

Department of

Biology**Sidney Palmer, Department Chair**

Gary Baird, Lou Buhrlay, Tate Carter, Steven Christenson, Van Christman, Robert Coleman, Kent Davis, Mark Dewall, Clair Eckersell, Lynn Firestone, John Griffith, Michael Groesbeck, Alan Holyoak, Jason Hunt, Todd Kelson, Sidney Palmer, Seth Ririe, Jerry Scrivner, Jason Shaw, Dave Stricklan, Russell Thurston, Travis Wall, Gene Weller, Dwight Wray, John Zenger
Lark Hillier, Secretary (208) 496-2009
<http://www.byui.edu/biology/>

Department Description

The Department of Biology provides a variety of classes for students seeking a degree in Biology and for non-major students completing the four-credit Biological Science General Education requirement. 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 Description**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.

Organismic Biology (700-56)

The Organismic Biology emphasis is designed to prepare students for career opportunities and graduate work in fields such as botany, zoology, and related disciplines. This emphasis will provide students with opportunities to study the biology of a wide range of organisms, the environments in which they live, and applicable laboratory and field techniques. When combined with an appropriate minor or clusters, this emphasis will qualify students for entry-level positions as biologists in private companies and selected jobs in State and Federal agencies.

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, neuropharmacology, 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. The emphasis will also serve pre-professional students interested in one of the medical professions.

B.S. in Ecology, Range, Wildlife and Fisheries (487)

This degree provides a powerful foundation for most natural resource related fields. It offers three separate areas of specialization with course work requirements designed to meet State and Federal hiring registries as well as to prepare students for future graduate studies at post graduate institutions.

(487-83) The Wildlife/Fisheries emphasis prepares students for careers as wildlife and fisheries biologists, conservation officers, natural resource managers, park rangers, natural resource policy/administration officers, and in environmental law or graduate work in wildlife and fisheries related fields.

(487-84) The Ecology emphasis is designed to be somewhat broader than the other two emphasis areas and should be taken by students interested in careers in conservation biology, botany, natural history education and interpretation, natural resource policy and law, as park rangers or as a foundation for graduate work in ecology and the life sciences.

(487-98) The Range emphasis prepares students for careers in rangeland conservationist, rangeland ecology, rangeland/livestock consulting, wildlife and livestock production, or for graduate work in rangeland ecology 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 an Education Minor. Students who graduate from this program are eligible for teacher certification in biology and in their chosen education minor.

For a listing of approved Secondary Education majors and minors, see the Teacher Education section of this catalog.

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.

For a listing of approved Secondary Education majors and minors see the Teacher Education section of this catalog.

BS in Biology				
Organismic Biology Emphasis (700-56)				
Take Required Foundation Courses				
Major Requirements				
<i>No Double Counting of Major Courses - No Grade Less Than C- in Major Courses</i>				
<i>Take these courses:</i> BIO 199 1 BIO 375 3 BIO 475 3 CHEM 105 4 CHEM 106 4 ENG 316 3 FDMAT 222 3 <hr style="width: 100%;"/> 21 <i>Take one course:</i> BIO 398 1-4 BIO 497 1 BIO 498R 1-8 <hr style="width: 100%;"/> 1	<i>Take these courses:</i> BIO 208 4 BIO 302 4 BIO 379 3 <hr style="width: 100%;"/> 11 <i>Take these courses:</i> BIO 204 4 BIO 209 4 <hr style="width: 100%;"/> 8	<i>Take 9 credits:</i> BIO 210 3 BIO 312 4 BIO 331 3 BIO 445 3 BIO 446 3 BIO 447 3 <hr style="width: 100%;"/> 9	<i>Take 5 credits:</i> <i>These classes may not double count with the previous list.</i> BIO 210 3 BIO 312 4 BIO 314 3 BIO 331 3 BIO 352 3 BIO 362 3 BIO 393 2 BIO 408 4 BIO 420 3 BIO 445 3 BIO 446 3 BIO 447 3 GEOG 230 3 <hr style="width: 100%;"/> 5	<i>Program Notes:</i>
Total Major Credits=55				
This major also requires a minor or 2 clusters				
This major is available on the following tracks:				
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES		

