Department of Biology

(College of Humanities, Arts and Sciences)

www.biology.uni.edu

The Department of Biology offers the following programs:

Undergraduate Major (B.S.)

- Biology (p. 2)
- Environmental Science (p. 2) (also listed in Department of Earth and Environmental Sciences)

Undergraduate Majors (B.A.)

- Biology (p. 4)
- Biology 3+1 Joint (p. 4)
- Biology: Biomedical Emphasis (p. 5)
- Biology: Ecology, Evolution and Organismal Biology Emphasis (p. 6)
- Biology-Teaching (p. 7)
- Environmental Resource Management (p. 7) (also listed in Department of Geography, Department of Earth and Environmental Sciences, and Department of Health, Recreation and Community Services)

Minors

- Biology (p. 11)
- Biology-Teaching (p. 12)

Graduate Major (M.S.)

- Biology (p. 12)

Major programs are offered by the Department of Biology in two baccalaureate areas: the Bachelor of Arts and the Bachelor of Science. The Bachelor of Science degree is recommended for most students preparing for graduate study in biology. The Bachelor of Arts degree provides a choice among several tracks depending upon student interest and/or career plans.

Note: Students should submit their declaration of a biology major early in their college programs. This will permit them to plan their major courses with a department advisor to avoid future conflicts. Transfer students with previous courses in biology, zoology, or botany must have transfer courses evaluated to avoid duplication and possible loss of credit. Decisions regarding UNI major courses and transfer credits should be approved by the department head.

Academic Standard Policy

Majors

1. Students should indicate their interest in majoring in biology by filling out a Declaration of Curriculum form any time after their admission to UNI.
2. A student's freshman year shall be devoted primarily to completing the required course work in general biology (BIOL 2051 General Biology: Organismal Diversity and BIOL 2052 General Biology: Cell Structure and Function) and chemistry (CHEM 1110 General Chemistry I and CHEM 1120 General Chemistry II, or CHEM 1130 General Chemistry I-II). UNIFI/General Education and/or math classes should be taken by students to complete their schedules.
3. For the BS Biology, the BS Environmental Science, the BA Biology, the BA Biology Biomedical Emphasis, the BA Biology-Teaching, and the BA Biology Ecology, Evolution and Organismal Biology emphasis, students must receive a grade of C- (1.67) or higher in courses that are applied to their major. Prior to enrollment in a course, all prerequisites must be completed with a C- (1.67) or higher.
4. ALEKS is a mathematics placement exam used at the University of Northern Iowa. Your academic advisor will use your score on the ALEKS assessment to determine your placement in UNI mathematics, chemistry, and physics courses.
5. A student enrolled in a biology class during fall or spring semester, or who drops a biology course after the first seven days of classes, should contact the department if they want to take the class again in an immediately subsequent semester. The student will only be allowed to register if space remains after all advanced registrations are completed.
6. To graduate from UNI with a BS Biology, a BA Biology, a BA Biology Biomedical Emphasis, or a BA Biology Ecology, Evolution and Organismal Biology emphasis, students must have both a cumulative and a major UNI GPA of 2.00 or higher, with a grade of C- (1.67) or higher in all courses that are applied to the major. To graduate from UNI with a BA Biology-Teaching, students must have both a cumulative and a major UNI GPA of 2.50 or higher, with a grade of C- (1.67) or higher in all courses that are applied to the major.
7. With the exception of the Biology 3+1 Joint program, to graduate from UNI with a biology major, students must take at least seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.
8. Transfer students entering UNI shall be subject to the acceptance requirements listed in #3.

Minors

To graduate from UNI with a biology minor, students must have both a cumulative and a minor UNI GPA of **2.00** or higher, with a grade of C- (1.67) or higher in all courses that are applied to the minor.

Notes:

1. A student can declare only **one** major within the Department of Biology.
2. A student with a major within the Department of Biology cannot declare a Biology minor or a Biology-Teaching minor.
3. A student with a major in the interdisciplinary B.A. Environmental Resource Management: Ecosystems Track may not also declare a major or minor in biology.

4. A student with a major in the interdisciplinary B.S. Environmental Science: Environmental Life Science Track may not also declare a major or minor in biology.

Bachelor of Science Degree Program

Emphasis-Honors Research

Students invited to do Honors Research will complete 4 credit hours of BIOL 3190 Undergraduate Research in Biology and 1 credit hour of BIOL 3191 Senior Thesis. The Biology BS degree is eligible for Honors Research.

Biology Major

The B.S. Biology major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

The Bachelor of Science Biology major is designed to prepare students for careers in areas which require a higher degree of concentration in subject matter and cognate areas, particularly advanced-level courses. This degree is especially appropriate for students planning graduate study. In order to ensure graduation within eight semesters, students should work with advisors early in their programs, as advanced planning for sequenced courses is very important. Field courses offered during the summer program at Iowa Lakeside Laboratory may be accepted for biology elective credit.

Course List

Required: *		
Introductory track:		15
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
BIOL 3100	Evolution, Ecology and the Nature of Science	
BIOL 3140	Genetics	
Biology:		5
BIOL 3190	Undergraduate Research in Biology @	
BIOL 4157/5157	Biostatistics	
Cognate courses:		
Chemistry and Biochemistry:		13-16
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
CHEM 2210	Organic Chemistry I	
CHEM 2220	Organic Chemistry II	
CHEM 2230	Organic Chemistry Laboratory	
Mathematics:		3-4
MATH 1420	Calculus I	
or STAT 1772	Introduction to Statistical Methods	
Physics:		8
PHYSICS 1511	General Physics I	
PHYSICS 1512	General Physics II	
Electives in Biology: †, ^		19
Any BIOL 3000-level or above (excluding BIOL 3101). CHEM 4510/5510 or MATH 1421 will also count as an elective.		
Total hours		63-67

* Students must take at last seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.

† BIOL 3000-level or above, excluding BIOL 3101 Human Anatomy and Physiology I. CHEM 4510/5510 or MATH 1421 will also count as an elective.

^ No more than 4 credits from BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study will be counted toward biology degree requirements.

