

Department of  
**Biology**



John Zenger, Department Chair

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### Department Description

The Department of Biology provides a variety of classes for students seeking a degree in biology and many biology courses servicing a number of non-biology majors such as Nursing, Exercise Science and Health Science. Bachelor of Science degrees are offered in Biology, Ecology/Wildlife/Fisheries, and Biology Education. Minors can be earned in Biology, Natural Resources, and Biology Education.

### Program Descriptions

#### B.S. in Biology (700)

The biology degree provides a solid foundation in biology. It is designed to prepare students for professional programs in medicine, dentistry, optometry, podiatry, physical/occupational therapy, etc., or graduate programs in botany, ecology, natural resources, biotechnology, microbiology, neurobiology, etc. In addition, the degree provides preparation for those students seeking employment after completing a bachelors degree. Students majoring in Biology select one of the following emphases depending on their interests and career goals.

#### Microbiology (700-55)

The Microbiology emphasis is designed to prepare students for career opportunities and graduate work in microbiology and related fields such as bacteriology, immunology, medical microbiology, and virology. Although this emphasis does not give students the depth that a degree in microbiology does, it will give students sufficient background and training to work in laboratories using basic microbiological techniques and to pursue further study in the field.

#### Zoology (700-170)

The zoology emphasis is designed to prepare students for career opportunities and graduate work in zoology and related areas. This emphasis will provide students with opportunities to study the structure, function, diversity, ecology, and evolution with an appropriate minor or clusters. This emphasis can qualify students for entry-level positions in industry or government agencies, as well as for further study at the graduate level.

#### Neuroscience (700-62)

Neuroscience is a multi-disciplinary program that focuses on the development, structure and function of the nervous system and its regulation of body systems and behavior. The neuroscience emphasis examines topics such as molecular and cellular neurobiology, neuroanatomy, the neural basis of behavior, learning, memory, cognition and perception, neuroendocrinology, neurophysiology, neuron pharmacology, and neurological disorders. Students will be prepared to pursue advanced degrees in biology, psychology, and neuroscience or to enter into the pharmaceutical and biotechnology workforce. Neuroscience is an excellent pre-professional field of study for those interested in health professions, law, or business.

#### Environmental Biology (700-68)

The Environmental Biology emphasis is designed to prepare students for careers and graduate studies in the biology-related fields of environmental science. Students selecting this emphasis complete all core courses for the Biology Major, as well as specified coursework designed to prepare them for work as environmental biologists. This sector of environmental science is expected to undergo significant increases in employment opportunities for the foreseeable future, and career paths for people trained in this field are found in education, government, industry, and non-governmental organizations.

#### Human Biology (700-69)

The Human Biology emphasis is designed for students planning on careers centered on human health and well-being, such as medicine, dentistry, optometry, podiatry, physical/occupational therapy, etc., and for students desiring to pursue graduate degrees in anatomy and physiology. The courses were chosen to prepare students for further study in these professional schools as well as for students interested in continuing their education in graduate school.

#### Biotechnology (700-70)

Biotechnology is the application of biological information and techniques to meet medical, agricultural, and environmental needs. Students selecting this emphasis will be well prepared to pursue graduate studies in genetics, molecular biology, cellular biology, biochemistry and physiology. The emphasis will also prepare students for immediate employment as entry level technicians in one of hundreds of different biotechnology companies and university research labs. The emphasis will also serve pre-professional students interested in one of the medical professions.

#### B.S. in Plant and Wildlife Ecology (488)

This degree provides a powerful foundation for most ecological and natural resource related fields. It offers five separate areas of specialization, with course work requirements designed to meet State and Federal hiring prerequisites, and to prepare students for graduate studies.

**Range Emphasis (488-179)**

The Range emphasis prepares students for careers in rangeland conservation, rangeland ecology, rangeland/livestock production consulting, wildlife and livestock production in a rangeland setting, or for post-baccalaureate studies in rangeland ecology related fields.

**Ecology Emphasis (488-180)**

The Ecology emphasis is designed to be somewhat broader than the other emphasis in the 487 series and should be taken by students interested in careers in conservation biology, natural history education/interpretation, natural resource policy/law, as park rangers, or as a foundation for post baccalaureate studies in ecology related fields.

**Wildlife Emphasis (488-176)**

The Wildlife emphasis prepares students for careers as wildlife biologists, conservation officers, natural resource managers, park rangers, natural resource policy/administration officers, and for legal careers and post-baccalaureate studies in wildlife related fields.

**Fisheries Emphasis (488-177)**

The Fisheries emphasis prepares students for careers as fisheries biologists, conservation officers, natural resource managers, park rangers, natural resource policy/administration officers and for legal careers and post-baccalaureate studies in fisheries related fields.

**Plant Biology Emphasis (488-178)**

The Plant Biology emphasis prepares students for careers as botanists. The degree also provides a strong foundation for post-baccalaureate studies in plant ecology, physiology, systematic, pathology, or other related fields.

**B.S. in Biology Education (800)**

The Biology Education Major at BYU-Idaho requires completion of specific coursework in Biology, BYU-Idaho Foundations classes, and Education classes needed for certification as a secondary education teacher in the state of Idaho (Idaho certification qualifies graduates to teach in 44 states). The Biology Education major at BYU-Idaho also requires the completion of a Science Education Minor. Students who graduate from this program are eligible for teacher certification in biology and in their chosen Science education minor.

For a listing of approved Secondary Science Education majors and minors, see the Teacher Education section of this catalog or the program notes for BS in Biology Education.

**B.S. in Biology Education Composite (805)**

A second pathway to the Biology Education Major at BYU-Idaho requires completion of specific coursework in Biology, BYU-Idaho Foundation classes, and Secondary Education classes needed for certification as a teacher in the State of Idaho. The Composite Biology Education major at BYU-Idaho does not require a minor, but gives more emphasis to preparation in the various biological sciences. Students who graduate from this program are eligible for teacher certification in biology but do not receive any other teaching endorsements.

## Biology

Brigham Young University-Idaho 2015-2016

### BS in Plant and Wildlife Ecology Wildlife Emphasis (488-176)

<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 199           1 BIO 208           4 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take 1 course:</i> BIO 398           1-4 BIO 498R         1-4 <hr style="width: 50%; margin-left: 0;"/> 1	<i>Take these courses:</i> AGTEC 286         3 AGTEC 486         3 BIO 225           3 BIO 302           4 BIO 303           2 BIO 352           3 BIO 362           3 BIO 375           3 BIO 379           3 BIO 423           3 BIO 475           3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 36	<b>Emphasis Courses</b> <i>Take these courses:</i> AS 215             3 AS 215L           1 BIO 307           3 BIO 312           4 BIO 351           3 BIO 360           3 BIO 390           2 BIO 392           2 BIO 445           3 BIO 446           3 BIO 447           3 <hr style="width: 50%; margin-left: 0;"/> 30	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>	
Foundations	40	Fall-Winter	Yes
Major	80	Winter-Spring	Yes
Total	120	Spring-Fall	Yes

