

Admission Requirements for the Biology Major

New freshmen admitted to USU in good standing qualify for admission to this major.

Transfer students from other institutions need a 2.25 transfer GPA and students transferring from other USU majors need a 2.25 cumulative GPA for admission to this major.

The Program

The Department of Biology offers programs leading to a Bachelor of Science or Bachelor of Arts degree with the Biology Major. Students complete a required core of courses which provide an understanding of biological principles and upper-division courses which provide integration, in-depth study, and an opportunity for specialization within the different degree emphases. Additional coursework in chemistry, physics, statistics, and mathematics provides knowledge and analytical skills in these related fields.

Biology degrees provide a foundation for graduate work or employment in research, industry, or governmental agencies. Four different emphases are available within the Biology major. The **Biology Emphasis** is the most flexible option. Electives may be selected in whatever sub-discipline the student wishes to emphasize (e.g. botany, ecology, zoology, entomology, microbiology, etc). Many students interested in a health profession pursue the Biology Major with the Biology Emphasis. The **Cellular/Molecular Emphasis** and **Ecology/Biodiversity Emphasis** provide more directed training that is appropriate for research or other technical employment in academic institutions, government agencies, and the private sector. The **Environmental Emphasis** prepares students in the biological and physical sciences as they relate to environmental problems and provides practical training for employment at the bachelor's degree level. Biology majors can add a minor in another area of study, such as business or chemistry, to enhance their employment opportunities.

The **Human Biology Emphasis** is designed to fulfill the academic course requirements for entrance to most medical or dental schools in the United States and Canada. Students should become familiar with the specific requirements for each of the medical, dental or other health professional schools to which they will apply. The minimum requirements in the sciences typically are: BIOL 1610, 1615, 1620, 1625; CHEM 1210, 1215, 1220, 1225, 2310, 2315, 2320, 2325; PHYS 2110, 2120; and MATH 1210. BIOL 2320, 2420, 3060, 3300, 5210; and CHEM 3700, 3710 are highly recommended. In addition, many schools require a full year of English Composition (AP English does not count). Experience has shown that one's chances of being admitted to professional school are notably enhanced by additional upper-division biology and advanced written communication courses. A variety and number of carefully selected courses in the humanities and social sciences should be elected beyond those required for the University Studies requirements. Courses in deductive logic, bioethics, medical sociology, and diversity focusing on culture, history and/or current circumstances of non-dominant population groups are useful for a well-rounded background. This provides an eclectic background that is generally favored by medical and dental school admission boards. Prehealth students should take advantage of the resources offered by the Prehealth Advising Office, located in the TSC, Exploratory Advising 304, or 435-797-3373.

Biology Advising Center

All students should contact their academic advisor for assistance with course selection, program planning, and meeting graduation requirements. The Biology Advisor, Josh Wardle (josh.wardle@usu.edu), and Department of Biology Director of Undergraduate Studies, Dennis Welker (dennis.welker@usu.edu) are available to provide all undergraduate majors with additional information regarding specific programs and career opportunities. The **Biology Advising Center** is located in BNR 101. Additional information is available at <http://www.biology.usu.edu> or by calling 435-797-2652. For Biology majors pursuing Prehealth interests, the **Prehealth Advising Office** provides resources on preparing for health professions, including preparatory coursework and extracurricular activities. Yvonne Kobe (yvonne.kobe@usu.edu) is located in the TSC, Exploratory Advising 304, phone 435-797-3373.

Departmental Honors

Biology majors enrolled in the Honors Program (or those with at least a 3.5 GPA) may earn Departmental Honors by completing 9 credits of upper-division (3000 and above) honors Biology or Public Health coursework, 3 credits of BIOL 5800, and 3 credits of a research-based Bachelor's Thesis (BIOL 5810). For further information, contact Dr. Kimberly Sullivan, BNR 313, 435-797-3713, vejunco@biology.usu.edu.

Other Undergraduate Degrees offered through the Department of Biology

- **Composite Teaching-Biological Science:** BS, BA
Advisor: Richard Mueller, richard.mueller@usu.edu
- **Public Health:** BS
Advisor: Carl Farley, carl.farley@usu.edu
Emphases: Industrial Hygiene
Environmental Health
Public Health Education

Minors offered by the Biology Department

Biology Minor: This minor requires completion of the following: BIOL 1610, 1615, 1620 and 1625 (each with a C- or better); and 12 credits of upper division (3000 or above) BIOL prefix elective credits. BIOL 2220 may be used towards the 12 elective credits. A minimum GPA of 2.25 is required in this coursework.

BioMath Minor: This minor requires math and quantitative biology courses beyond those required for basic biology degrees. A minimum GPA of 2.25 is required in this coursework with a C- or better in BIOL 1610, 1615, 1620 and 1625. Biology majors may take this minor through the Mathematics and Statistics Department.

Public Health Minor: This minor requires the completion of the following: BIOL 1610, 1615, 1620, and 1625 (each with a C- or better); and 12 upper division public health (PUBH) elective credits. A minimum GPA of 2.50 is required in this coursework.

Graduation Requirements

Candidates for the **Bachelor of Science Degree** or **Bachelor of Arts Degree** with a Biology Major must meet all of the minimum requirements for the University, College of Science, and Department of Biology. In addition to the requirements listed on this sheet, a **BA Degree** candidate must receive foreign language training. All candidates for BS and BA degrees should refer to the [General Catalog](#) for more detailed information on degree requirements.