@This course meets the Bachelor of Science undergraduate research course requirement.

Environmental Science Major

The B.S. Environmental Science program will include two curricular paths for students, one with a life science emphasis and the other with an earth science emphasis. The program will enable students to prepare for a graduate program in the environmental sciences or to directly enter industry in the public or private sector. All students will have a common core of courses providing a foundation in biology and geosciences, and will also be required to take part in a capstone research project.*

For students pursuing the B.S. Environmental Science major, the Department of Biology will waive BIOL 2052 as a prerequisite for BIOL 3000-level courses.

For students pursuing the B.S. Environmental Science major, the Department of Biology will waive BIOL 3140 as a prerequisite for BIOL 4000-level courses.

A student with a major in the interdisciplinary B.S. Environmental Science: Environmental Life Science Track may not also declare a major or minor in biology.

Required Core		
BIOL 2051	General Biology: Organismal Diversity	4
BIOL 3100	Evolution, Ecology and the Nature of Science	3
Chemistry and Biochemistry		5-8
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
EARTHSCI 1200	Elements of Weather	3
EARTHSCI 1300	Introduction to Geology	4
GEOG 2410	Geographic Information Systems I	3
MATH 1420	Calculus I	4
BIOL 3190	Undergraduate Research in Biology	3
or EARTHSCI 4400	Undergraduate Research in Earth and Environmental Science	

Choose one of the following tracks outlined below:		**33**
Environmental Life Sciences Track		
Environmental Earth Science Track		
Total Hours		**62-65**

Environmental Life Sciences Track

Required:		
BIOL 4157/5157	Biostatistics	3
BIOL 4168/5168	Ecology	4
Electives:		26
Pick courses from each of the three categories (A, B, & C) to accumulate to a minimum of 26 hours.		
Category A - Content Policy Related Courses (select a minimum of 2 courses)		
BIOL 4105/5105	Wildlife Ecology and Management	
BIOL 4108/5108	Biodiversity Conservation Policy	
BIOL 4167/5167	Conservation Biology	
BIOL 4180/5180	Restoration Ecology	
Category B - Content Biology Related Courses (select a minimum of 2 courses)		
BIOL 3109/5109	Plants of North America	
BIOL 3120	Plant Diversity and Evolution	
BIOL 3151	General Microbiology	
BIOL 3170	Entomology	
BIOL 4164/5164	Mammalogy	
Category C - Cognates (select a minimum of 2 courses)		
CHEM 2040	Applied Organic and Biochemistry	
or CHEM 2210	Organic Chemistry I	
EARTHSCI 1320	Earth History	
EARTHSCI 3210/5210	Meteorology	
EARTHSCI 3230/523	Air Quality	
EARTHSCI 3325/532	Sedimentary Geology	
EARTHSCI 3330/533	Geomorphology	
EARTHSCI 3340/534	Oceanography	
EARTHSCI 3345/534	Environmental Geology	
EARTHSCI 3350/535	Environmental Hydrology	
EARTHSCI 3355/535	Hydrogeology	
EARTHSCI 3360/536	Field and Laboratory Methods in Hydrology	
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 3220	Environmental Geography: Variable Topic **	
GEOG 4370/5370	Remote Sensing of the Environment	
GEOG 4320/5320	Geographic Information Systems II	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4240/5240	The Ice Age **	
MATH 1421	Calculus II	
Total Hours		**33**

Environmental Earth Science Track

Required:		
EARTHSCI 3230/5230	Air Quality	4
EARTHSCI 3345/5345	Environmental Geology	3
EARTHSCI 3350/5350	Environmental Hydrology	3
Electives:		23
Pick courses from each of the Categories (A & B) to accumulate a minimum of 23 hours		
Category A - Physical Environment Relate Courses (select a minimum of 4 courses)		
EARTHSCI 1320	Earth History	
EARTHSCI 1400	Introduction to Environmental Earth Science	
EARTHSCI 3210/5210	Meteorology	
EARTHSCI 3240/524	Air Quality Modeling	
EARTHSCI 3250/525	Measurement and Analysis of Air Quality	
EARTHSCI 3322	Earth Materials	
EARTHSCI 3325/532	Sedimentary Geology	
EARTHSCI 3327/532	Paleoclimatology	
EARTHSCI 3330/533	Geomorphology	
EARTHSCI 3340/534	Oceanography	
EARTHSCI 3355/535	Hydrogeology	
EARTHSCI 3360/536	Field and Laboratory Methods in Hydrology	
Category B - Cognates (select a minimum of 2 courses)		
BIOL 3109/5109	Plants of North America	
BIOL 3120	Plant Diversity and Evolution	
BIOL 3170	Entomology	
BIOL 4105/5105	Wildlife Ecology and Management	
BIOL 4108/5108	Biodiversity Conservation Policy	
BIOL 4157/5157	Biostatistics	
BIOL 4164/5164	Mammalogy	
BIOL 4167/5167	Conservation Biology	
BIOL 4168/5168	Ecology	
BIOL 4180/5180	Restoration Ecology	
CHEM 2040	Applied Organic and Biochemistry	
or CHEM 2210	Organic Chemistry I	
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 3220	Environmental Geography: Variable Topic **	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4320/5320	Geographic Information Systems II	
GEOG 4230/5230	Rivers	
GEOG 4240/5240	The Ice Age **	

GEOG 4370/5370	Remote Sensing of the Environment	
MATH 1421	Calculus II	
Total Hours		**33**

* Students must receive a grade of C- (1.67) or higher in courses that are applied to their major. Prior to enrollment in a course, all prerequisites must be completed with a C- (1.67) or higher.

** These courses have additional prerequisites as follows:
GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor.
GEOG 4240/5240 has prerequisite of GEOG 1210; GEOG 2210; EARTHSCI 1300.

Bachelor of Arts Degree Programs

Emphasis-Honors Research

Students invited to do Honors Research will complete 4 credit hours of BIOL 3190 Undergraduate Research in Biology and 1 credit hour of BIOL 3191 Senior Thesis. The following BA degrees are eligible for Honors Research: Biology BA, Biology: Biomedical BA, and Biology: Ecology, Evolution and Organismal Biology BA.