### BS in Plant and Wildlife Ecology Fisheries Emphasis (488-177)

<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 199           1 BIO 208           4 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take 1 course:</i> BIO 398           1-4 BIO 498R         1-4 <hr style="width: 50%; margin-left: 0;"/> 1	<i>Take these courses:</i> AGTEC 286         3 AGTEC 486         3 BIO 225           3 BIO 302           4 BIO 303           2 BIO 352           3 BIO 362           3 BIO 375           3 BIO 379           3 BIO 423           3 BIO 475           3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 36	<b>Emphasis Courses</b> <i>Take these courses:</i> BIO 307           3 BIO 312           4 BIO 314           3 BIO 331           3 BIO 351           3 BIO 360           3 BIO 420           3 BIO 445           3 BIO 446           3 <hr style="width: 50%; margin-left: 0;"/> 28  <i>Take 1 course:</i> BIO 390           2 BIO 392           2 <hr style="width: 50%; margin-left: 0;"/> 2	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>	
Foundations	40	Fall-Winter	Yes
Major	80	Winter-Spring	Yes
Total	120	Spring-Fall	Yes

### BS in Plant and Wildlife Ecology Plant Biology Emphasis (488-178)

<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 199           1 BIO 208           4 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take 1 course:</i> BIO 398           1-4 BIO 498R         1-4 <hr style="width: 50%; margin-left: 0;"/> 1	<i>Take these courses:</i> AGTEC 286         3 AGTEC 486         3 BIO 225           3 BIO 302           4 BIO 303           2 BIO 352           3 BIO 362           3 BIO 375           3 BIO 379           3 BIO 423           3 BIO 475           3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 36	<b>Emphasis Courses</b> <i>Take these courses:</i> APS 220           3 APS 220L          1 APS 413           1 BIO 209           4 BIO 210           3 BIO 391           2 BIO 392           2 BIO 393           4 BIO 401R          1 BIO 408           4 CHEM 351          4 <hr style="width: 50%; margin-left: 0;"/> 29	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>	
Foundations	40	Fall-Winter	Yes
Major	79	Winter-Spring	Yes
Elective	1	Spring-Fall	Yes
Total	120		

## Biology

Brigham Young University-Idaho 2015-2016

BS in Plant and Wildlife Ecology Range Emphasis(488-179)			
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 199           1 BIO 208           4 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take 1 course:</i> BIO 398           1-4 BIO 498R         1-4 <hr style="width: 50%; margin-left: 0;"/> 1	<i>Take these courses:</i> AGTEC 286         3 AGTEC 486         3 BIO 225            3 BIO 302            4 BIO 303            2 BIO 352            3 BIO 362            3 BIO 375            3 BIO 379            3 BIO 423            3 BIO 475            3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 36	<b>Emphasis Courses</b> <i>Take these courses:</i> APS 220            3 AGRON 425         3 AS 220             3 AS 360             4 BIO 210            3 BIO 325            3 BIO 351            3 BIO 455            3 BIO 466            3 <hr style="width: 50%; margin-left: 0;"/> 28  <i>Take 1 course:</i> BIO 390            2 BIO 392            2 <hr style="width: 50%; margin-left: 0;"/> 2	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>	
Foundations	40	Fall-Winter	Yes
Major	80	Winter-Spring	Yes
Total	120	Spring-Fall	Yes

BS in Plant and Wildlife Ecology Ecology Emphasis (488-180)				
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 199           1 BIO 208           4 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take 1 course:</i> BIO 398           1-4 BIO 498R         1-4 <hr style="width: 50%; margin-left: 0;"/> 1	<i>Take these courses:</i> AGTEC 286         3 AGTEC 486         3 BIO 225            3 BIO 302            4 BIO 303            2 BIO 352            3 BIO 362            3 BIO 375            3 BIO 379            3 BIO 423            3 BIO 475            3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 36	<b>Emphasis Courses</b> <i>Take 1 course:</i> BIO 445            3 BIO 446            3 BIO 447            3 BIO 448            3 <hr style="width: 50%; margin-left: 0;"/> 3	<i>Take these courses:</i> APS 220            3 APS 220L          1 BIO 210            3 BIO 351            3 BIO 392            2 BIO 393            4 BIO 408            4 BIO 420            3 CHEM 351          4 <hr style="width: 50%; margin-left: 0;"/> 27	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Foundations	40	Fall-Winter	Yes	
Major	80	Winter-Spring	Yes	
Total	120	Spring-Fall	Yes	

BS in Biology Microbiology Emphasis (700-55)			
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 199           1 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 13  <i>Take these courses:</i> BIO 375            3 BIO 475            3 MATH 221B         3 <hr style="width: 50%; margin-left: 0;"/> 9	<i>Take 1 course:</i> BIO 398           1-4 BIO 497            3 BIO 498R          1-4 <hr style="width: 50%; margin-left: 0;"/> 1  <i>Take these courses:</i> BIO 181            4 BIO 377            3 <hr style="width: 50%; margin-left: 0;"/> 7	<b>Emphasis Courses</b> <i>Take these courses:</i> BIO 321            4 BIO 410            3 BIO 411            3 BIO 412            3 BIO 413            2 <hr style="width: 50%; margin-left: 0;"/> 15  <i>Take 6 credits:</i> BIO 376            3 CHEM 481          3 CHEM 482          3 HS 370             3 <hr style="width: 50%; margin-left: 0;"/> 6	<b>Program Notes:</b>  •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>	
Foundations	40	Fall-Winter	Yes
Major	51	Winter-Spring	Yes
Elective	29	Spring-Fall	Yes
Total	120		

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BS in Biology Neuroscience Emphasis (700-62)					
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 199           1 CHEM 105         4 CHEM 106         4 <hr style="width: 100%;"/> 13  <i>Take these courses:</i> BIO 375           3 BIO 475           3 MATH 221B       3 <hr style="width: 100%;"/> 9	<i>Take 1 course:</i> BIO 398           1-4 BIO 497           3 BIO 498R         1-4 <hr style="width: 100%;"/> 1  <i>Take these courses:</i> BIO 181           4 BIO 377           3 <hr style="width: 100%;"/> 7	<b>Emphasis Courses</b> <i>Take these courses:</i> BIO 240           4 BIO 461           5 BIO 485           4 <hr style="width: 100%;"/> 13	<i>Take 9 credits:</i> BIO 376           3 BIO 380           4 BIO 460           4 BIO 462           2 PSYCH 342        3 PSYCH 370        3 PSYCH 384        3 <hr style="width: 100%;"/> 9	<b>Program Notes:</b> •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses	
<b>Credit Requirements:</b>			<b>Tracks Available:</b>		
Foundations	40	Major	52	Fall-Winter	Yes
Elective	28	Winter-Spring	Yes	Spring-Fall	Yes
Total	120				

BS in Biology Environmental Biology Emphasis (700-68)					
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 199           1 CHEM 105         4 CHEM 106         4 <hr style="width: 100%;"/> 13  <i>Take these courses:</i> BIO 375           3 BIO 475           3 MATH 221B       3 <hr style="width: 100%;"/> 9	<i>Take 1 course:</i> BIO 398           1-4 BIO 497           3 BIO 498R         1-4 <hr style="width: 100%;"/> 1  <i>Take these courses:</i> BIO 181           4 BIO 377           3 <hr style="width: 100%;"/> 7	<b>Emphasis Courses</b> <i>Take these courses:</i> BIO 250           4 BIO 302           4 BIO 423           3 CHEM 220         5 GEOG 230         3 <hr style="width: 100%;"/> 19	<i>Take 6 credits:</i> BIO 314           3 BIO 351           3 BIO 352           3 BIO 362           3 BIO 390           2 BIO 391           2 BIO 392           2 BIO 393           4 BIO 420           3 <hr style="width: 100%;"/> 6	<b>Program Notes:</b> •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses	
<b>Credit Requirements:</b>			<b>Tracks Available:</b>		
Foundations	40	Major	55	Fall-Winter	Yes
Elective	25	Winter-Spring	Yes	Spring-Fall	Yes
Total	120				

