Hours

Biology - Biological Sciences Emphasis, BS

Program Description

This B.S. Biology emphasis is designed for students interested in graduate school and seeking a career in research or academia. Students can cater their studies in this degree in multiple areas of biology including, molecular, biochemical, physiological, evolutionary and organismal. It is also the best option for students looking to apply to Veterinary school.

Program Curriculum

120 credits

Code

Utah Tech General Education Requirements

Title

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 (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)

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
Code	Title	Hours
Biology Core Requirements		
BIOL 1610 & BIOL 1615	Principles of Biology I (LS) and Principles of Biology I Lab (LAB)	5
BIOL 1620 & BIOL 1625	Principles of Biology II and Principles of Biology II Lab	5
BIOL 3010	Evolution	3
BIOL 3030	Principles of Genetics	3
Mathematics & Physical Science	e Requirements	
CHEM 1210 & CHEM 1215	Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB)	5
CHEM 1220 & CHEM 1225	Principles of Chemistry II and Principles of Chemistry II Lab	5
CHEM 2310 & CHEM 2315	Organic Chemistry I and Organic Chemistry I Lab	5
CHEM 2320 & CHEM 2325	Organic Chemistry II and Organic Chemistry II Lab	5
Complete one (1) of the following series of courses:		
PHYS 2010 & PHYS 2015 & PHYS 2020 & PHYS 2025	College Physics I (PS) and College Physics I Lab and College Physics II and College Physics II Lab	10