Biology Major

The B.A. Biology major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

This major provides a broad training in biology but allows different specializations through choice of electives. Students who select this major to prepare themselves for graduate study in the biological sciences should consult with their advisor for elective courses. Field courses offered during the summer program at Iowa Lakeside Laboratory may be accepted for biology elective credit.

Required: *		
Introductory track:		15
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
BIOL 3100	Evolution, Ecology and the Nature of Science	
BIOL 3140	Genetics	
Cognate courses:		
Chemistry and Biochemistry:		9-13
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
CHEM 2210 & CHEM 2230	Organic Chemistry I and Organic Chemistry Laboratory	
or CHEM 2040	Applied Organic and Biochemistry	
Mathematics:		3-5
Select one of the following:		
MATH 1120 & MATH 1130	Mathematics for Biological Sciences and Trigonometry	
MATH 1140	Precalculus	
MATH 1420	Calculus I	
STAT 1772	Introduction to Statistical Methods	
Earth Science/Physics (select one of the following):		8
EARTHSCI 1300 & EARTHSCI 1320	Introduction to Geology and Earth History	
PHYSICS 1511 & PHYSICS 1512	General Physics I and General Physics II	
Electives in Biology: †, ^		18
BIOL 3000-level or above (excluding BIOL 3101). CHEM 2220 or CHEM 4510/5510 will also count as an elective.		
Total hours		53-59

* Students must take at last seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.

† BIOL 3000-level or above, excluding BIOL 3101 Human Anatomy and Physiology I. CHEM 2220 or CHEM 4510/5510 will also count as an elective.

^ No more than 4 credits from BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study will be counted toward biology degree requirements.

Biology 3+1 Joint Major

Students interested in one of the following professional programs may complete the basic work on the University of Northern Iowa campus and transfer back to UNI a year's credit from the professional school to complete the requirements for a Bachelor of Arts degree in Biology at UNI:

- Chiropractic
- Medical Laboratory Sciences
- Nursing 3+1
- Doctor of Podiatric Medicine

A student shall complete the core and cognate requirements for the B.A. (Joint Program Option) in Biology, an additional 10 credits at the BIOL 3000/4000 level, and have a total of 90 semester hours recognized by UNI, at least 32 of which were completed at UNI. The professional courses transferred must bring the total hours to at least 120 semester hours. Credit is accepted only from professional schools which are fully accredited. Details of the B.A. (Joint Program Option) are available from the Biology Department.

The student must know the requirements for entrance to the professional school so as to be able to take at the University of Northern Iowa the work required for admission while at the same time meeting UNI degree requirements. The student will work with the Biology Department advisor who will help in the selection of proper courses.

A student who meets the above requirements may use professional credit from one of the approved professional programs with which

the Department of Biology has an articulation agreement to satisfy the remaining hours required for the baccalaureate degree at the University of Northern Iowa. The student shall have completed all of the specific requirements for the B.A. (Joint Program Option).

Required:

Introductory Track		15
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
BIOL 3100	Evolution, Ecology and the Nature of Science	
BIOL 3140	Genetics	
Cognate Courses:		
Chemistry and Biochemistry:		9-13
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
CHEM 2210 & CHEM 2230	Organic Chemistry I and Organic Chemistry Laboratory	
or CHEM 2040	Applied Organic and Biochemistry	
Mathematics:		3-5
Select one of the following:		
MATH 1120 & MATH 1130	Mathematics for Biological Sciences and Trigonometry	
MATH 1140	Precalculus	
MATH 1420	Calculus I	
STAT 1772	Introduction to Statistical Methods	
Earth Science/Physics (select one of the following):		8
EARTHSCI 1300 & EARTHSCI 1320	Introduction to Geology and Earth History	
PHYSICS 1511 & PHYSICS 1512	General Physics I and General Physics II	
Electives in Biology (3000/4000 level) [^]		10
Total Hours		**45-51**

[^] No more than 4 credits from BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study will be counted toward biology degree requirements.

Biology Major: Biomedical Emphasis

The B.A. Biology Major: Biomedical Emphasis requires a minimum of 120 total hours to graduate. This total includes UNIFI/ General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

This major offers basic preparation to students for allopathic, osteopathic, chiropractic, pharmacy, physical therapy, dental, veterinary, optometric, podiatric and other health-related programs. In addition, it prepares students for graduate study in biomedical sciences, e.g., pharmacology, toxicology, pathology, physiology, cellular biology, and related areas. Students should seek advice and information early in their programs so that individual goals and specific additional requirements of some graduate and professional programs can be considered in curricular planning.

Required: [*]

Introductory track:		15
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
BIOL 3100	Evolution, Ecology and the Nature of Science	
BIOL 3140	Genetics	
Anatomy and Physiology group:		8
BIOL 3101	Human Anatomy and Physiology I	
or BIOL 3106	Vertebrate Anatomy	
BIOL 3102	Human Anatomy and Physiology II	
Cognate courses:		
Chemistry and Biochemistry:		13-16
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
CHEM 2210	Organic Chemistry I	
CHEM 2220	Organic Chemistry II	
CHEM 2230	Organic Chemistry Laboratory	
Mathematics:		3-5
Select one of the following:		
MATH 1120 & MATH 1130	Mathematics for Biological Sciences and Trigonometry	
MATH 1140	Precalculus	
MATH 1420	Calculus I	
STAT 1772	Introduction to Statistical Methods	
Physics:		8
PHYSICS 1511	General Physics I	
PHYSICS 1512	General Physics II	
Electives selected from the following (consult with advisor): [^]		10
BIOL 3106	Vertebrate Anatomy [§]	
BIOL 3108	Medical Histology	
BIOL 3147	Cancer and Emerging Infectious Diseases	
BIOL 3151	General Microbiology	
BIOL 3190	Undergraduate Research in Biology	
BIOL 4114/5114	Comparative Animal Physiology	
BIOL 4116/5116	Neurobiology	
BIOL 4128/5128	Cell Biology	
BIOL 4129/5129	Genomics	
BIOL 4130/5130	Genetic Technologies in Medicine	

BIOL 4137/5137	Advanced Human Physiology	
BIOL 4144/5144	Virology	
BIOL 4146/5146	Developmental Biology of Animals	
BIOL 4150/5150	Immunology	
BIOL 4157/5157	Biostatistics	
BIOL 4164/5164	Mammalogy	
CHEM 4510/5510	Biochemistry I **	
Total hours		57-62

* Students must take at last seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.