BS in Biology Human Biology Emphasis (700-69)					
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 199           1 CHEM 105         4 CHEM 106         4 <hr style="width: 100%;"/> 13  <i>Take these courses:</i> BIO 375           3 BIO 475           3 MATH 221B       3 <hr style="width: 100%;"/> 9	<i>Take 1 course:</i> BIO 398           1-4 BIO 497           3 BIO 498R         1-4 <hr style="width: 100%;"/> 1  <i>Take these courses:</i> BIO 181           4 BIO 377           3 <hr style="width: 100%;"/> 7	<b>Take 13 credits:</b> BIO 240           4 BIO 321           4 BIO 376           3 BIO 380           4 BIO 381           3 BIO 383           3 BIO 410           3 BIO 411           3 BIO 413           2 BIO 430           3 BIO 462           2 CHEM 481         3 CHEM 482         3 ESS 375           3 HRHP 359         3 <hr style="width: 100%;"/> 13	<b>Program Notes:</b> •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses		
<b>Credit Requirements:</b>			<b>Tracks Available:</b>		
Foundations	40	Major	52	Fall-Winter	Yes
Elective	28	Winter-Spring	Yes	Spring-Fall	Yes
Total	120				

## Biology

Brigham Young University-Idaho 2015-2016

BS in Biology Biotechnology Emphasis (700-70)				
<b>Core Courses</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 199           1 CHEM 105        4 CHEM 106        4 <hr style="width: 50px; margin-left: 0;"/> 13	<i>Take these courses:</i> BIO 375           3 BIO 475           3 MATH 221B       3 <hr style="width: 50px; margin-left: 0;"/> 9  <i>Take 1 course:</i> BIO 398           1-4 BIO 497           3 BIO 498R         1-4 <hr style="width: 50px; margin-left: 0;"/> 1	<i>Take these courses:</i> BIO 181           4 BIO 377           3 <hr style="width: 50px; margin-left: 0;"/> 7  <b>Emphasis Courses</b> <i>Take these courses:</i> BIO 321           4 BIO 376           3 CHEM 351         4 CHEM 481         3 <hr style="width: 50px; margin-left: 0;"/> 14	<i>Take 8 credits:</i> BIO 410           3 BIO 411           3 BIO 412           3 BIO 413           2 CHEM 482         3 <hr style="width: 50px; margin-left: 0;"/> 8	<b>Program Notes:</b> •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>			<b>Tracks Available:</b>	
Foundations	40		Fall-Winter	Yes
Major	52		Winter-Spring	Yes
Elective	28		Spring-Fall	Yes
Total	120			

BS in Biology Zoology Emphasis (700-170)				
<b>Introduction to Biology Module</b> <i>Take these courses during your first 2 semesters:</i> BIO 180           4 BIO 181           4 BIO 199           1 MATH 221B        3 <hr style="width: 50px; margin-left: 0;"/> 12  <b>Science Module</b> <i>Take these courses:</i> BIO 375           3 BIO 377           3 BIO 475           3 CHEM 105         4 CHEM 106         4 <hr style="width: 50px; margin-left: 0;"/> 17	<b>Animal Diversity Module</b> <i>Take this course:</i> BIO 204           4 <hr style="width: 50px; margin-left: 0;"/> 4  <i>Take 9 credits:</i> BIO 312           4 BIO 331           3 BIO 445           3 BIO 446           3 BIO 447           3 BIO 448           3 <hr style="width: 50px; margin-left: 0;"/> 9	<b>Enrichment Module</b> <i>Take 9 credits:</i> BIO 208           4 BIO 209           4 BIO 302           4 BIO 312           4 BIO 314           3 BIO 331           3 BIO 362           3 BIO 380           4 BIO 381           3 BIO 383           3 BIO 401R          1 <i>cont. in next column</i>	<i>cont. from previous column</i> BIO 420           3 BIO 445           3 BIO 446           3 BIO 447           3 BIO 448           3 BIO 460           4 BIO 461           5 BIO 499R          1-6 <hr style="width: 50px; margin-left: 0;"/> 9  <b>Internship</b> <i>Take 1 course:</i> BIO 398           1-4 BIO 497           3 BIO 498R          1-4 <hr style="width: 50px; margin-left: 0;"/> 1	<b>Program Notes:</b> •No Double Counting of Major Courses  •No Grade Less Than C- in Major Courses
<b>Credit Requirements:</b>			<b>Tracks Available:</b>	
Foundations	40		Fall-Winter	Yes
Major	52		Winter-Spring	Yes
Elective	28		Spring-Fall	Yes
Total	120			

BS in Biology Education (800)				
<b>Education Core</b> <i>Take these courses:</i> ED 200           2 ED 304           3 ED 448           3 ED 461           3 ED 492           10 SPED 360         2 <hr style="width: 50px; margin-left: 0;"/> 23	<i>Take these courses:</i> BIO 180           4 BIO 181           4 BIO 204           4 BIO 209           4 BIO 305           2 BIO 375           3 BIO 378           2 BIO 405           3 BIO 475           3 <hr style="width: 50px; margin-left: 0;"/> 29	<i>Take 1 course:</i> BIO 250           4 BIO 302           4 <hr style="width: 50px; margin-left: 0;"/> 4  <i>Take 1 course:</i> BIO 210           3 BIO 312           4 BIO 321           4 BIO 331           3 BIO 445           3 BIO 446           3 BIO 447           3 <hr style="width: 50px; margin-left: 0;"/> 3	<b>Program Notes:</b> •No Double Counting of Major Courses •No Grade Less Than C- in Major Courses •Students in this education major are required to take a Science Education Minor (worth 20 credits) for graduation. •The possible Minors are: Natural Science Education (130), Chemistry Education (172), Physics Education (178), Earth Science Education (181), or Physical Science Education (182) •Once you have completed 24 university credit hours a hold will be placed on your registration until you speak with the Biology Education Program Director.	
<b>Credit Requirements:</b>			<b>Tracks Available:</b>	
Foundations	40		Fall-Winter	Yes
Major	36		Winter-Spring	Yes
Elective	1		Spring-Fall	Yes
Education Core	23			
Education Minor	20			
Total	120			