BS in Biology				
Neuroscience Emphasis (700-62)				
Take Required Foundation Courses				
Major Requirements				
<i>No Double Counting of Major Courses - No Grade Less Than C- in Major Courses</i>				
<i>Take these courses:</i> BIO 199 1 BIO 375 3 BIO 475 3 CHEM 105 4 CHEM 106 4 ENG 316 3 FDMAT 222 3 <hr style="width: 100%;"/> 21 <i>Take one course:</i> BIO 398 1-4 BIO 497 1 BIO 498R 1-8 <hr style="width: 100%;"/> 1	<i>Take these courses:</i> BIO 200 4 BIO 211 3 BIO 377 3 <hr style="width: 100%;"/> 10	<i>Take these courses:</i> BIO 240 4 BIO 461 5 BIO 485 4 <hr style="width: 100%;"/> 13	<i>Take 10 credits:</i> BIO 376 3 BIO 380 4 BIO 460 4 PSYCH 342 3 PSYCH 370 3 PSYCH 384 3 <hr style="width: 100%;"/> 10	<i>Program Notes:</i>
Total Major Credits=55				
This major also requires a minor or 2 clusters				
This major is available on the following tracks:				
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES		

BS in Biology			
Biotechnology Emphasis (700-70)			
Take Required Foundation Courses			
Major Requirements			
<i>No Double Counting of Major Courses - No Grade Less Than C- in Major Courses</i>			
<i>Take these courses:</i> BIO 199 1 BIO 375 3 BIO 475 3 CHEM 105 4 CHEM 106 4 ENG 316 3 FDMAT 222 3 <hr style="width: 100%;"/> 21 <i>Take one course:</i> BIO 398 1-4 BIO 497 1 BIO 498R 1-8 <hr style="width: 100%;"/> 1	<i>Take these courses:</i> BIO 200 4 BIO 211 3 BIO 377 3 <hr style="width: 100%;"/> 10	<i>Take these courses:</i> BIO 321 4 BIO 376 3 CHEM 351 4 CHEM 481 4 <hr style="width: 100%;"/> 15 <i>Take 8 credits:</i> BIO 410 4 BIO 411 4 BIO 412 4 BIO 461 5 BIO 490 1-3 CHEM 220 5 <hr style="width: 100%;"/> 8	<i>Program Notes:</i>
Total Major Credits=55 This major also requires a minor or 2 clusters			
This major is available on the following tracks:			
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES	

BS in Biology Education (800)			
Take Required Foundation Courses			
Major Requirements			
<i>No Double Counting of Major Courses - No Grade Less Than C- in Major Courses</i>			
Education Core <i>Take these courses:</i> ED 200 2 ED 304 3 ED 361 3 ED 461 3 ED 492 10 SPED 360 2 <hr style="width: 100%;"/> 23	<i>Take these courses:</i> BIO 204 4 BIO 208 4 BIO 221 3 BIO 305 1 BIO 375 3 BIO 405 3 BIO 475 3 CHEM 105 4 <hr style="width: 100%;"/> 25	<i>Take 1 course:</i> BIO 209 4 BIO 210 3 <hr style="width: 100%;"/> 3 <i>Take 1 course:</i> BIO 250 4 BIO 302 4 <hr style="width: 100%;"/> 4 <i>Take 1 course:</i> BIO 377 3 BIO 378 2 <hr style="width: 100%;"/> 2	<i>Take 1 course:</i> BIO 312 4 BIO 331 3 BIO 446 3 BIO 447 3 <hr style="width: 100%;"/> 3 <i>Program Notes:</i>
Total Major Credits=37 Education Core Credits=23 Education Majors Require an Education Minor for Graduation			
This major is available on the following tracks:			
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES	

Minor in Biology (143)