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& PHYS 2225 and Physics/Scientists Engineers II Lab Additional Biology Requirements 4 BIOL 3040 General Ecology 4 & BIOL 3155 Biostatistics and the Scientific Method 4 & BIOL 3155 Biostatistics and the Scientific Method 5 & BIOL 3155 and Scientific Method and Experimental Design 7 PIEC 2010 DNA Methods and Analysis 2 BTEC 2030 Cell Culture Techniques 2 BTEC 2030 Cell Culture Techniques 2 BTEC 2030 Cell Culture Techniques 2 BIOL 3200 Fundamentals of Bioinformatics 2 Complete one (1) of the following sets of courses: 8 BIOL 3455 General Microbiology 4 & BIOL 3455 General Microbiology Lab 4 & BIOL 3455 General Microbiology 4 & BIOL 3455 Advanced Human Physiology 3 & BIOL 3450 Advanced Human Physiology 3 & BIOL 3450 Advanced Human Physiology 4 & BIOL 3450 Advanced Human Physiology	or PHYS 2210	Physics/Scientists Engineers I (PS)	
& PMYS 2225 and Physics/Scientists Engineers II Lab Additional Biology Requirements BIOL 3040 General Ecology Lab 4 & BIOL 3150 Biostatistics and the Scientific Method 4 & BIOL 3155 Biostatistics and the Scientific Method 4 ECO 101 BIOL 3150 Biostatistics and Experimental Design PIEC 2010 DNA Methods and Analysis 2 BIEC 2020 Protein Purification and Analysis 2 BIEC 2030 Cell Culture Techniques 2 BIDL 2300 Fundamentatis of Bioinformatics 2 BIDL 2300 Fundamentatis of Bioinformatics 2 Complete one (1) of the following sets of courses: BIDL 3450 General Microbiology 4 d BIOL 3550 Enkaryotic Cell Biology Lab 3 or BIOL 3550 Complete one (1) of the following seties of courses: 8 BIDL 3450 A Advanced Human Physiology 3 BIDL 3450 A Advanced Human Physiology 3 BIDL 3450 A Ribushida 3 Or BIDL 4500 Plant Physiology <td></td> <td></td> <td></td>			
BIOL 3040 See BIOL 3045 and General Ecology Lab 4 BIOL 3150 Blostatistics and the Scientific Method and Experimental Design 4 Pick 50 FICT Set Technical Laboratory Courses 7 BITCC 2010 DIMA Methods and Analysis 2 BTEC 2030 Protein Purification and Analysis 2 BTEC 2030 Call Culture Techniques 2 BTEC 2050 Zebrafish Maintenance & Methodology 2 BIOL 3250 Fundamental of Bioinformatics 2 BIOL 3550 General Microbiology Lab 4 A BIOL 3550 General Microbiology Lab 6 BIOL 3400 General Ecology Lab 6 BIOL 3450 General Ecology Lab	& PHYS 2225		
ik BIOL 31950 and General Ecology Lab BIOL 3155 and Scientific Method and Experimental Design Pick one (1) of the following Technical Laboratory Courses BTEC 2010 DNA Methods and Analysis 2 BTEC 2020 Protein Purification and Analysis 2 BTEC 2030 Cell Culture Techniques 2 BTEC 2030 Eubrafish Maintenance & Methodology 2 BICL 300 Fundamentals of Bioinformatics 2 Complete one (1) of the following sets of courses: 2 BIOL 3450 General Microbiology 4 & BIOL 3550 Eukaryotic Cell Biology 4 & BIOL 3550 Eukaryotic Cell Biology Lab 3 BIOL 3420 Advanced Human Physiology 3 BIOL 4505 and General Microbiology Lab 3 Ø BIOL 4505 and Comparative Vertebrate Physiology 3 Ø BIOL 4506 Plant Physiology 3 Ø BIOL 4505 and Comparative Vertebrate Physiology Lab 4 Ø BIOL 4506 and Plant Physiology 5 Ø BIOL 4505 and Indinvertebrate Zoology	Additional Biology Requirement	s	
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Rib III. 3135 and Scientific Method and Experimental Design Pick one (1) of the following Te-th-itcal Laboratory Courses TETC 2010 DNA Methods and Analysis 2 BTEC 2020 Protein Purification and Analysis 2 BTEC 2030 Cell Culture Techniques 2 BTEC 2050 Zebrafish Maintenance & Methodology 2 BIOL 3200 Fundamentals of Bioinformatics 3 Complete one (1) of the following sets of courses: BIOL 3450 General Microbiology 4 & BIOL 3455 Ceneral Microbiology Below 1 4 & BIOL 3550 Eukaryotic Cell Biology Cell Biology 4 & BIOL 3500 Eukaryotic Cell Biology Cab 3 BIOL 3400 Advanced Human Physiology 3 BIOL 3500 Comparative Vertebrate Physiology Age 3 BIOL 4500 Plant Physiology Lab 4 BIOL 3200 Invertebrate Zoology Lab 4 BIOL 4250 All Protections and Invertebrate Zoology Lab 4 BIOL 4270 Inthtysiology Lab 4 4 BIOL 4280			