## Biology

Brigham Young University-Idaho 2015-2016

### BS in Biology Education Composite (805)

<b>Education Core</b> <i>Take these courses:</i> ED 200           2 ED 304           3 ED 448           3 ED 461           3 ED 492           10 SPED 360        2 <hr style="width: 50%; margin-left: 0;"/> 23	<b>Core Courses</b> <i>Take these courses:</i> BIO 180           4 BIO 181           4 BIO 204           4 BIO 209           4 BIO 221           3 BIO 222           1 BIO 230           4 <i>cont. in next column</i>	<i>cont. from previous column</i> BIO 302           4 BIO 303           2 BIO 305           2 BIO 375           3 BIO 378           2 BIO 405           3 BIO 475           3 CHEM 105         4 CHEM 106         4 <hr style="width: 50%; margin-left: 0;"/> 51	<i>Take 1 course:</i> BIO 210           3 BIO 312           4 BIO 321           4 BIO 331           3 BIO 445           3 BIO 446           3 BIO 447           3 <hr style="width: 50%; margin-left: 0;"/> 3 <i>Take 1 course:</i> BIO 376           3 MATH 221B        3 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Program Notes:</b> •No Double Counting of Major Courses •No Grade Less Than C- in Major Courses •Once you have completed 24 university credits hours a hold will be placed on your registration until you speak with the Biology Education Program Director.
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Foundations	40	Fall-Winter	Yes	
Major	57	Winter-Spring	Yes	
Education Core	23	Spring-Fall	Yes	
<b>Total</b>	<b>120</b>			

### Natural Resources Minor (141)

<b>Core Courses</b> <i>Take these courses:</i> BIO 302           4 BIO 351           3 BIO 352           3 BIO 362           3 BIO 423           3 <hr style="width: 50%; margin-left: 0;"/> 16	<i>Take 6 credits:</i> APS 220           3 APS 220L         1 BIO 208           4 BIO 209           4 BIO 210           3 BIO 307           3 BIO 312           4 BIO 314           3 BIO 331           3 <i>cont. in next column</i>	<i>cont. from previous column</i> BIO 379           3 BIO 390           2 BIO 391           2 BIO 392           2 BIO 393           4 BIO 408           4 BIO 420           3 BIO 446           3 BIO 447           3 GEOG 230         3 <hr style="width: 50%; margin-left: 0;"/> 6	<b>Program Notes:</b> •No Double Counting of Minor Courses •No Grade Less Than C- in Major Courses	
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Total	22	Fall-Winter	Yes	
		Winter-Spring	Yes	
		Spring-Fall	Yes	

### Minor in Biology (143)

<b>Core Courses</b> <i>Take these courses:</i> BIO 208           4 BIO 302           4 <hr style="width: 50%; margin-left: 0;"/> 8 OR <i>Take these courses:</i> BIO 180           4 BIO 181           4 <hr style="width: 50%; margin-left: 0;"/> 8 <i>Take 4 credits:</i> CHEM 101         3 CHEM 101L       1 OR CHEM 105         4 <hr style="width: 50%; margin-left: 0;"/> 4	<i>Take 8 credits:</i> BIO 302           4 BIO 312           4 BIO 314           3 BIO 321           4 BIO 331           3 BIO 351           3 BIO 352           3 BIO 362           3 BIO 375           3 BIO 376           3 BIO 377           3 BIO 379           3 <i>cont. in next column</i>	<i>cont. from previous column</i> BIO 380           4 BIO 390           2 BIO 391           2 BIO 392           2 BIO 393           4 BIO 408           4 BIO 410           3 BIO 411           3 BIO 412           3 BIO 413           2 BIO 420           3 BIO 423           3 BIO 446           3 <i>cont. in next column</i>	<i>cont. from previous column</i> BIO 447           3 BIO 460           4 BIO 461           5 BIO 475           3 BIO 485           4 CHEM 481         3 <hr style="width: 50%; margin-left: 0;"/> 8	<b>Program Notes:</b> •No Double Counting of Minor Courses •No Grade Less Than C- in Minor Courses
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Total	20	Fall-Winter	Yes	
		Winter-Spring	Yes	
		Spring-Fall	Yes	

## Biology

Brigham Young University-Idaho 2015-2016

### Minor in Biology Education (173)

<b>Core Courses</b> <i>Take these courses:</i> BIO 180           4 BIO 181           4 BIO 204           4 BIO 209           4 <hr style="width: 50%; margin-left: 0;"/> 16	<b>Take 4 credits:</b> BIO 210           3 BIO 230           4 BIO 302           4 BIO 331           3 BIO 378           2 BIO 447           3 <hr style="width: 50%; margin-left: 0;"/> 4	<b>Program Notes:</b>  • <i>Students wishing to take this education minor are required to combine it with a Science Education Major for graduation.</i>  • <i>The possible majors are: Chemistry Education (810), Earth Science Education (870), or Physics Education (870).</i>
<b>Credit Requirements:</b>  Total                   20	<b>Tracks Available:</b>  Fall-Winter       Yes Winter-Spring    Yes Spring-Fall        Yes	

### Biology Pre-approved Clusters

#### Pre-Veterinary 1100

<i>Take these courses:</i>	
BIO 221   General Microbiology	3
BIO 222   General Microbiology Lab	1
BIO 375   Genetics and Molecular Biology	3
PH 105    Introductory Applied Physics I	4
<i>Take 1 course:</i>	
BIO 180   Introduction to Biology I	4
BIO 208   General Botany	4
<b>Total Credits</b>	<b>15</b>

#### Recreation Therapy (Recreation Management Majors) 1101

<i>Take these courses:</i>	
BIO 264   Anatomy and Physiology I	3
BIO 264L   Anatomy and Physiology I Lab	1
BIO 265   Anatomy and Physiology II	3
BIO 265L   Anatomy and Physiology II Lab	1
<i>Take 4 credits:</i>	
BIO 240   Neurobiology	4
HS 280    Medical Terminology	2
HS 349    Sports Medicine	3
HS 349L   Sports Medicine Lab	1
HS 351    Gerontology	2
<b>Total Credits</b>	<b>12</b>

#### Natural Resource (Recreation Management Majors) 1102

<i>Take this course:</i>	
BIO 202   Natural Resource Management	4
<i>Take 9 credits:</i>	
BIO 225   Range Management	3
BIO 302   Ecology I	4
BIO 307   Wildlife Law and Enforcement	3
BIO 351   Principles Wildlife Management	3
BIO 423   Natural Resource Policy	3
GEOG 230   Introduction to GIS	3
<b>Total Credits</b>	<b>13</b>

#### Neuroscience (Psychology Majors) 1103

<i>Take these courses:</i>	
BIO 240   Neurobiology	4
BIO 485   Advanced Neuroscience	4
<i>Take 4 credits:</i>	
BIO 180   Introduction to Biology I	4
BIO 264   Anatomy and Physiology I	3
BIO 264L   Anatomy and Physiology I Lab	1
BIO 265   Anatomy and Physiology II	3
BIO 265L   Anatomy and Physiology II Lab	1
<b>Total Credits</b>	<b>12</b>

#### Biological Illustrations (Art Majors) 1104

<i>Take these courses:</i>	
BIO 208   General Botany	4
BIO 460   Human Anatomy	4
<i>Take 7 credits:</i>	
BIO 204   Vertebrate and Invertebrate Strategies	4
BIO 209   An Evolutionary Survey of Plants	4
BIO 210   Plant Systematics	3
BIO 221   General Microbiology	3
BIO 331   General Entomology	3
BIO 380   Histology with Lab	4
BIO 445   Ichthyology	3
BIO 446   Ornithology	3
BIO 447   Mammalogy	3
<b>Total Credits</b>	<b>15</b>