Minor Requirements

No Grade Less Than C- in Minor Courses

<p><i>Take these courses:</i></p> <p>BIO 208 4 BIO 302 4 <u>8</u></p> <p>OR</p> <p><i>Take these courses:</i></p> <p>BIO 200 4 BIO 211 3 <u>7</u></p> <p><i>Take 1 courses:</i></p> <p>CHEM 101 4 CHEM 105 4 <u>4</u></p>	<p><i>Take 9 credits:</i></p> <p>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 continued next column</p>	<p>BIO 380 4 BIO 390 2 BIO 391 2 BIO 392 2 BIO 393 2 BIO 408 4 BIO 410 4 BIO 411 4 BIO 412 4 BIO 420 3 BIO 423 3 BIO 446 3 continued next column</p>	<p>BIO 447 3 BIO 460 4 BIO 461 5 BIO 475 3 BIO 485 4 CHEM 481 4 <u>9</u></p>	<p><i>Program Notes:</i></p>
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Total Minor Credits=20

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Minor in Biology Education (173)

Minor Requirements

No Grade Less Than C- in Minor Courses

<p><i>Take these courses:</i></p> <p>BIO 204 4 BIO 208 4 BIO 375 3 <u>11</u></p> <p><i>Take 1 course:</i></p> <p>BIO 209 4 BIO 210 3 <u>3</u></p>	<p><i>Take 1 course:</i></p> <p>BIO 312 4 BIO 331 3 BIO 446 3 BIO 447 3 <u>3</u></p>	<p><i>Take 1 course:</i></p> <p>BIO 302 4 BIO 475 3 <u>3</u></p>	<p><i>Program Notes:</i></p>
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Total Minor Credits=20

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Biology Pre-approved Clusters

Pre-Veterinary cluster			
<i>Take these courses:</i>			
BIO 221	Microbiology	3	
BIO 222	Microbiology Lab	1	
BIO 375	Genetics and Molecular Biology	3	
PH 105	Applied Physics I	4	
<i>Take one course:</i>			
BIO 200	General Biology	4	
BIO 208	General Botany	4	
	Total Credits	15	
Neuroscience (Psychology Majors)			
<i>Take these courses:</i>			
BIO 240	Neurobiology	4	
BIO 485	Advanced Neuroscience	4	
<i>Take 4-7 credits:</i>			
BIO 200	General Biology	4	
BIO 208	General Botany	4	
BIO 264	Anatomy & Physiology I	4	
BIO 265	Anatomy & Physiology II	4	
	Total Credits	12	
Recreation Therapy (Recreation Management Majors)			
<i>Take these courses:</i>			
BIO 264	Anatomy & Physiology I	4	
BIO 265	Anatomy & Physiology II	4	
<i>Take 4-7 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	
	Total Credits	12	
Natural Resource (Recreation Management Majors)			
<i>Take this course:</i>			
BIO 202	Natural Resource Management	4	
<i>Take 11 credits:</i>			
AS 225	Range Ecology	3	
BIO 307	Wildlife Law	3	
BIO 351	Wildlife Management	3	
BIO 423	Natural Resource Policy	3	
GEOG 230	Introduction to GIS	3	
GEOG 240	Maps and Remote Sensing	3	
GEOG 340	Advanced GIS	3	
GEOL 440	Applied GIS (Fall classes only)	3	
	Total Credits	16	
Biology Illustrations (Art Majors)			
<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	4	
BIO 445	Ichthyology	3	
BIO 446	Ornithology	3	
BIO 447	Mammalogy	3	
	Total Credits	15	
Microbiology			
<i>Take these courses:</i>			
BIO 221	General Microbiology	3	
BIO 222	General Microbiology Lab	1	
OR			
BIO 321	Microbiology	4	
<i>Take 8-11 credits:</i>			
BIO 410	Immunology	4	
BIO 411	Medical Microbiology	4	
BIO 412	Virology	4	
HS 370	Epidemiology	3	
	Total Credits	12	
Biotechnology/Forensics			
<i>Take these courses:</i>			
BIO 200	Introduction to Biology	4	
BIO 375	Genetics	3	
BIO 377	Techniques in Biochemistry and Molecular Biology	3	
<i>Take one course:</i>			
BIO 376	Cell and Molecular Biology	3	
CHEM 481	Biochemistry	4	
	Total Credits	13	
Health Professions			
<i>Take 12-15 credits:</i>			
BIO 200	Introduction to Biology I	4	
BIO 211	Introduction to Biology II	3	
BIO 221	General Microbiology	3	
BIO 222	General Microbiology Lab	1	
BIO 321	Biology of Microorganisms	4	
CHEM 105	General Chemistry I	4	
CHEM 106	General Chemistry II	4	
CHEM 351	Organic Chemistry I	4	
CHEM 352	Organic Chemistry II	4	
PH 105	Introduction to Applied Physics I	4	
PH 106	Introduction to Applied Physics II	4	
PH 115	Pre-Medical Physics I	4	
PH 116	Pre-Medical Physics II	4	
	Total Credits	12	