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BIOL 3450 General Microbiology 4 and General Microbiology Lab and General Microbiology Lab and General Microbiology Lab and Eukaryotic Cell Biology 4 and Eukaryotic Cell Biology Lab 4 and Eukaryotic Cell Biology Lab Complete one (1) of the following series of courses: 8 BIOL 3550 Advanced Human Physiology 3 BIOL 4500 Advanced Human Physiology And Comparative Vertebrate Physiology Lab and Comparative Vertebrate Physiology Lab and Labour Series of courses: 8 BIOL 4500 1 Phat Physiology Lab Complete one (1) of the following sets of courses: 8 BIOL 3200 Invertebrate Zoology Lab BIOL 3200 Invertebrate Zoology Lab 8 BIOL 3205 Indeptrate Zoology Lab BIOL 4260 Herpetology Lab 8 BIOL 4270 Ichthyology Lab 8 BIOL 4270 Ichthyology Lab BIOL 4270 Ichthyology Lab 8 BIOL 4380 Marinal Behavior 8 BIOL 4380 Marinal Behavior Lab 8 BIOL 4380 And Inhal Behavior Lab 8 BIOL 4380 And Inhal Behavior Lab 8 BIOL 4411 And Almal Behavior Lab 8 BIOL 4411 And Almal Behavior Lab 8 BIOL 4411 And Almal Behavior Lab 8 BIOL 4411 Almal Almal Behavior Lab 8 BIOL 4411 Almal Behavior Lab 1 Biochemistry Barbana Lab 1 Biochemistry Barbana Lab 1 Bioche			
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& BIOL 3555 and Eukaryotic Cell Biology Lab Complete one (1) of the following series of courses: BIOL 3420 Advanced Human Physiology 3 BIOL 4500 Comparative Vertebrate Physiology 4 BIOL 4505 and Comparative Vertebrate Physiology Lab or BIOL 4605 Plant Physiology Lab or BIOL 4605 and Plant Physiology Lab Complete one (1) of the following sets of courses: BIOL 3200 Invertebrate Zoology Lab BIOL 3200 Invertebrate Zoology Lab BIOL 4260 Herpetology Lab BIOL 4265 and Herpetology Lab BIOL 4270 Lchthyology Lab BIOL 4270 Ichthyology Lab BIOL 4280 Marine Biology BIOL 4355 and Invertebrate Zoology Lab BIOL 4380 Animal Behavior Lab BIOL 4380 Ornithology Lab BIOL 4385 and Animal Behavior Lab BIOL 4380 General Entonlogy & BIOL 4380 General Entonlogy Lab BIOL 4411 Mammalogy Lab BIOL 44410 General Entonlogy & BIOL 44411 Mammalogy Lab BIOL 44412 Complete the following seminar course: BIOL 4910 Senior Seminar 1 Biology Electives Complete 12 credits of upper-division BIOL or BTEC coursework not already used to fulfill another requirement. Courses from the following 12 list may also be used to fulfill this requirement: CHEM 3510 Biochemistry I and Biochemistry I Lab & CHEM 3520 Biochemistry II Lab		· · · · · · · · · · · · · · · · · · ·	•
BIOL 3420 Advanced Human Physiology 3 BIOL 3450 Comparative Vertebrate Physiology 4 & BIOL 4505 and Comparative Vertebrate Physiology Lab or BIOL 4600 Plant Physiology and Plant Physiology Lab Ormplete one (1) of the following sets of courses: BIOL 3200 Invertebrate Zoology & BIOL 3200 and Invertebrate Zoology Lab BIOL 3200 Invertebrate Zoology Lab BIOL 3205 and Invertebrate Zoology Lab BIOL 3206 and Invertebrate Zoology Lab BIOL 3205 and Invertebrate Zoology Lab BIOL 3206 and Herpetology Lab BIOL 4265 and Herpetology Lab BIOL 4270 inchtyology Lab BIOL 4275 and Ichthyology Lab BIOL 4375 and Ichthyology Lab BIOL 4385 Animal Behavior Lab BIOL 4385 and Animal Behavior Lab BIOL 4385 and Animal Behavior Lab BIOL 4385 and Ornithology Lab BIOL 4385 and Ornithology Lab BIOL 4411 Mammalogy Lab BIOL 4411 Mammalogy Lab BIOL 4440 General Entomology Complete the following seminar course Complete the following seminar course from the following lab BIOL 4410 Senior Seminar 1 BIOL 4910 Senior Seminar 1 BIOL 4910 Senior Seminar 1 BIOL 4910 Senior Seminar 1 Complete L2 credits of upper-division BIOL or BTEC coursework not already used to fulfill another requirement. Courses from the following lab may also be used to fulfill this requirement: CHEM 3510 Biochemistry I 6 CHEM 3510 Biochemistry II 6 CHEM 3520 Biochemistry II 6 CHEM 3520 Biochemistry II 6 CHEM 3520 Biochemistry II Lab CHEM 3520 Biochemistry II Lab	or BIOL 3550	Eukaryotic Cell Biology	