#### Microbiology 1105

<i>Take these courses:</i>	
BIO 221   General Microbiology	3
BIO 222   General Microbiology Lab	1
OR	
BIO 321   Biology of Microorganisms	4
<i>Take 8-11 credits:</i>	
BIO 410   Immunology	3
BIO 411   Medical Microbiology	3
BIO 412   Virology	3
BIO 413   Advanced Microbiology Lab	2
HS 370    Epidemiology	3
<b>Total Credits</b>	<b>12</b>

#### Biotechnology/Forensics 1106

<i>Take these courses:</i>	
BIO 180   Introduction to Biology I	4
BIO 375   Genetics and Molecular Biology	3
BIO 377   Techniques in Biochemistry and Molecular Biology	3
<i>Take 1 course:</i>	
BIO 376   Cell and Molecular Biology	3
CHEM 481   Biochemistry I	3
<b>Total Credits</b>	<b>13</b>

#### Pre-Profession 1200

<i>Take these courses:</i>	
BIO 180   Introduction to Biology I	4
BIO 181   Introduction to Biology II	4
<i>Take 5-7 credits:</i>	
BIO 375   Genetics and Molecular Biology	3
BIO 376   Cell and Molecular Biology	3
BIO 460   Human Anatomy with Lab	4
BIO 461   Principles of Physiology	5
CHEM 481   Biochemistry I	3
<b>Total Credits</b>	<b>13</b>



## Course Descriptions

## Credits\*

**BIO 180 Introduction to Biology I****(4:3:2:0)**

This course is the first semester of a year-long Introduction to Biology course. It includes the areas of biological chemistry, cellular structure and function, and metabolism. There is a weekly lab in addition to the lecture. This course is a prerequisite for most other upper division courses in Biology.

(Fall, Winter, Spring)

**BIO 181 Introduction to Biology II****(4:3:2:0)**

Total Course Fees: \$15.00

Prerequisite: BIO 180

This course is the second semester of a year-long Introduction to Biology course. It includes the areas of classical genetics, molecular biology, ecology, and evolution. There is a weekly lab in addition to the lecture.

(Fall, Winter, Spring)

**BIO 182 Introduction to Biology III****(3:3:0:0)**

Prerequisite: BIO 181

This course is a one-semester introduction to diversity of life on Earth, including prokaryotes, protists, fungi, plants and animals. This course is designed specifically for students preparing to take the DAT or GRE-Biology Subject Exam.

(See Rotation Schedule on page 143)

**BIO 199 Biology Orientation****(1:1:0:0)**

The course will be divided into 6 modules as follows: 1: General Overview \*Required for all students\* 2: Ecology/Wildlife 3: Graduate Programs / Academic Careers 4: Pre-Professional Careers (med, dent, opt, vet, etc.) 5: Industry Careers (lab, pharmaceutical reps, etc.) 6: Allied Health (chiropractic, PA, OP, PT, etc.) Each student will be expected to attend all of Module 1: General Overview, then select three of the remaining five modules. Modules may be taught by different faculty members. Each module will have its own unique information pertinent to the topics covered and a set of requirements for those students who attend that module. These requirements may include reading assignments, reports, summary sheets, or written papers.

(Fall, Winter, Spring)

**BIO 202 Natural Resource Management****(4:3:3:0)**

This course involves the management of natural resources such as wildlife, fisheries, forests, range, and recreational lands. The orientation of the course will be ecological with emphasis on economic principles, ecosystem interrelationships, and current National Natural Resource Policy.

(This course is currently not offered.)

**BIO 204 Invert/Vertebrate Zoology****(4:3:3:0)**

Total Course Fees: \$15.00

This course covers the comparative organization and evolutionary significance of adaptive morphological, physiological, behavioral, reproductive, and ecological differences in vertebrates and invertebrates.

(See Rotation Schedule on page 143)

**BIO 208 General Botany****(4:3:2:0)**

Total Course Fees: \$15.00

This course is an introduction to Botany including cell structure/function, plant physiology, heredity, evolution, reproduction, and plant anatomy. Lab is required.

(Fall, Winter, Spring)

**BIO 209 An Evolutionary Survey of Plants****(4:3:3:0)**

Total Course Fees: \$20.00

Prerequisite: BIO 208

This course is an introduction and overview to the evolution, phylogeny, morphology, anatomy, and life history of various photosynthetic organisms, including cyanobacteria, archaea, protists, algae, and land plants, but also including some non-photosynthetic organisms traditionally considered plants, such as fungi, slime molds, and water molds.

(See Rotation Schedule on page 143)

**BIO 210 Plant Systematics****(3:2:3:0)**

Total Course Fees: \$20.00

Prerequisite: BIO 208

This is a basic course in vascular plant classification, systematics, and nomenclature, including a survey of common or important vascular plant families, with emphasis on flowering plants and the local flora. Students will also learn the skills necessary for plant identification.

(See Rotation Schedule on page 143)

**BIO 221 General Microbiology****(3:3:0:0)**

In this course, students will study the microorganisms (especially bacteria and viruses), their metabolism and requirements for growth, the methods used to grow and study them, the disease processes caused by them, methods used to control their growth, and the immune response to infection and disease.

(Fall, Winter, Spring)

**BIO 222 General Microbiology Lab****(1:0:2:0)**

Corequisite: BIO 221

In this course, students use the microscope to study different types of microorganisms and learn the methods used to grow, identify, and characterize them.

(Fall, Winter, Spring)

**BIO 225 Range Management****(3:3:0:0)**

In this course, subject material will focus on: rangeland management history, physical characteristics descriptions of rangelands, rangeland plant physiology, ecology, inventory, monitoring, stocking rates, grazing methods, wildlife livestock distribution, animal nutrition, multiple use management, livestock production on rangelands, rangeland wildlife, and manipulation of range vegetation.

(Fall, Winter, Spring)

**BIO 230 Human Biology****(4:3:2:0)**

This is an introductory course in human anatomy and physiology for non-science and non-health professions majors.

(Fall, Winter, Spring)

**BIO 240 Neurobiology****(4:3:2:0)**

This is an introductory course in Neuroscience. It covers the elements of Neurobiology by providing an introduction to the nervous system; examines cellular communication, sensory, motor and integrating systems, such as, the neural basis of behavior; and explores the plasticity of neural systems in learning, during development and via hormonal influences.

(Fall, Winter, Spring)

**BIO 250 Environmental Biology with Lab****(4:3:2:0)**

This course will use basic ecological principles to examine environmental issues. The environmental issues range from local to global and include direct and indirect human impact on ecosystems. This class includes a 2 hour lab (Bio 250L) to allow hands on understanding of what is covered in lecture.

(See Rotation Schedule on page 143)

**BIO 250L Environmental Biology Lab****(1:0:2:0)**

This course consists of selected experiments dealing with possible human impact on the ecosystems.

**BIO 264 Human Anatomy and Physiology I****(3:3:0:0)**

This is the first part of a two semester course to prepare students for further study in the health and medical fields. Specifically designed for students of nursing and the allied health professions. Includes basic biochemistry, structure and function of the cell, tissues, skeleton, muscles, and nervous systems of the body. Not acceptable for biology major credit.

(Fall, Winter, Spring)

**BIO 264L Human Anatomy and Physiology I Lab****(1:0:2:0)**

This is the laboratory accompaniment of the first part of a two-semester course studying the anatomy and physiology of the human body. While the lecture mainly focuses on physiology, most of the anatomical learning occurs in this lab. The course is designed for students of nursing and the allied health professions. Students wishing to apply to the nursing program must complete both the lecture and lab components. This course is not acceptable for biology major credit. (These students should take Bio 460 and 461 instead of 264 and 265.)