Course Descriptions	Credits*
BIO 100 Principles of Biology An introduction to biology, designed around the areas of cell structure, function, laws of heredity, evolution and ecology. (Fall, Winter, Spring)	(3.0:3:0)
BIO 118 Field Biology Fee: \$50.00 This is an introductory level ecology course. It includes field identification techniques, ecological relationships, and field study methods. Field Biology is field oriented. We strive to create an atmosphere of experiential education where students can learn by experiencing nature. The class integrates lecture and lab in a field setting. Many local ecosystems are visited including cold deserts, coniferous forests, streams and rivers, and riparian areas. (Fall, Winter, Spring)	(4.0:3:2)
BIO 150 General Zoology An introduction to the diversity of animals with emphasis on their 1) structure, 2) function, 3) behavior and 4) economic importance. (Fall, Winter)	(3.0:3:0)
BIO 150L General Zoology Lab Fee: \$5.00 Prerequisite: Concurrent or previous enrollment in BIO 150 Selected activities that reinforce the concepts introduced in lecture. (Fall, Winter)	(1.0:0:2)
BIO 176 Heredity Fee: \$10.00 In this course, we will be studying the patterns of inheritance, probability, chromosome structure and abnormalities, population genetics, and molecular genetics. Class time will be occupied by discussion, lecture, and problem-solving, and lab time will be spent doing lab exercises and working genetics problems. (Fall, Winter, Spring)	(4.0:3:2)
BIO 199 Biology Orientation 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 (chiropractics, 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)	(1.0:1:0)
BIO 200 Introduction to Biology I Fee: \$5.00 Prerequisite: Chem 105 Biology 200 is the first half of a two semester intensive introduction to biology designed for majors in the life sciences. An emphasis is placed on learning the vocabulary, principles, and concepts of molecular and cellular biology, genetics, and microevolution. The course provides a strong background for upper division course work in these fields. (Fall, Winter, Spring)	(4.0:3:2)
BIO 202 Natural Resource Management Fee: \$25.00 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. (Fall, Winter, Spring)	(4.0:3:3)
BIO 204 Invertebrate and Vertebrate Zoology Fee: \$10.00 Comparative organization and evolutionary significance of adaptive morphological, physiological, behavioral, reproductive and ecological differences in vertebrates and invertebrates. One required field trip. (See teaching schedule)	(4.0:3:3)
BIO 208 General Botany Fee: \$10.00 An introduction to Botany including cell structure, plant anatomy, physiology, reproduction, heredity, evolution and ecology. Lab is required. (Fall, Winter, Spring)	(4.0:3:2)
BIO 209 An Evolutionary Survey of Plants Fee: \$10.00 Prerequisite: BIO 208 or permission by the Instructor 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, slimemolds, and water molds. (Fall, Winter)	(4.0:3:3)
BIO 210 Plant Systematics Fee: \$20.00 Prerequisite: Bio 208 or permission of instructor. 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. (Fall, Spring)	(3.0:2:3)
BIO 211 Introduction to Biology II Prerequisite: BIO 200 or BIO 208 The second semester of introductory biology for majors and minors. Includes fundamental concepts in ecology, macroevolution, systematics, biodiversity, plant form and function, and animal form and function. (Fall, Winter, Spring)	(3.0:3:0)
BIO 221 General Microbiology Prerequisite: Knowledge of the structure and function of the cell. 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)	(3.0:3:0)
BIO 222 General Microbiology Lab Fee: \$5.00 Prerequisite: Completion of or concurrent registration in Bio 221 General Microbiology 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)	(1.0:0:2)
BIO 225 Range Ecology I 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. (Rotating schedule)	(3.0:3:0)
BIO 230 Human Biology Fee: \$10.00 An introductory course in human anatomy and physiology for non-science and non-health professions majors. (Fall, Winter)	(4.0:3:2)
BIO 240 Neurobiology 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.	(4.0:3:2)
BIO 250 Environmental Biology with Lab Basic ecological principles in relationship to 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 to allow hands on understanding of what is covered in lecture. (Fall, Winter)	(4.0:3:2)