^ No more than 3 credits of BIOL 3190 Undergraduate Research in Biology will be counted toward biology elective requirements for this degree. For students pursuing the Honors Emphasis, the remaining credit of BIOL 3190 Undergraduate Research in Biology and BIOL 3191 Senior Thesis will be applied to university electives.

§ If not used to satisfy the Anatomy and Physiology group requirement.

** For students pursuing graduate programs in Allopathic or Osteopathic Medicine, Physician Assistant, or Veterinary Medicine, Biochemistry I (CHEM 4510) and Biochemistry II (CHEM 4520) are recommended and would satisfy a Chemistry minor in addition to the BA Biology Biomedical degree.

Biology Major: Ecology, Evolution and Organismal Biology Emphasis

The B.A. Biology Major: Ecology, Evolution and Organismal Biology Emphasis requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

This emphasis provides training to students interested in organismal and/or ecological biology. This emphasis is appropriate for students interested in a career with private and governmental organizations conducting endangered species recovery, ecological restoration, biological surveys, toxicity evaluations, environmental impact analyses, field research, museum or herbarium curation, or who wish to work in zoos, nature centers, museums, or botanical gardens. This emphasis also provides suitable background for students wishing to pursue graduate degrees in animal behavior, botany, conservation biology, ecology, environmental toxicology, evolutionary biology, systematics, population biology, and zoology. Students should seek advice and information early in their programs so that individual goals and specific additional requirements of some graduate and professional programs can be considered in curricular planning. Field courses offered during the summer program at Iowa Lakeside Laboratory may be accepted for biology elective credit.

Required: *

Introductory track:		15
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
BIOL 3100	Evolution, Ecology and the Nature of Science	
BIOL 3140	Genetics	
Cognate courses:		
Chemistry and Biochemistry:		5-8
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II	
or CHEM 1130	General Chemistry I-II	
Mathematics:		3-5
Select one of the following:		
MATH 1120 & MATH 1130	Mathematics for Biological Sciences and Trigonometry	
MATH 1140	Precalculus	
MATH 1420	Calculus I	
STAT 1772	Introduction to Statistical Methods	
Physical Science		4
EARTHSCI 1300	Introduction to Geology	
or PHYSICS 1511	General Physics I	
Electives: select from the following (consult with advisor):		26
Biology: ^		
BIOL 3106	Vertebrate Anatomy	
BIOL 3109/5109	Plants of North America	
BIOL 3120	Plant Diversity and Evolution	
BIOL 3160	Field Zoology of Vertebrates	
BIOL 3170	Entomology	
BIOL 3174	Field Biology: _____	
BIOL 3185	Readings in Biology	
BIOL 3190	Undergraduate Research in Biology	
BIOL 4105/5105	Wildlife Ecology and Management	
BIOL 4108/5108	Biodiversity Conservation Policy	
BIOL 4114/5114	Comparative Animal Physiology	
BIOL 4137/5137	Advanced Human Physiology	
BIOL 4142/5142	Evolutionary Biology	
BIOL 4146/5146	Developmental Biology of Animals	
BIOL 4157/5157	Biostatistics	
BIOL 4164/5164	Mammalogy	
BIOL 4167/5167	Conservation Biology	
BIOL 4168/5168	Ecology	
BIOL 4172/5172	Developmental Plant Anatomy	
BIOL 4180/5180	Restoration Ecology	
BIOL 4198	Independent Study	
CHEM 2040	Applied Organic and Biochemistry	
or CHEM 2210 & CHEM 2230	Organic Chemistry I and Organic Chemistry Laboratory	
GEOG 2410	Geographic Information Systems I	

or GEOG 4220/522	Soils and Landscapes	
Total hours		53-58

* Students must take at last seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.

^ No more than 4 credits from BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study will be counted toward biology degree requirements.

Biology Major-Teaching

The B.A. Biology-Teaching major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements, the Professional Education Requirements, and the following specified major requirements to complete the minimum of 120 hours.

The Biology Teaching major provides a broad education in biology. Along with professional education courses and student teaching, this curriculum is a sound preparation for teaching life science, biology, and other secondary science courses. This is an extended program requiring at least nine semesters; therefore, students should contact their advisors early in their program. This program is an excellent preparation for graduate work in biology or science education.

This major leads to endorsement #151 5-12 Biological Science.

Required: *		
Introductory track:		
BIOL 2051	General Biology: Organismal Diversity	4
BIOL 2052	General Biology: Cell Structure and Function	4
BIOL 3100	Evolution, Ecology and the Nature of Science	3
BIOL 3140	Genetics	4
Evolutionary Biology:		
BIOL 4142/5142	Evolutionary Biology	3
Plant group:		4
Select one of the following:		
BIOL 3109/5109	Plants of North America	
BIOL 3120	Plant Diversity and Evolution	
BIOL 4172/5172	Developmental Plant Anatomy	
Animal group:		4
Select one of the following:		
BIOL 3102	Human Anatomy and Physiology II **	
BIOL 3106	Vertebrate Anatomy	
BIOL 4114/5114	Comparative Animal Physiology	
BIOL 4146/5146	Developmental Biology of Animals	
Cellular group:		4
Select one of the following:		
BIOL 3151	General Microbiology	
BIOL 4128/5128	Cell Biology	
Cognate courses:		
Chemistry and Biochemistry:		
CHEM 1110	General Chemistry I	4
CHEM 1120	General Chemistry II ^	4
CHEM 2040	Applied Organic and Biochemistry	4
Earth Science:		
EARTHSCI 1320	Earth History ^^	4
Physics:		
PHYSICS 1511	General Physics I	4
Methods:		
Science and Science Education:		
SCI ED 3300/5300	Orientation to Science Teaching	4
SCI ED 4800/5800	Methods for Teaching Secondary Science or MTSS (Methods for Teaching Secondary Science)	3
Teaching:		
TEACHING 3129	Secondary and Special-Area Classroom Management	1
Biology:		
Electives in Biology: †		4
Total Hours		**62**

* Students must take at last seven (7) hours of 4000-level biology coursework pertinent to their major, with four (4) of those hours being taken at UNI.