(Fall, Winter, Spring)

**BIO 265 Human Anatomy and Physiology II****(3:3:0:0)**

Prerequisite: BIO 264

This is the second part of a two-semester course to prepare students for further study in the health and medical fields. Specifically designed for students of nursing and the allied health professions. Includes structure and function of the senses, circulatory, lymphatic, respiratory, urinary, digestive, endocrine and reproductive systems. Not acceptable for biology major credit.

(Fall, Winter, Spring)

<p><b>BIO 265L Human Anatomy and Physiology II Lab</b> (1:0:2:0) Total Course Fees: \$20.00 This is the laboratory accompaniment of the second part of a two-semester course studying the anatomy and physiology of the human body. The course is designed for students of nursing and the allied health professions. Students wishing to apply to the nursing program must complete both the lecture and lab components. This course is not acceptable for biology major credit. (These students should take BIO 460 and 461 instead of 264 and 265.) (Fall, Winter, Spring)</p>	<p><b>BIO 321 Biology of Microorganisms</b> (4:3:2:0) Total Course Fees: \$15.00 Corequisite: BIO 181 The topics covered in this course will include microbial diversity, the methods used to study microorganisms, microbial metabolism and genetics, the role of microorganism in causing disease, the immune response, the methods used to control microorganisms, and the use of microorganisms by man. (Fall, Winter, Spring)</p>
<p><b>BIO 295 Pharmacology</b> (2:2:0:0) Prerequisite: BIO 264 and BIO 265 This course is designed for nursing and other health-related profession students. Underlying principles of pharmacology are studied including overviews of physiological and anatomical basics for the interaction of drugs with the human body. Common drugs in clinical medicine are examined, including their therapeutic uses and mechanisms of action. (Fall, Winter, Spring)</p>	<p><b>BIO 325 Range Ecology Systems Management</b> (3:3:0:0) Areas of discussion in this course include pasture lay out, fence design, water systems, herding effect, grazing systems, leasing, permits, BLM, state ground, private ground, lease ground, forage estimates, photosynthesis, energy store, tools of land management, and drought management. (See Rotation Schedule on page 143)</p>
<p><b>BIO 302 Ecology I</b> (4:3:3:0) Total Course Fees: \$20.00 Prerequisites: BIO 208 or BIO 181 This course is an introduction to Ecology including climates and distribution of life, adaptations of life to environmental conditions, life history characteristics, population characteristics, competition, predation, and parasitism. Lab is required. (Fall, Winter, Spring)</p>	<p><b>BIO 331 General Entomology</b> (3:2:3:0) Total Course Fees: \$15.00 This course is an introduction to Entomology with lectures and laboratories on insect structure, development, classification, behavior, and control. An insect collection and fieldwork are required. (See Rotation Schedule on page 143)</p>
<p><b>BIO 303 Ecology II</b> (2:2:0:0) Prerequisite: BIO 302 This course is a continued introduction to Ecology including energy and nutrient cycling, community composition, succession, ecosystem function, distribution, and characteristics of major biomes. (See Rotation Schedule on page 143)</p>	<p><b>BIO 351 Principles Wildlife Management</b> (3:3:0:0) This course introduces students to the art and science of wildlife management. This course will provide a foundation course from which students who major in Ecology and Wildlife may build a successful collegiate experience and professional career. It will also provide insight into the wildlife discipline for non-wildlife majors. (See Rotation Schedule on page 143)</p>
<p><b>BIO 305 Science Teaching Principles</b> (2:1:1:0) Prerequisites: ED 200 and (BIO 181 or CHEM 106 or GEOL 112 or PH 106) This course is designed to be taken in the 1st semester of the junior year. Students in this class receive experience in lesson preparation and teaching of general biology topics to non-major biology students. This class is based on a mix of classroom discussion on various aspects of science teaching, and preparation and execution of mentor-directed teaching experiences. (See Rotation Schedule on page 143)</p>	<p><b>BIO 352 Wildland Ecology and Range Plants</b> (3:2:2:0) Total Course Fees: \$50.00 This course requires identification of some 200 species from the intermountain area of the west. Successful students will be able to identify mounted specimens by common, scientific, and family names. Species are taken from a variety of habitats. There is a Mandatory field trip. (See Rotation Schedule on page 143)</p>
<p><b>BIO 307 Wildlife Law and Enforcement</b> (3:3:0:0) This course is an in-depth analysis of legal mandates (Federal and State) from a resource protection paradigm. Environmental law and evidence collection in relation to the atmosphere associated with the judicial system will be covered. Descriptions of field techniques for evidence collection, case investigation, and arrest will be provided. (See Rotation Schedule on page 143)</p>	<p><b>BIO 360 Principles of Fish Management</b> (3:3:0:0) Prerequisite: BIO 302 This course introduces students to the science of fisheries management and demonstrates how fishery biology principles and methods are applied to management of recreational and commercial fisheries. (See Rotation Schedule on page 143)</p>
<p><b>BIO 311 Scientific Writing and Communication</b> (1:1:0:0) The goal of this course is to familiarize students with the principles of effective scientific communication. This course will cover areas of scientific communication that students will need to know to be successful in their careers. Students will learn the basic rules of word, grammar, and punctuation usage; as well as an approach to the style of writing. Students will then apply these principles when writing papers, reports, resumes; and when preparing scientific presentations and posters. (See Rotation Schedule on page 143)</p>	<p><b>BIO 362 Stream Ecology</b> (3:2:2:0) Total Course Fees: \$25.00 Prerequisites: BIO 181 or BIO 302 This course is an in-depth examination of stream ecology. Emphasis is placed on the structure and function of running waters. Links to terrestrial and riparian components of applicable ecosystems will be investigated. The political issues that impinge on water issues are explored. (See Rotation Schedule on page 143)</p>
<p><b>BIO 312 Invertebrate Zoology</b> (4:3:3:0) Prerequisites: BIO 181 or BIO 302 This course is an introduction to the diversity, anatomy, physiology, ecology, and evolution of invertebrate animals, with laboratory. (See Rotation Schedule on page 143)</p>	<p><b>BIO 375 Genetics and Molecular Biology</b> (3:3:0:0) Prerequisites: BIO 208 or BIO 181 This course consists of an investigation of the transmission of heritable material in prokaryotes and eukaryotes. Topics include classical genetics (patterns of inheritance, linkage and chromosome mapping), molecular biology (DNA structure and function, gene expression, biotechnology), and population genetics. (Fall, Winter, Spring)</p>
<p><b>BIO 314 Marine Biology</b> (3:3:0:0) Prerequisites: BIO 302 or BIO 181 This course is an introduction to the ecology, diversity, structure, and function of marine communities. (See Rotation Schedule on page 143)</p>	<p><b>BIO 376 Cell and Molecular Biology</b> (3:3:0:0) Prerequisites: BIO 181 or BIO 302 This course covers principles, processes, and methodology of molecular and cell biology. Students will gain knowledge of interactions at the cellular level through structure and function of membranes, organelles and cytoskeletal elements, energy metabolism, signal transduction, cell cycle, cell-cell communication, and cellular movement. (Fall, Winter, Spring)</p>

**BIO 377 Techniques in Biochemistry and Molecular Biology (3:0:6:0)**

Total Course Fees: \$50.00

Prerequisites: CHEM 106 and (BIO 180 or BIO 208)

This is a comprehensive laboratory course designed to familiarize students with essential laboratory techniques in molecular biology, cellular biology, genetics, and biochemistry. The course topics demand a rigorous but rewarding schedule that enables students to follow several multi-session projects from start to finish. Students successfully completing the course will find they have most of the skills necessary to work as an entry level laboratory technician.