<p>BIO 250L Environmental Biology Lab (1.0:0:2) Selected experiments dealing with possible human impact on the ecosystems. (Fall, Winter)</p> <p>BIO 264 Human Anatomy & Physiology I (4.0:3:2) Fee: \$10.00 Prerequisite: Recommended: 1 biology course (Not for Biology Majors) 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)</p> <p>BIO 265 Human Anatomy & Physiology II (4.0:3:2) Fee: \$10.00 Prerequisite: Completion of BIO 264 (Not for Biology Majors) 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> <p>BIO 302 Ecology (4.0:3:3) Fee: \$40.00 Prerequisite: Bio 200 or Bio 208 Interrelationships between plants and animals characteristics of aquatic, mountain, and deserts ecosystems with emphasis on structure and function. (Fall, Winter, Spring)</p> <p>BIO 305 Biology Teaching Practicum (1.0:0:2) Prerequisite: Completion of all 200 level biology classes required for Biology Education Majors. This class gives students experience in lesson preparation and teaching of general biology topics to non-majors biology students. This class is based on a mix of out-of-class preparation and student-directed teaching experiences. (Fall, Winter, Spring)</p> <p>BIO 307 Wildlife Law and Enforcement (3.0:3:0) In-depth analysis of legal mandates, (Federal and State) from a resource protection paradigm. Review of environmental law and evidence collection in relation to the atmosphere associated with the judicial system. Description of field techniques for evidence collection, case investigation and arrest. (Fall, Spring)</p> <p>BIO 311 Professional School Preparation (1.0:1:0) A pre-professional service course designed to increase your understanding of the professional school admissions process, provide exposure to many aspects of the medical fields and strengthen your qualifications as a professional school applicant. This course should be taken by those who plan to apply for schools of medicine, dentistry, optometry, etc. (Fall)</p> <p>BIO 312 Invertebrate Zoology (4.0:3:3) Fee: \$10.00 Prerequisite: Bio 211 or Bio 204 or Bio 302 An introduction to the taxonomy, anatomy, physiology, ecology, and evolution of invertebrate animals. (Fall, Winter, Spring)</p> <p>BIO 314 Marine Biology (3.0:3:0) Prerequisite: BIO 211 or BIO 302 An introduction to the ecology, diversity, structure, and function of marine communities. (Fall, Winter, Spring)</p> <p>BIO 321 Biology of Microorganisms (4.0:3:2) Fee: \$10.00 Prerequisite: Bio 200 or Bio 208 The topics covered 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>BIO 325 Range Ecology Systems Management (3.0:3:0) Areas of discussion 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, drought management. (Fall, Spring)</p> <p>BIO 331 General Entomology (3.0:2:3) Fee: \$10.00 An introduction to Entomology with lectures and laboratories on insect structure, development, classification, behavior and control. An insect collection and fieldwork are required. (Fall, Spring)</p> <p>BIO 351 Principles of Wildlife Management (3.0:3:0) Fee: \$25.00 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. (Rotating schedule)</p> <p>BIO 352 Wildland Ecology and Range Plants (3.0:2:2) 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 habitats.</p> <p>BIO 362 Stream Ecology (3.0:2:2) Fee: \$25.00 Prerequisite: BIO 208 An in-depth examination of riparian ecology. Emphasis is placed on stream channel morphology, function and riparian plant succession. Assessment methods of important physical and biotic stream influences, including water chemistry, aquatic insects and other life forms is conducted. Links to terrestrial and riparian components of applicable ecosystems will be investigated. The political issues that impinge on water issues are explored. (Fall, Spring)</p> <p>BIO 375 Genetics and Molecular Biology (3.0:3:0) Prerequisite: BIO 208 or 211. Other 200-level biology courses may fulfill this requirement, please see instructor for approval. 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>BIO 376 Cell and Molecular Biology (3.0:3:0) Prerequisite: BIO 200 Principles, processes and methodology of molecular and cell biology. Interactions at the cellular level including: structure and function of membranes, organelles and cytoskeletal elements, energy metabolism, signal transduction, cell cycle, cell-cell communication and cellular movement. (Alternating semesters. See schedule in catalog.)</p> <p>BIO 377 Techniques in Biochemistry and Molecular Biology (3.0:0:6) Fee: \$50.00 Prerequisite: Prior enrollment in Bio 211 or Bio 208. Prior or concurrent enrollment in Bio 375 is recommended. Biology 377 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)</p>
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Biology