** BIOL 3101 is a prerequisite for BIOL 3102. Students who take BIOL 3101 Human Anatomy and Physiology I will receive university elective credit. BIOL 3102 Human Anatomy and Physiology II will fulfill the Animal Group requirement. BIOL 3102 Human Anatomy and Physiology II cannot count as biology elective credit if used to fulfill the Animal Group requirement.

^ Students with excellent preparation in chemistry may substitute CHEM 1130 General Chemistry I-II plus 3 additional credit hours of biology or chemistry electives for CHEM 1110 General Chemistry I and CHEM 1120 General Chemistry II.

† Not more than four (4) semester hours of credit from BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study will be accepted for biology elective credit.

^^ EARTHSCI 1320 has a prerequisite of EARTHSCI 1300. This prerequisite is waived for Biology Teaching majors.

Environmental Resource Management Major

The Environmental Resource Management major is aimed at students searching for career options in the broadly-defined 'outdoor environment' that are related to natural resources, environmental systems, and sustainable development. This program will prepare students for careers in the environmental and human management of public and private spaces across differing categories of environmental systems - from public parks and lands to conservancy units managed by governmental and other non-profit agencies and organizations. This program aims to serve those students who do not wish to pursue careers as environmental scientists *per se* from more tightly focused 'environmental science' programs.

- *STUDENTS ARE REQUIRED TO TAKE THE CORE REQUIREMENTS (31 HOURS) AND MAY CHOOSE ONLY ONE OF THE FOUR SPECIALIZATION TRACKS (30-32 HOURS).*
- *Each track is composed of clusters of courses with a specific concentration, each of which has a separate hourly requirement.*
- *For purposes of this degree program, those prerequisite courses required by BIOL, EARTHSCI, GEOG, and RTNL for mid/upper-level courses in each Track THAT ARE NOT INCLUDED IN THE CORE REQUIREMENTS will normally be waived by the appropriate departments.*
- *The separate tracks allow students to specialize in the area of most general interest while the primary & secondary foci within each track make sure students also are exposed to a wide range of important auxiliary coursework.*
- *A student with a major in the interdisciplinary B.A. Environmental Resource Management: Ecosystems Track may not declare another major or minor in biology.*
- *By permission of the Provost's Office, students enrolled in the B.A. Environmental Resource Management major will be considered majors in all four of the participating departments.*

Core Requirements

BIOL 2051	General Biology: Organismal Diversity	4
BIOL 3100	Evolution, Ecology and the Nature of Science *	3
CHEM 1110	General Chemistry I	4
EARTHSCI 1300	Introduction to Geology	4
or		
GEOG 1210 & GEOG 1211	Planet Earth and Planet Earth Laboratory	
EARTHSCI 3330/5330	Geomorphology	4
GEOG 2260	Environmental Resource Management	3
GEOG 2410	Geographic Information Systems I	3
RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
HIST 4170/5170	U.S. Environmental History	3
Total Hours		**31**

* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive the BIOL 2052 and CHEM 1120 prerequisites for enrollment into BIOL 3100.

Encouraged Certificates: Certificate programs that are appropriate to couple with the ERM major and help to expand specific, relevant experiences for students.

- GIS & Cartography (Department of Geography)

- Sustainability (Interdisciplinary)

- Outdoor Recreation (Department of Health, Recreation and Community Services)

- Tourism (Department of Health, Recreation and Community Services)

- Nonprofit Management Certificate (Department of Health, Recreation and Community Services)

- Environmental Health Certificate (Department of Health, Recreation and Community Services)

- Public History (Department of History)

Ecosystems Track

A total of 31-32 hours are needed for this track. There are 11-12 hours of required courses. In addition, student select courses from all three elective categories (A, B, & C) to accumulate to a minimum of 20 hours. At least one course must be taken from each elective category.

Required		
BIOL 4168/5168	Ecology **	4
CHEM 1120	General Chemistry II §	4
MATH 1140	Precalculus	3-4
or STAT 1772	Introduction to Statistical Methods	
Electives:		**20**
Category A - Content Management Related Courses (pick at least 1 course)		
BIOL 4105/5105	Wildlife Ecology and Management **	
BIOL 4108/5108	Biodiversity Conservation Policy **	
BIOL 4167/5167	Conservation Biology **	
BIOL 4180/5180	Restoration Ecology **	
Category B - Content Related Courses (pick at least 1 course)		
BIOL 3109/5109	Plants of North America	
BIOL 3160	Field Zoology of Vertebrates *	
BIOL 3170	Entomology *	
BIOL 4157/5157	Biostatistics **	
BIOL 4164/5164	Mammalogy **	
BIOL 4172/5172	Developmental Plant Anatomy **	
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 4320/5320	Geographic Information Systems II	
Category C - Cognates (pick at least 1 course)		
EARTHSCI 1200	Elements of Weather	
ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers ^	
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 2240	Natural Hazards and Disasters	
GEOG 3179	Cooperative Education in Geography ^	
or BIOL 3179	Cooperative Education	
or EARTHSCI 3430	Internship	
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership	

or PH 4180	Internship
GEOG 3220	Environmental Geography: Variable Topic ^
GEOG 4220/5220	Soils and Landscapes
GEOG 4270/5270	Science of Scenery
GEOG 4240/5240	The Ice Age ^
GEOG 4250/5250	Laboratory Methods in Environmental Geography
GEOG 4370/5370	Remote Sensing of the Environment
MGMT 3183	Leadership Skills ^
MGMT 3185	Project Management ^
RTNL 2120	Foundations of Tourism
RTNL 4553/5553	Trends and Issues in Outdoor Recreation
RTNL/HIST 4556	History of Outdoor Recreation
Total Hours	**31-32**

* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 2052 and CHEM 1120 for BIOL 3000-level courses.