(Fall, Winter, Spring)

**BIO 378 Molecular Lab Pedagogy (2:0:4:0)**

Total Course Fees: \$50.00

Prerequisite: BIO 305

This is a comprehensive laboratory course designed specifically for biology education majors in order to familiarize them with essential laboratory techniques and equipment used in teaching high school honors, AP, and college biology. Cellular biology, molecular biology, genetics, and biochemistry will be the focus of the content of the labs learned in this class. Students will also learn about developing labs and writing lab reports at the high school level as well as becoming certified in laboratory safety.

(See Rotation Schedule on page 143)

**BIO 379 Range and Wildlife Inventory, Analysis, and Technique (3:0:6:0)**

Total Course Fees: \$20.00

Prerequisites: BIO 302 and MATH 221A

This is a laboratory course designed to familiarize students with essential laboratory and field techniques in ecology and natural resource based fields.

(See Rotation Schedule on page 143)

**BIO 380 Histology with Lab (4:3:3:0)**

Total Course Fees: \$30.00

Prerequisites: BIO 181 or (BIO 264 and BIO 265)

This course covers microscopic anatomy of cells and tissues and their relationship to the function of the cell.

(See Rotation Schedule on page 143)

**BIO 381 Pathophysiology (3:3:0:0)**

Prerequisites: (CHEM 101 or CHEM 105) and (BIO 461) or (BIO 264 and BIO 265)

This course is a study of the derangement of bodily function as seen in diseased states.

(Fall, Winter, Spring)

**BIO 383 Human Embryology (3:3:0:0)**

Prerequisites: BIO 180 or BIO 265

This course is intended to provide a foundation of understanding for the processes involved in creating gametes and their participation in the process of conception. A discussion will then continue to discover the processes important in the development of a fully formed and functional fetus. This course will examine the cellular and morphological development of most of the major human body systems. The study of human embryology is important to provide a logical framework for understanding structure and function in the study of anatomy and physiology.

(See Rotation Schedule on page 143)

**BIO 390 Fire Ecology (2:2:0:0)**

Prerequisite: BIO 302

This course will focus on fire history, safety, terms, behavior, current and past policies, general effects of fire on soils, watersheds, and animal and plant communities.

(See Rotation Schedule on page 143)

**BIO 391 Weed Ecology (2:2:0:0)**

Prerequisites: BIO 181 or BIO 302

This course will evaluate the ecological and economic impacts of invasive species in a variety of habitats. Students will learn what governs their invasions and treatment feasibility.

(See Rotation Schedule on page 143)

**BIO 392 Range and Wildland Restoration (2:2:0:0)**

Prerequisite: BIO 302

Restoration ecology is the study of the restoration of degraded and damaged ecosystems. This course will examine the current state of knowledge in this area through case studies and project design/implementation.

(See Rotation Schedule on page 143)

**BIO 393 Range and Wildland Plant Ecology (4:3:2:0)**

Total Course Fees: \$20.00

Prerequisite: BIO 302

The purpose of this course is to elaborate on information gained in ecology (Bio 302). Students will explore plants' complex interactions with their environments, looking often to adaptations which enable species to exploit particular ecological niches. Understanding such interactions will require the incorporation of concepts drawn from various other fields including: geology, chemistry, climatology, and mathematics.

(See Rotation Schedule on page 143)

**BIO 398 Natural Resource Internship (1:4:0:0)**

Internship Fees: \$78.00 (LDS) \$156.00 (non-LDS) per credit

Exempt from tuition, but charged this independent course fee

This course is designed to award university credit for an occupational internship. Students wishing to engage in research are encouraged to enroll in the department's research internship (Bio 498R).

(Fall, Winter, Spring)

**BIO 401R Readings in Biology (1:1:0:0)**

Repeatable Course: May earn maximum of 3 credits

This course consists of selected readings in biology.

(Fall, Winter, Spring)

**BIO 405 Biology Teaching Methods (3:2:3:0)**

Prerequisites: BIO 305 and ED 304 and SPED 360

General science teaching methods needed for certification in secondary education in the field of biology are taught. The course focuses on classroom and laboratory techniques specific to science teaching. Practical experience in teaching laboratories, lectures and demonstrations will be emphasized. Students will build a science unit which demonstrates their understanding and application of inquiry and the use of a multitude of other teaching, learning, and assessment strategies.

(See Rotation Schedule on page 143)

**BIO 408 Advanced Botany (4:3:3:0)**

Prerequisite: BIO 208

This course covers advanced topics in plant structure and function. Advanced concepts in plant morphology, anatomy, and physiology are studied. Previous or concurrent enrollment in organic chemistry is required.

(See Rotation Schedule on page 143)

**BIO 410 Immunology (3:3:0:0)**

Prerequisite: BIO 321

This course is an introduction to the functions of the cells and proteins that make up the immune system of the body. The topics that will be discussed include innate immunity, structure and function of immune system molecules, the genetics of the immune system, lymphocyte development and activation, failure of immunity, and immune system diseases.

(Fall, Winter, Spring)

**BIO 411 Medical Microbiology (3:3:0:0)**

Prerequisite: BIO 321

This course includes the study of bacteriology, mycology, and virology. The major areas of emphasis will focus on host-parasitic interactions between humans and bacteria. Paradigms in bacterial virulence factors will be stressed.

(See Rotation Schedule on page 143)

**BIO 412 Virology (3:3:0:0)**

Prerequisite: BIO 321

This is an introductory course on viruses that explores the characteristics common to all viruses. Particular emphasis will be placed on the replication strategies used by various animal viruses as well as the interactions between these viruses and the host cells they infect.

(See Rotation Schedule on page 143)