Brigham Young University-Idaho 2009-2010

BIO 378 Techniques in Biochemistry and Molecular Biology (2.0:0:6)

Fee: \$50.00

Prerequisite: Prior enrollment in Bio 211 or Bio 208. Prior or concurrent enrollment in Bio 375 is recommended.

Biology 378 is a 10 week comprehensive laboratory course designed to familiarize students with essential laboratory techniques in molecular 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.
(Fall, Winter, Spring)

BIO 379 Ecological and Wildlife Techniques (3.0:0:6)

Fee: \$20.00

Travel Fee: \$20.00

Prerequisite: Math 221, Bio 302 Bio 375 recommended.

Laboratory course designed to familiarize students with essential laboratory and field techniques in ecology and natural resource based fields.
(Fall, Spring)

BIO 380 Histology with Lab (4.0:3:3)

Fee: \$50.00

Prerequisite: BIO 200 or BIO 264 & 265

Microscopic anatomy of cells and tissues and their relationship to the function of the cell.
(Fall, Winter)

BIO 381 Pathophysiology (3.0:3:0)

Prerequisite: Bio 264 and 265 or Bio 461; Chem 101 or equivalent

A study of the derangement of function of the body seen in disease states.
(Fall, Winter)

BIO 383 Human Embryology (3.0:3:0)

Prerequisite: BIO 211 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 teaching schedule)

BIO 386 Pharmacology (3.0:3:0)

Prerequisite: BIO 264 & 265 or Bio 461. Some chemistry background is helpful.

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.
(Rotating schedule)

BIO 390 Fire Ecology (2.0:2:0)

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.
(Every 4th Semester)

BIO 391 Weed Ecology (2.0:2:0)

Prerequisite: Bio 302

Evaluate the ecological and economic impacts of invasive species in a variety of habitats. What governs their invasions and treatment feasibility.
(Rotating Schedule)

BIO 392 Restoration Ecology (2.0:2:0)

Prerequisite: Bio 302

Restoration ecology is the study of the restoration of degraded and damaged ecosystems. This class will examine the current state of knowledge in this area through case studies and project design/implementation.
(Every 4th Semester)

BIO 393 Plant Ecology (2.0:2:0)

Prerequisite: Bio 302

The purpose of this course is to elaborate on information gained in ecology (Bio 302). We 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.
(Rotating Schedule)

BIO 398 Internship (1.0-4.0:0:0)

This course is designed to award university credit for occupational training-based internships in any biomedical or ecological field. This course is meant for students engaged in operational duties of a facility. Students wishing to engage in research-based internship training are encouraged to enroll in the department's research internship (Bio 498R).