** For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 3140 as a prerequisite for BIOL 4000-level courses.

§ Students pursuing the Ecosystems track can take CHEM 1110 and CHEM 1120 (8 credits) OR CHEM 1130 (5 credits). CHEM 1130 is designed for students with exceptional preparation in Chemistry. Taking CHEM 1130 changes the total degree requirement from 62-63 credit hours to 59-60 credit hours.

^ These courses have additional prerequisites as follows:
ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.
GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor.
GEOG 4240/5240 has prerequisites of GEOG 1210; GEOG 2210; EARTHSCI 1300; or consent of instructor; junior standing.
MGMT 3183 has a prerequisite of MGMT 3965/5965.
GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.
RTNL 4320 has prerequisites of three (3) credit hours of RTNL 31XX; junior standing. For students pursuing the Environmental Resource Management major, Department of Health, Recreation and Community Services will waive the prerequisites of 3 hours of RTNL 31XX.
RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, Department of Health, Recreation and Community Services will waive this corequisite.
PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

Geosystems Track

A total of 30 hours are needed for this track, with a minimum of 21 hours from the Primary Focus group and 9 hours from the Secondary Focus group.

Electives

Primary Focus - Content Related Courses		**21**
EARTHSCI 1200	Elements of Weather	
EARTHSCI 3350/535	Environmental Hydrology ^	
EARTHSCI 3322	Earth Materials ^	
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 2240	Natural Hazards and Disasters	
GEOG 3220	Environmental Geography: Variable Topic * ^	
or		
EARTHSCI 3345/534	Environmental Geology ***	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4250/5250	Laboratory Methods in Environmental Geography	
GEOG 4370/5370	Remote Sensing of the Environment	
RTNL 2130	Foundations of the Nonprofit Sector	
RTNL 4553/5553	Trends and Issues in Outdoor Recreation	
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment	
Secondary Focus - Management Cognates		**9**
BIOL 4105/5105	Wildlife Ecology and Management **	
BIOL 4180/5180	Restoration Ecology **	
EARTHSCI 3325/532	Sedimentary Geology ****	
EARTHSCI 3360/536	Field and Laboratory Methods in Hydrology	
ECON 3225/5225	Environmental Economics ^	
ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers ^	
GEOG 4170/5170	Climate Action Planning	
GEOG 4240/5240	The Ice Age *	
GEOG 4270/5270	Science of Scenery	
GEOG 4310/5310	GIS Applications: (Variable Topic) ^	
GEOG 4320/5320	Geographic Information Systems II	
RTNL 2120	Foundations of Tourism	
RTNL/HIST 4556	History of Outdoor Recreation	
RTNL 4776/5776	Eco, Adventure and Sport Tourism	
MGMT 3185	Project Management ^	
POL AMER 3172	Public Budgeting ^	
BIOL 3179	Cooperative Education ^	
or GEOG 3179	Cooperative Education in Geography	
or EARTHSCI 3430	Internship	

or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership
or PH 4180	Internship
Other courses as approved by advisors and program director	
Total Hours	**30**

* * For students pursuing the Geosystems Track, the Geography Department will accept GEOG 1210 and GEOG 1211 or EARTHSCI 1300 as the prerequisite for enrollment into all listed Geography courses except GEOG 4310/5310 and GEOG 4320/5320.

**** The Biology Department will waive BIOL 3140 as a prerequisite for BIOL 4105/5105 and BIOL 4180/5180.

***** The Earth and Environmental Sciences Department will accept GEOG 1210 and GEOG 1211 as substitutes for courses that require EARTHSCI 1300.

****** The Earth and Environmental Sciences Department will waive the requirement of EARTHSCI 1320 for EARTHSCI 3325/5325.

The Department of Health, Recreation and Community Services will waive RTNL 2120 as a prerequisite for RTNL 4776/5776.

^ ^ These courses have additional prerequisites as follows:
EARTHSCI 3322 has a prerequisite of EARTHSCI 1300.
EARTHSCI 3350/5350 has prerequisites of EARTHSCI 1300; junior standing.
GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor.
ECON 3225/5225 has prerequisites of ECON 1041, ECON 1051; junior standing.
ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.
GEOG 4310/5310 has prerequisites of GEOG 2410; junior standing.
GEOG 4320/5320 has prerequisites of GEOG 2410 or consent of instructor; junior standing.
POL AMER 3172 has prerequisites of POL AMER 1014; POL AMER 1048.
GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.
RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health Recreation and Community Services will waive this corequisite.
PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

Resource Administration Track

A total of 30 hours are needed for this track, with a minimum of 21 hours from the Primary Focus group and 9 hours from the Secondary Focus group.

Primary Focus - Content Related Courses		**21**
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 2240	Natural Hazards and Disasters	
GEOG 4170/5170	Climate Action Planning	
PH 3720/5720	Environmental and Occupational Health Regulations	
RTNL 2130	Foundations of the Nonprofit Sector	
RTNL 3337	Human Resource Development for Recreation, Tourism and Nonprofit Leadership	
RTNL 4310/5310	Areas and Facilities in Recreation, Tourism and Nonprofit Leadership	
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment	
RTNL/HIST 4556	History of Outdoor Recreation	
RTNL 4776/5776	Eco, Adventure and Sport Tourism	
Secondary Focus - Cognates		**9**
BIOL 4167/5167	Conservation Biology **	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4250/5250	Laboratory Methods in Environmental Geography	
GEOG 4270/5270	Science of Scenery	
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 4320/5320	Geographic Information Systems II	
GEOG 4370/5370	Remote Sensing of the Environment	
ENGLISH 4775/5775	Applied Writing: Specialized Documents ^	
or ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers	
PH 3710/5710	Environmental Health Science	
RTNL 2120	Foundations of Tourism	
RTNL 4552/5552	Theory and Practice of Outdoor Education	
RTNL 4553/5553	Trends and Issues in Outdoor Recreation	
RTNL 4779/5779	Community Planning Workshop	
MGMT 3185	Project Management ^	
POL AMER 3172	Public Budgeting ^	
GEOG 3179	Cooperative Education in Geography ^	
or BIOL 3179	Cooperative Education	
or EARTHSCI 3430	Internship	
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership	
or PH 4180	Internship	
Other courses as approved by advisors and program director		
Total Hours		**30**

* * The Biology Department will waive BIOL 3140 as a prerequisite for BIOL 4167/5167.