## Biology

Brigham Young University–Idaho 2015-2016

<p><b>BIO 413 Advanced Microbiology Lab</b> (2:0:4:0)            Total Course Fees: \$50.00            Prerequisite: BIO 321            This course is a comprehensive laboratory experience designed to familiarize students with the essential and commonly practiced techniques in the field of microbiology. Topics include microbial culturing, staining, and detection through biochemical, fluorescent, and serological methods, as well as experience with animal tissue culture. Students will learn and practice common technical procedures that apply to a variety of molecular and microbiological laboratory settings. Students will develop proficiency in experimental design, aseptic technique, data analysis, record-keeping, and scientific writing.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 461 Principles of Physiology</b> (5:4:3:0)            Total Course Fees: \$15.00            Prerequisites: BIO 181 and (BIO 180 or BIO 208)            This course is an in-depth coverage of general physiologic principles and homeostatic mechanisms regulating human organ system function.            (Fall, Winter, Spring)</p>
<p><b>BIO 420 Principles of Limnology</b> (3:3:0:0)            Prerequisites: BIO 302 or BIO 181            This course is an introduction to the physical, chemical, and biological aspects of inland water systems with a particular focus on lakes, ponds, and reservoirs.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 462 Head and Neck Anatomy</b> (2:1:3:0)            Total Course Fees: \$20.00            Prerequisites: BIO 264 or BIO 460            Course Requirements: Instructor Approval Required            This course introduced Biology Majors to the anatomy of the human head and neck. Comprehensive, in depth study of the development, organization and relationships of the anatomical structures of the head and neck will be covered. The lecture component of the course introduces the content, while the lab allows the opportunity to study the regions of interest from models, atlases, and from dissected cadavers.            (See Rotation Schedule on page 143)</p>
<p><b>BIO 423 Natural Resource Policy</b> (3:3:0:0)            This course is an introduction to theory, processes, and techniques for the management of natural resources. There will be an emphasis on ecological processes and public policy issues.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 466 Rangeland Vegetation Improvement</b> (3:2:0:0)            Prerequisite: BIO 225            In this course, students will study how rangeland habitat is improved by manipulating plant communities. Techniques include: prescribed fire, biological control, herbicide treatments, mechanical treatments, and manipulation by herbivory. Economic considerations of these techniques are investigated.            (See Rotation Schedule on page 143)</p>
<p><b>BIO 430 Advanced Pharmacology</b> (3:3:0:0)            Prerequisites: (BIO 264 and BIO 265) or BIO 461            This course is designed to help Biology students understand the basic principles of pharmacokinetics, pharmacodynamics and the clinical application of drugs. The mechanisms of drug action are emphasized to correlate physiological and pharmacological principles.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 475 Evolutionary Science</b> (3:2:2:0)            Prerequisites: (BIO 208 and BIO 375) or (BIO 181 and BIO 375)            In this course, basic Darwinian evolution and the history of evolutionary thought is presented. This course includes the study of the scientific processes through which both microevolution and macroevolution occur, the history of life on earth, phylogenetics, cladistics, molecular evolution, sexual selection, population genetics, and rates of evolution.            (Fall, Winter, Spring)</p>
<p><b>BIO 445 Ichthyology</b> (3:2:2:0)            Total Course Fees: \$25.00            Prerequisites: BIO 302 or BIO 181            In this course students will study the biology of fishes.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 485 Advanced Neuroscience</b> (4:3:3:0)            Total Course Fees: \$20.00            Prerequisite: BIO 240            In this course, students will study the fundamentals of Neuroscience which covers neuro-anatomy, cellular and molecular neuroscience, development of the nervous system, sensory systems, motor systems, regulatory systems, and behavioral and cognitive neuroscience. The associated lab offers students the chance to perform hands-on experiments involving modern neuroscience techniques using state-of-the-art equipment and protocols.            (Fall, Winter, Spring)</p>
<p><b>BIO 446 Ornithology</b> (3:2:2:0)            Total Course Fees: \$15.00            Prerequisites: BIO 208 or BIO 181            This course provides an in-depth study of avian (bird) biology including evolutionary history, systematics, anatomy, physiology, behavior, and reproduction. A lab is required.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 490 Special Problems</b> (1-3:0:0:0)            Repeatable Course: May earn maximum of 6 credits            Course Requirements: Instructor Approval Required            This course is determined by consultation with a faculty mentor.            (Fall, Winter, Spring)</p>
<p><b>BIO 447 Mammalogy</b> (3:2:2:0)            Total Course Fees: \$25.00            Prerequisites: BIO 302 or BIO 181            In this course, students will study mammalian diversity, systematics, evolution, morphology, distribution, and natural history. At least one field trip is required.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 497 Senior Seminar</b> (3:3:0:0)            Prerequisites: BIO 181 or BIO 302            A capstone course in which participants discuss topics related to the practice of scientific writing. Each participant produces a written review paper or research proposal, and other relevant support documents such as a letter of application and a curriculum vitae.            (Fall, Winter, Spring)</p>
<p><b>BIO 448 Insect Systematics</b> (3:2:3:0)            Prerequisite: BIO 331            This is an advanced course that will cover the diversity of insect biology and structure with an emphasis on the identification of adults. It will include coverage of speciation, evolutionary relationships, approaches to classification, nomenclature, zoogeography, and techniques of collection. One extended camping field trip is required.            (See Rotation Schedule on page 143)</p>	<p><b>BIO 498R Research and Occupational Internship</b> (1-4:0:0:0)            Repeatable Course: May earn maximum of 8 credits            Internship Fees: \$78 (LDS) \$156 (non-LDS) per credit            Exempt from tuition, but charged this independent course fee            This course is designed to award university credit for research-based internships in any biomedical or ecological field. This course is meant for students engaged in laboratory or field research. Students wishing to engage in occupational training (ie. working in a doctor's office) are encouraged to enroll in the department's occupational internship (BIO 398).            (Fall, Winter, Spring)</p>
<p><b>BIO 455 Rangeland Inventory and Analysis Lab</b> (3:2:2:0)            Prerequisite: BIO 225            In this course, students will study rangeland ecology and vegetation measurements including condition, trend, utilization, suitability, and production.            (This course is currently not offered.)</p>	<p><b>BIO 499R Undergraduate Research</b> (1-6:0:0:0)            Course Requirements: Instructor Approval Required            This course is designed to award University credit for student mentored research on the BYU-I campus by a faculty member in the Biology Department.            (Fall, Winter, Spring)</p>
<p><b>BIO 460 Human Anatomy with Lab</b> (4:3:2:0)            Prerequisite: BIO 181            This course involves regional human anatomy for Biology Majors. Comprehensive regional study of gross human anatomy with emphasis on the limbs, and the thoracic, abdominal, and pelvic cavities will be covered.            (Fall, Winter, Spring)</p>	

**Biology Course Rotation Schedule**

Some courses will not appear in this rotation schedule  
because they are offered **every** semester.

Course ID	Fall 15	Win 16	Spr 16	Fall 16	Win 17	Spr 17	Fall 17
BIO 182	X		X		X		X
BIO 204	X		X		X		X
BIO 209		X		X	X		
BIO 210	X		X			X	X
BIO 250	X		X		X		X
BIO 303		X		X		X	
BIO 305	X	X		X	X		X
BIO 307		X		X		X	
BIO 311		X		X		X	
BIO 312	X		X		X		X
BIO 314		X		X		X	
BIO 325	X		X		X		X
BIO 331	X		X	X		X	X
BIO 351	X		X		X		X
BIO 352	X		X		X		X
BIO 360		X		X		X	
BIO 362	X		X		X		X
BIO 378	X		X	X		X	X
BIO 379	X		X	X		X	X
BIO 380	X		X		X		X
BIO 383		X		X		X	
BIO 390		X		X		X	
BIO 391	X		X		X		X
BIO 392	X		X		X		X
BIO 393		X		X		X	
BIO 405		X	X		X	X	
BIO 408	X			X		X	
BIO 411	X		X		X		X
BIO 412		X		X		X	
BIO 413	X		X		X		X
BIO 420		X		X		X	
BIO 423		X		X		X	
BIO 430		X		X		X	
BIO 445		X		X		X	
BIO 446	X		X		X		X
BIO 447		X		X		X	
BIO 448					X		
BIO 462	X		X		X		X
BIO 466		X		X		X	

Although unforeseen circumstances may result in occasional changes  
to this schedule, we will make every attempt to adhere to it.