BIO 401R (1.0:1:0)

Selected readings in biology.

BIO 405 Teaching Methods for the Biological Sciences (3.0:2:3)

Fee: \$10.00

Prerequisite: Bio 305, ED 304 and ED 361, along with 80% of science courses required for the Biology Education major must be completed prior to enrolling in this course. In addition this course should not be taken until the semester immediately preceding student teaching.

Biological and general science teaching methods needed for certification in biology secondary education are taught. The course focuses on classroom and laboratory techniques utilized in the biological sciences. 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 multiple teaching and assessment strategies.
(Fall, Spring)

BIO 408 Advanced Botany (4.0:3:3)

Fee: \$15.00

Prerequisite: Bio 208

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

BIO 410 Immunology (4.0:3:2)

Fee: \$25.00

Prerequisite: Bio 321

This introductory immunology course will focus on fundamental and clinical principles of immunology. Special attention will be given to landmark experiments that have led to the underlying theoretical framework of immunology.
(Fall of even years; Winter of even years)

BIO 411 Medical Microbiology (4.0:3:2)

Fee: \$25.00

Prerequisite: BIO 321

Medical microbiology 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. The accompanying lab will center on providing experience and insight into the processes of specimen handling, isolation, identification, and sensitivity testing of pathogenic microorganisms. Aseptic techniques are stressed throughout the course.
(Fall - odd years; winter - odd years)

BIO 412 Virology (4.0:3:2)

Fee: \$25.00

Prerequisite: Bio 321

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. The accompanying lab will focus on developing proficiency in bacterial and animal host cell culturing methods as well as developing the ability to analyze the replication potential and pathogenic effects of viruses within host cells.
(Alternating Semesters)

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BIO 420 Principles of Limnology (3.0:3:0) Prerequisite: Bio 211 or Bio 302 An introduction to the physical, chemical, and biological aspects of inland water systems, with a particular focus on lakes, ponds, and reservoirs. (Fall even years, winter odd years)	BIO 466 Rangeland Vegetation Manipulation and Improvement (3.0:3:0) Prerequisite: AS 225 or Bio 225 Rangeland habitat improvement by manipulating plant communities. Techniques include: prescribed fire, biological control, herbicide treatments, mechanical treatments and manipulation by herbivory. (Rotating schedule)
BIO 423 Natural Resource Policy (3.0:3:0) Fee: \$10.00 Introduction to theory, processes, and techniques for the management of natural resources. Emphasis on ecological processes and public policy issues. (Rotating schedule)	BIO 475 Evolutionary Science (3.0:2:2) Prerequisite: Completion of Bio 211 or Bio 208 and Bio 375 required. Basic Darwinian evolution and the history of evolutionary thought is presented. Includes the study of the scientific processes through with 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)
BIO 445 Ichthyology (3.0:2:2) Fee: \$25.00 Prerequisite: Bio 211 or 302 A study of the anatomy, physiology, diversity, zoogeography, ecology, and evolution of fishes. (Every 4th Semester)	BIO 485 Advanced Neuroscience (4.0:3:3) Fee: \$20.00 Prerequisite: Bio 240 Fundamentals of Neuroscience covering neuroanatomy, 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. (Winter)
BIO 446 Ornithology (3.0:2:2) Fee: \$25.00 Prerequisite: Bio 208 or Bio 211 In-depth study of avian (bird) biology systematics, distribution, evolution and natural history. At least one field trip required. (Winter)	BIO 497 Senior Seminar (1.0:1:0) Prerequisite: Bio 211 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)
BIO 447 Mammalogy (3.0:2:2) Fee: \$25.00 Prerequisite: Bio 208 or Bio 211 A study of mammalian diversity, systematics, evolution, morphology, distribution, and natural history. At least one field trip is required. (See teaching schedule)	BIO 498R Occupational Internship (1.0-4.0:0:0) 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).
BIO 448 Insect Systematics (3.0:2:3) 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. (Even Springs)	BIO 499R Undergraduate Research (1.0-6.0:0:0) Prerequisite: Consent of instructor Undergraduate Research (Arranged with instructor)
BIO 455 Rangeland Inventory and Analysis Lab (3.0:2:2) Fee: \$20.00 Prerequisite: Bio 225 Rangeland ecology and vegetation measurements including condition, trend, utilization, suitability and production. (Rotating schedule)	
BIO 460 Human Anatomy with Lab (4.0:3:2) Prerequisite: Bio 200 or consent of instructor Advanced human anatomy for Biology Majors. Comprehensive regional study of gross human anatomy with emphasis on the limbs, and the thoracic, abdominal and pelvic cavities. (Fall, Winter, Spring)	
BIO 461 Principles of Physiology (5.0:4:3) Fee: \$15.00 Prerequisite: Bio 211 or Bio 208 In-depth coverage of general physiologic principles and homeostatic mechanisms regulating human organ system function. (See teaching schedule)	
BIO 462 Head and Neck Anatomy (2.0:1:3) Fee: \$20.00 Prerequisite: Completion of BIO 264 or Bio 460 and consent of the instructor. Anatomy of the human head and neck for Biology Majors. Comprehensive, in depth study of the development, organization and relationships of the anatomical structures of the head and neck. 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. (Alternating Semesters)	