**** The Geography Department and the Department of Health, Recreation and Community Services will waive RTNL 2120 as a prerequisite for enrollment into RTNL 4310/5310.

^ ^ These courses have additional prerequisites as follows:
RTNL 4776/5776 has prerequisites of RTNL 2120 or consent of instructor; junior standing.
ENGLISH 4775/5775 has prerequisites of MGMT 2080 or ENGLISH 2770 or consent of instructor; junior standing.
ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.
POL AMER 3172 has prerequisites of POL AMER 1014; POL AMER 1048.
GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.
RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health, Recreation and Community Services will waive this corequisite.
PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

Environmental Compliance Track

A total of 32 hours need for this focus area, with 15 hours of required courses, a minimum of 10 hours from the Primary Focus group and 7 hours from the Secondary Focus group.

Required		
ECON 1041	Principles of Macroeconomics	3
ECON 1051	Principles of Microeconomics	3
ECON 3225/5225	Environmental Economics	3
PH 3720/5720	Environmental and Occupational Health Regulations	3
PHIL 2550	Environmental Ethics	3
Primary Focus - Content Related Courses		**10**
EARTHSCI 1200	Elements of Weather	
EARTHSCI 1400	Introduction to Environmental Earth Science	
EARTHSCI 3230/523	Air Quality ^	
EARTHSCI 3345/534	Environmental Geology *	
or		
GEOG 3220	Environmental Geography: Variable Topic	
EARTHSCI 3350/535	Environmental Hydrology *	
Secondary Focus - Cognates		**7**
EARTHSCI 3240/524	Air Quality Modeling ^	
EARTHSCI 3250/525	Measurement and Analysis of Air Quality ** ^	
EARTHSCI 3325/532	Sedimentary Geology ***	
EARTHSCI 3355/535	Hydrogeology *	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4370/5370	Remote Sensing of the Environment	
PH 3710/5710	Environmental Health Science	
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment	
MGMT 3153	Organizational Management *	
MGMT 3185	Project Management ^	
POL AMER 1048	Introduction to Public Administration	
GEOG 3179	Cooperative Education in Geography ^	
or BIOL 3179	Cooperative Education	
or EARTHSCI 343	Internship	
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership	
or PH 4180	Internship	
Other courses as approved by advisors and program director		
Total Hours		**32**

* * The Earth and Environmental Sciences Department will accept GEOG 1210 and GEOG 1211 as a substitute for courses that require EARTHSCI 1300.
**** The Earth and Environmental Sciences Department will waive EARTHSCI 3230/5230 as a prerequisite for enrollment into EARTHSCI 3250/5250.
***** The Earth and Environmental Sciences Department will waive the requirement for EARTHSCI 1320 for EARTHSCI 3325/5325.
^ ^ These courses have additional prerequisites as follows:
GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor.
EARTHSCI 3240/5240 has prerequisites of EARTHSCI 1200; junior standing.
EARTHSCI 3250/5250 has prerequisites of EARTHSCI 1200; junior standing and a prerequisite or corequisite of EARTHSCI 3230/5230.
GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.
RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health, Recreation and Community Services will waive this corequisite.
PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

Minors

Biology Minor

Required:		
Introductory track:		8
BIOL 2051	General Biology: Organismal Diversity	
BIOL 2052	General Biology: Cell Structure and Function	
Chemistry and Biochemistry:		8
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II *	
Electives in Biology: **		10-12
Total Hours		**26-28**

* Students with excellent preparation in chemistry may substitute CHEM 1130 General Chemistry I-II plus 3 additional credit hours of biology electives for CHEM 1110 General Chemistry I and CHEM 1120 General Chemistry II.

** BIOL 3000/4000-level, excluding BIOL 3101 Human Anatomy and Physiology I, BIOL 3179 Cooperative Education, BIOL 3185 Readings in Biology, BIOL 3190 Undergraduate Research in Biology, and BIOL 4198 Independent Study

Biology Minor-Teaching

The Biology Minor-Teaching provides for second endorsement approval by the Iowa Board of Educational Examiners and requires first endorsement approval (major) in another science discipline or general science.

This minor leads to endorsement #151 5-12 Biological Science. Students must also complete all requirements for a Secondary Education major, including student teaching.

Required:		
Introductory track:		
BIOL 2051	General Biology: Organismal Diversity	4
BIOL 2052	General Biology: Cell Structure and Function	4
BIOL 3100	Evolution, Ecology and the Nature of Science	3
BIOL 3140	Genetics	4
Chemistry and Biochemistry:		8
CHEM 1110 & CHEM 1120	General Chemistry I and General Chemistry II **	
Methods:		
Science and Science Education:		
SCI ED 3300/5300	Orientation to Science Teaching	4
SCI ED 4800/5800	Methods for Teaching Secondary Science or MTSS (Methods for Teaching Secondary Science)	3
Teaching:		
TEACHING 3129	Secondary and Special-Area Classroom Management	1
Total Hours		**31**

** Students with excellent preparation in chemistry may substitute *CHEM 1130 General Chemistry I-II* plus 3 additional credit hours of biology electives for CHEM 1110 General Chemistry I and CHEM 1120 General Chemistry II.

