTEC 2030	Cell Culture Techniques	2
BTEC 3040	Advanced Nucleic Acid Laboratory	4

Elective Requirements	Students must successfully complete one G/I course to meet graduation requirements	9
		Credits
Additional credits to meet credit and upper-division requirements.		9

Graduation Requirements

1. Complete the required minimum 120 credit hours.
2. At least 30 credit hours in residence at UVU or satellite sites are required, with 10 hours earned during the last 45 hours.
3. A minimum of 40 credits must be upper-division (numbered 3000 or above)
4. A minimum of 40 credits must be in the major (BIOL, BOT, BTEC, MICR, or ZOOL prefixes), 30 of which must be upper-division. A minimum of nine Department credits must be taken at UVU.
5. Complete core courses with a grade of "C" or higher in each BTEC course and a "C-" or higher in all other core courses.
6. Achieve a minimum overall GPA of 2.0 with a minimum GPA of 2.25 in core courses.
7. Successful completion of at least one Global/Intercultural course.
8. Successful completion of two writing enriched (WE) courses.
9. [Complete Departmental Assessment conducted by the Dept. of Biology Assessment Coordinator.](#)
10. [Complete an exit survey administered by the Biology Department.](#)

Graduation Plan

This graduation plan is a sample plan and is intended to be a guide. Your specific plan may differ based on your Math and English placement and/or transfer credits applied. You are encouraged to meet with an advisor and set up an individualized graduation plan in Wolverine Track (<http://www.uvu.edu/wolverinetrack/>).

First Year		Credit Hours
Semester 1		
ENGL 1010 or ENGL 1005	Introduction to Academic Writing or Foundations of Academic Writing	3
MATH 1050 or MATH 1055	College Algebra or College Algebra with Preliminaries	4
BIOL 1610 or BIOL 1610H	College Biology I or College Biology I	4
BIOL 1615	College Biology I Laboratory	1
BTEC 1010	Fundamentals of Biotechnology I Career Survey	3
Credit Hours		15
Semester 2		
ENGL 2010	Intermediate Academic Writing	3
STAT 2040	Principles of Statistics	4
Personal, Professional, and Civic Growth GE class		3
BTEC 2010	DNA Manipulation and Analysis	3
MICR course		3
MICR lab		1
Credit Hours		17
Second Year		
Semester 3		
CHEM 1210	Principles of Chemistry I	4
CHEM 1215	Principles of Chemistry I Laboratory	1
PHYS 2010	College Physics I	4
PHYS 2015	College Physics I Lab	1
BIOL 3500	Genetics	3
BIOL/CHEM/BTEC/BOT/ZOOL course		1
Credit Hours		14
Semester 4		
American Institutions Distribution		3
CHEM 1220	Principles of Chemistry II	4
CHEM 1225	Principles of Chemistry II Laboratory	1
PHYS 2020	College Physics II	4
PHYS 2025	College Physics II Lab	1
BTEC 2020	Protein Purification and Analysis	3
Credit Hours		16

Third Year**Semester 5**

Humanities Distribution		3
CHEM 2310	Organic Chemistry I	4
CHEM 2315	Organic Chemistry I Laboratory	1
BIOL 3400	Cell Biology	3
BTEC 2030	Cell Culture Techniques	2
Elective		3
Credit Hours		16

Semester 6

Fine Arts Distribution		3
Social/Behavioral Science Distribution		3
CHEM 2320	Organic Chemistry II	4
CHEM 2325	Organic Chemistry II Laboratory	1
Elective		3
Credit Hours		14

Fourth Year**Semester 7**

BIOL 3550	Molecular Biology	3
BTEC 3040	Advanced Nucleic Acid Laboratory	4
BTEC or BIOL Internship or Research course		8
Credit Hours		15

Semester 8

BIOL 3600	Biological Chemistry	3
BIOL 4550	Molecular Evolution and Bioinformatics	3
BTEC 4940R	Student Seminar	2
BIOL/CHEM/BTEC/BOT/ZOOL course		2
Elective		3
Credit Hours		13
Total Credit Hours		120

Program Learning Outcomes

1. Apply the process of science through the use of hypothesis testing in the design and completion of scientific experiments
2. Critically evaluate scientific information
3. Quantitatively analyze scientific data through graph interpretation, statistical analysis, and problem solving
4. Effectively communicate scientific information in both written and oral formats.
5. Explain fundamental biological concepts including molecular biology, biochemistry, cell biology, genetics, and evolution.

Natural sciences managers

- Total Positions 100,100
- Field Growth 7.5%
- Median Salary \$157,740
- Average Openings 8.3

Biological scientists, all other

- Total Positions 66,800
- Field Growth 5.6%
- Median Salary \$91,100
- Average Openings 5.4

Biological science teachers, postsecondary

- Total Positions 64,900
- Field Growth 8.4%
- Median Salary \$83,920
- Average Openings 5.6