BIOL 3420 Advanced Human Physiology 3 BIOL 4500 Comparative Vertebrate Physiology 4 & BIOL 4505 and Comparative Vertebrate Physiology In and Plant Physiology In Invertebrate Zoology Invertebrate Zoology & BIOL 3200 Invertebrate Zoology Lab Invertebrate Zoology In Invertebrate Zoology In Invertebrate Zoology In Invertebrate Zoology Inv	& BIOL 3555	and Eukaryotic Cell Biology Lab	
BIOL 4500 Comparative Vertebrate Physiology & BIOL 4505 and Comparative Vertebrate Physiology Lab or BIOL 4600 Plant Physiology and Physiology Lab complete one (1) of the following sets of courses: BIOL 3200 Invertebrate Zoology & BIOL 3205 and Invertebrate Zoology Lab BIOL 3205 Invertebrate Zoology Lab BIOL 4260 Herpetology & BIOL 4275 and Ichthyology Lab BIOL 4380 Ornithology Animal Behavior As BIOL 4385 and Animal Behavior Lab BIOL 4380 Ornithology Animal Behavior Lab BIOL 4411 Mammalogy Lab BIOL 4411 Mammalogy Lab BIOL 4411 Mammalogy Lab BIOL 4411 Mammalogy Lab BIOL 4410 General Entomology Complete the following seminar General Entomology Complete the following seminar or Seminar 1 BIOL 4910 Senior Seminar 1 BIOL 4910 Senior Seminar 1 Complete 12 credits of upper-division BIOL or BTEC coursework not already used to fulfill another requirement. Courses from the following list may also be used to fulfill this requirement: CHEM 3510 BIOchemistry I and Biochemistry II Lab CHEM 3520 BIOChemistry II Lab A CHEM 3520 BIOChemistry II Lab	Complete one (1) of the following se	eries of courses:	
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or BIOL 4600			4
& BIOL 4605 and Plant Physiology Lab Complete one (1) of the following sets of courses: BIOL 3200 Invertebrate Zoology & BIOL 3205 and Invertebrate Zoology Lab BIOL 4260 Herpetology & BIOL 4265 and Herpetology Lab BIOL 4270 Ichthyology & BIOL 4275 and Ichthyology Lab BIOL 4280 Marine Biology BIOL 4380 Animal Behavior & BIOL 4385 and Ornithology Lab BIOL 4385 and Ornithology Lab BIOL 4385 and Ornithology Lab BIOL 4411 Mammalogy & BIOL 4415 and Mammalogy Lab BIOL 44415 and Mammalogy Lab BIOL 4440 General Entomology Complete the following seminar course: BIOL 44910 Senior Seminar Davis Seminar Davis Seminar Seminar Seminar Courses From the following 12 list may also be used to fulfill this requirement: CHEM 3510 Biochemistry I Lab CHEM 3520 Biochemistry II Lab & CHEM 3520 Biochemistry II Lab			
Complete one (1) of the following sets of courses: BIOL 3200			
BIOL 3200			
& BIOL 3205 and Invertebrate Zoology Lab BIOL 4260			
& BIOL 4265 and Herpetology Lab BIOL 4270 Ichthyology Responsible to the period of the period o		and Invertebrate Zoology Lab	
& BIOL 4275 and Ichthyology Lab BIOL 4280 Marine Biology BIOL 4350 Animal Behavior & BIOL 4355 and Animal Behavior Lab BIOL 4380 Ornithology & BIOL 4385 and Ornithology Lab BIOL 4411 Mammalogy & BIOL 4415 and Mammalogy Lab BIOL 4440 General Entomology Complete the following seminar course: BIOL 4910 Senior Seminar 1 Biology Electives Complete 12 credits of upper-division BIOL or BTEC coursework not already used to fulfill another requirement. Courses from the following list may also be used to fulfill this requirement: CHEM 3510 Biochemistry I & CHEM 3520 Biochemistry II & CHEM 3520 Biochemistry II Lab CHEM 3520 and Biochemistry II Lab		, •	
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Complete 12 credits of upper-division BIOL or BTEC coursework not already used to fulfill another requirement. Courses from the following list may also be used to fulfill this requirement: CHEM 3510 & CHEM 3515 and Biochemistry I Lab CHEM 3520 Biochemistry II & CHEM 3525 Biochemistry II Lab		Senior Seminar	1
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& CHEM 3525 and Biochemistry II Lab			
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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 Program Requirement, Core Discipline Requirement, and Biology Elective Requirement course.
- 6. Maximum 6 total credits of BIOL 4810R, and/or BIOL 4890R, and/or BIOL 4930R may be used toward Biology requirements.