Master of Science Degree Program

Major in Biology

This major is available for students seeking an extensive research experience. Students interested in enrolling in the program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNIverse Student Center To-Do list or contact the Department of Biology for any other application requirements. Applications should include three recommendations and transcripts of undergraduate and graduate credits. Graduate information and application for graduate admission can be found at https://admissions.uni.edu/application.

The Graduate Record Examination (General Test) **is not** required for admission to the program.

Only graduate courses (course numbers 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.

This major is available on the **thesis** option only. A **minimum of 30 semester hours** is required, including a minimum of 21 hours of normal course work and a maximum of 9 hours of thesis research. **A minimum of 18 hours of 6000-level course work is required.**

Students are required to pass an oral comprehensive examination in defense of their final thesis.

This program is flexible and designed to allow students, working with their advisory committee, to tailor a program to fit student interests and aspirations in biology.

Required:		
Biology:		9
BIOL 6202	Graduate Colloquium and Scientific Skills (2 hr. each semester for four semesters)	
BIOL 6292	Research Methods in Biology (1 hr.)	
Research:		9
BIOL 6299	Research	
Electives: *		12
Total Hours		**30**

* 100g/5000-level or above, excluding BIOL 6299 Research.

Biology, B.S.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in biological topics of the student's interest in areas including anatomy, physiology, genetics, organismal development, ecology, evolution, and/or organismal biology. Students will be able to think critically and communicate effectively on these discipline-specific topics. Students in the BS program will gain deeper exposure to the process of science through Undergraduate Research (BIOL 3190) and through Biostatistics (BIOL 4157).

Outcomes:

1. Students will show proficiency in advanced content from their areas of interest in the fields of anatomy, physiology, development, cellular biology, immunology, genetics, ecology, evolution, and/or organismal biology.
2. Students will communicate effectively using discipline-specific vocabulary and standard scientific communication skills such as graphical representation of data.

3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to living organisms.
4. Students will gain first-hand experience with the process of scientific inquiry by participating in a specific line of research.
5. Students will become proficient in common statistical methods used in biology.

Biology, B.A.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in biological topics of the student's interest in areas including anatomy, physiology, genetics, organismal development, ecology, evolution, and/or organismal biology. Students will be able to think critically and communicate effectively on these discipline-specific topics.

Outcomes:

1. Students will show proficiency in advanced content from their areas of interest in the fields of anatomy, physiology, development, cellular biology, immunology, genetics, ecology, evolution, and/or evolutionary biology.
2. Students will communicate effectively using discipline-specific vocabulary and standard scientific communication skills such as graphical representation of data.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to living organisms.

Biology: Biomedical Major, B.A.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in topics related to biomedical fields. Students will be able to think critically and communicate effectively on these discipline-specific topics.

Outcomes:

1. Students will show proficiency in advanced content from their areas of interest in the fields of anatomy, physiology, development, cellular biology, immunology, and/or genetics.
2. Students will communicate effectively using discipline-specific vocabulary and standard scientific communication skills such as graphical representation of data.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to living organisms.

Biology: Ecology, Evolution and Organismal Biology, B.A.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in topics in ecology, evolution, and organismal biology. Students will be able to think critically and communicate effectively on these discipline-specific topics.

Outcomes:

1. Students will show proficiency in advanced content from the fields of ecology, evolution, and/or organismal biology that will allow students to explain biodiversity and the relationship of living things with their environment and with each other.
2. Students will communicate effectively using discipline-specific vocabulary and standard written and oral scientific communication skills.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to natural systems.

Biology Teaching, B.A.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in biological topics of the student's interest in areas including anatomy, physiology, genetics, organismal development, ecology, evolution, and/or organismal biology. Students will be able to think critically and communicate effectively on these discipline-specific topics in ways that allow them to become excellent educators.

Outcomes:

1. Students will show proficiency in advanced content from their areas of interest in the fields of anatomy, physiology, development, cellular biology, immunology, genetics, ecology, evolution, and/or evolutionary biology.
2. Students will communicate effectively using appropriate teaching strategies for a classroom setting.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to living organisms.

Environmental Resource Management: Ecosystems Track, B.A.

Goals: Students will gain an understanding of major themes in biology related to ecosystems (organization of life, diversity and its causes) along with deeper exposure to and advanced competency in topics related to ecosystems and their management. Students will be able to think critically and communicate effectively on these discipline-specific topics.

Outcomes:

1. Students show proficiency in advanced content from the fields of ecology, evolution, and organismal biology that will allow students to evaluate issues important to modern ecosystem management.
2. Students will communicate effectively using discipline-specific vocabulary and standard written and oral scientific communication skills.

3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to natural systems.

Environmental Science, Environmental Life Science Track, B.S.

Goals: Students will gain an understanding of major themes in biology (organization of life, diversity and its causes, genetics, and cellular biology) along with deeper exposure to and advanced competency in topics in environmental science. Students will be able to think critically and communicate effectively on these discipline-specific topics. Students in the BS program will gain deeper exposure to the process of science through Undergraduate Research (BIOL 3190) and through Biostatistics (BIOL 4157).

Outcomes:

1. Students will show proficiency in advanced content in environmental science.
2. Students will communicate effectively as evidenced by use of discipline-specific vocabulary and standard scientific communication skills such as graphical representation of data.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to living organisms.
4. Students will gain first-hand experience with the process of scientific inquiry by participating in a specific line of research.
5. Students will become proficient in common statistical methods used in biology.

Biology, M.S.

Goals: Students will gain an advanced understanding of a sub-discipline within biology through advanced biology coursework. Students will develop an understanding of the nature of science and learn critical thinking skills by completing a research project that advances knowledge in their subdiscipline. Students will generate data, analyze and interpret data, and present data in thesis format. Students will improve communication skills through scientific writing and oral communication in formal settings.

Outcomes:

1. Students will show proficiency in content chosen from the student’s area of interest in the fields of ecology, evolution, organismal biology, physiology, development, cellular biology, immunology, and/or genetics.
2. Students will communicate effectively on the topic of their research using discipline-specific vocabulary and standard written and oral scientific communication skills.
3. Students will be proficient in discipline-specific research techniques, allowing the student to think critically as needed to solve problems new to science.