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Teaching Schedule

Class	Win 09	Sum 09	Fall 09	Win 10	Sum 10	Fall 10	Win 11	Sum 11	Fall 11	Win 12	Sum 12	Fall 12
BIO 202		X		X		X		X			X	
BIO 204	X		X		X		X		X	X		X
BIO 209	X		X	X			X		X	X		
BIO 210		X			X	X		X			X	X
BIO 225	X		X		X		X		X		X	
BIO 230		X		X		X		X		X		X
BIO 240		X		X		X		X		X		X
BIO 250	X		X		X		X		X		X	
BIO 307	X			X			X			X		
BIO 311	X			X			X			X		
BIO 312	X				X				X			
BIO 314		X				X				X		
BIO 325	X	X		X		X		X		X		
BIO 331		X	X		X	X		X	X		X	X
BIO 351	X		X		X		X		X		X	
BIO 352	X		X		X		X		X		X	
BIO 362		X				X		X			X	
BIO 376		X		X		X		X		X		X
BIO 379			X		X			X	X		X	X
BIO 380	X		X		X		X		X		X	
BIO 381	X		X	X		X	X		X	X		X
BIO 386		X		X		X		X		X		X
BIO 390	X				X				X			
BIO 391		X				X				X		
BIO 392			X				X				X	
BIO 393				X				X				X
BIO 401R	To be Announced each Semester			To be Announced each Semester			To be Announced each Semester			To be Announced each Semester		
BIO 405		X	X		X	X		X	X		X	X
BIO 408	X				X				X			
BIO 410		X		X		X		X		X		X
BIO 411	X		X		X		X		X		X	
BIO 412	X	X			X	X			X	X		
BIO 420				X				X				X
BIO 423	X		X		X		X		X		X	
BIO 445		X	X			X	X					
BIO 446	X		X		X		X		X		X	
BIO 447		X		X		X		X		X		X
BIO 448					X						X	
BIO 455		X	X		X	X		X	X			X
BIO 460		X		X		X		X		X		X
BIO 461	X		X		X		X		X		X	
BIO 462	X		X		X		X		X		X	
BIO 466		X		X		X		X		X		X
BIO 485	X		X		X		X		X		X	
BIO 499R	Arranged with Instructor			Arranged with Instructor			Arranged with Instructor			Arranged with Instructor		

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