Graduation Plan

Oracación i lan		
1st Year		
Fall Semester	Hours Spring Semester	Hours
SSC 1010	2 BIOL 1620	5
	& BIOL 1625	
BIOL 1610	5 CHEM 1210	5
& BIOL 1615	& CHEM 1215	_
ENGL 1010	3 MATH 1060	3
MATH 1050	4	
	14	13
2nd Year		
Fall Semester	Hours Spring Semester	Hours
BIOL 3030	3 BIOL 3010	3
CHEM 1220	5 BIOL 3040	4
& CHEM 1225	& BIOL 3045	_
ENGL 2010	3 CHEM 2310 & CHEM 2315	5
MATH 1210	4 General Education (American	
MATTI 1210	Institutions) (catalog.utahtech.edu/	
	programs/generaleducation/	
	#gerequirementstext)	
Technical Lab Course Choice		
	15	12
3rd Year		
Fall Semester	Hours Spring Semester	Hours
CHEM 2320	5 Eukaryotic/General Microbiology	
& CHEM 2325	Choice	
PHYS 2010	5 PHYS 2020	5
& PHYS 2015	& PHYS 2025	
General Elective	2 BIOL Upper Division Elective	4
BIOL 3150	4 General Education (Social	
& BIOL 3155	& Behavioral Sciences)	
	(catalog.utahtech.edu/	
	programs/generaleducation/ #gerequirementstext)	
General Education (Literature/	" gerequirementstext)	
Humanities) (catalog.utahtech.edu/		
programs/generaleducation/		
#gerequirementstext)		
	16	9
4th Year		
Fall Semester	Hours Spring Semester	Hours
Organismal Set or Series Choice	4 BIOL 4910	1
Physiology & Lab Choice	BIOL Uppper Division Electives	
BIOL Upper Division Electives	BIOL Uppper Division Electives	2
Upper Division General Elective(s)	4 General Electives	

Upper Division BIOL Elective

Humanities) (catalog.utahtech.edu/ programs/generaleducation/ #gerequirementstext)

General Education (Lit /

	General Elective	3
	8	6
Total Hours 93		
Graduation Plan - MATH 1010		
1st Year		
Fall Semester	Hours Spring Semester	Hours
BIOL 1610	5 ENGL 2010	3
& BIOL 1615		_
ENGL 1010	3 BIOL 1620 & BIOL 1625	5
MATH 1010	4 MATH 1050	4
BIOL 3030	3 General Education (Social	3
	& Behavioral Science)	
	(catalog.utahtech.edu/	
	programs/generaleducation/	
General Education (Fine	#gerequirementstext) 3	
Arts) (catalog.utahtech.edu/	3	
programs/generaleducation/		
#gerequirementstext)		
	18	15
2nd Year		
Fall Semester	Hours Spring Semester	Hours
CHEM 1210 & CHEM 1215	5 CHEM 1220 & CHEM 1225	5
MATH 1060	3 BIOL 3010	3
BIOL 3030	3 MATH 1210	4
General Education (Fine	3 General Education (American	3
Arts) (catalog.utahtech.edu/	Institutions) (catalog.utahtech.edu/	
programs/generaleducation/	programs/generaleducation/	
#gerequirementstext)	#gerequirementstext)	
3rd Year	14	15
Fall Semester	Hours Spring Semester	Hours
CHEM 2310	5 CHEM 2320	5
& CHEM 2315	& CHEM 2325	
PHYS 2010	5 PHYS 2020	5
& PHYS 2015	& PHYS 2025	
BIOL 3040 & BIOL 3045	4 Organismal Course	4
a biol 3043	14	14
4th Year	47	14
Fall Semester	Hours Spring Semester	Hours
BIOL 4500	4 Upper Division BIOL Elective	3
& BIOL 4505		_
BIOL 3450	4 BIOL 3150	4
& BIOL 3455	& BIOL 3155	

3 BIOL 4910

3 Upper Division BIOL Elective

1

3

Upper Division BIOL Elective		3
	14	14

Harris Division BIOL Floorius

Total Hours 118

BS Biological Sciences Program Learning Outcomes

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

- 1. Outline the foundational concepts of biology including cellular, organismal, ecological, and evolutionary biology.
- 2. Evaluate hypotheses, design research, test hypotheses, conduct data analysis, and draw conclusions on biology related problems.
- 3. Integrate knowledge of scientific literacy in oral and written assignments when communicating biological topics.
- 4. Evaluate information to discriminate between science and non-science.
- 5. Develop an understanding of why science is an integral activity for addressing social and environmental problems.