Minimum University Requirements

Total Credits	120
Grade point average.....	2.00 GPA
Credits of C- or better.....	100
Credits of upper-division courses (3000 or above).....	40
USU Credits (20 must be upper division, including 10 required by the major)	30
Completion of approved major program of study.....	
Credits in American Institutions.....	3
University Studies Requirements.....	

Minimum College of Science Requirements

All college requirements are met by completing the Biology Major degree requirements; no additional coursework is required.

Changes in Graduation/Catalog Requirements

Students who can complete a baccalaureate degree within seven years of enrollment at USU can qualify for graduation by meeting (1) the General Education/University Studies requirements in effect when they initially enrolled and (2) the major requirements in effect when they officially declared their major, even though there may have been changes in the University Studies and major requirements since that time.

Students who have not completed the baccalaureate requirements within seven years of their initial enrollment at USU must have their University Studies and major requirements evaluated and approved by their department head and dean.

University Studies Requirements for the Biology Major

Approved University Studies courses and requirements are listed at www.catalog.usu.edu

General Education Requirements

Competency Requirements

Communications Literacy (CL1 and CL2)

ENGL 1010 (CL1) or satisfactory AP, CLEP, IBO, ACT, or SAT score
ENGL 2010 (CL2) or satisfactory IBO score

Quantitative Literacy (QL)

MATH 1210 is required and fulfills this requirement

Breadth Requirements (CLEP, IBO, or AP credit may be used)

Select at least one approved course from each of the following four categories: **American Institutions (BAI)**, **Creative Arts (BCA)**, **Humanities (BHU)**, and **Social Sciences (BSS)**.

University Studies Breadth Courses with a **USU prefix** can be used. The most relevant courses with the USU prefix are: USU 1300 (**BAI**), USU 1320 (**BHU**), USU 1330 (**BCA**), and USU 1340 (**BSS**).

The **Life Science (BLS)** and **Physical Science (BPS)** breadth areas are fulfilled by coursework required by the Biology Major (BIOL 1610/1620 and CHEM 1210/1220). The **Social Science (BSS)** breadth area is fulfilled in the Human Biology emphasis with PSY 1010, SOC 1010, or SOC 1020.

Exploration Requirement

CHEM 1220 (**BPS**), in conjunction with *either* PHYS 2120 (**BPS**) or PHYS 2220 (**BPS/QI**) fulfills the Exploration Requirement for students in the Biology Major.

Depth Education Requirements

Communications Intensive (CI) (2 courses)

BIOL 5250 will meet one of the required courses.

Optional courses to fulfill the last CI course can be BIOL 4060 and BIOL 5390. These courses will fulfill the CI requirement and a biology elective. BIOL 3100 can fulfill the CI requirement and a biology elective for Human Biology Emphasis students only. For more CI options visit catalog.usu.edu.

Quantitative Intensive (QI) (1 course)

STAT 3000 will meet this requirement.

Depth Course Requirements (4 credit minimum, including 2 credits in each of the following two depth areas):

Humanities and Creative Arts (**DHA**)
Social Sciences (**DSS**)

Required Coursework for Biology Major

To graduate, a candidate for any bachelor's degree offered by the Department of Biology must maintain a GPA of 2.25 or better in all Department of Biology (BIOL or PUBH prefix) courses required for the major and a grade of C- or better in BIOL 1610, 1615, 1620 and 1625. A Pass-Fail option is not acceptable for any course required for the degree, but any passing grades including D grades are permitted within the restrictions of the 2.25 GPA. All Biological Science Composite Teaching Majors must have a C in all BIOL prefix courses and maintain the Department of Biology GPA of 2.25 and an overall GPA of 3.0.

Students may be asked to participate in an overall assessment exam covering important concepts in their major field of study.

Laboratory fees required for some Department of Biology courses are used to purchase expendable lab items and other materials required for successful completion of lab assignments.

Students who receive a 3 on the AP Biology examinations may fulfill the Breadth Life Science (BLS) requirements plus 3 elective credits. Students who receive a 4 or 5 on the AP Biology examination may fulfill both BIOL 1610 and BIOL 1620 requirement. Either way, you still have to take labs BIOL 1615 and BIOL 1625 in sequence.

Biology Emphasis

Required Biology Courses (21-22) credits

Credits

BIOL 1610 Biology I (F).....	3
BIOL 1615 Biology I Laboratory (F).....	1
BIOL 1620 (BLS) Biology II (Sp).....	3
BIOL 1625 Biology II Laboratory (Sp).....	1
BIOL 2220 General Ecology (F, Sp).....	3
BIOL 3060 (QI) Principles of Genetics (F, Sp, Su).....	4
BIOL 3300 General Microbiology (F, Sp).....	4
OR	
BIOL 5210 Cell Biology (F).....	3
BIOL 5250 (CI) Evolutionary Biology (F, Sp).....	3

Field Course Requirements (2-3) credits

Students must take one course from the following list:

BIOL 3220 (QI) Field Ecology (F).....	2
BIOL 4500 Applied Entomology (Sp).....	3
BIOL 5530 Insect Systematics and Evolution (F).....	3
BIOL 5550 Freshwater Invertebrates (Sp).....	3
BIOL 5560 Ornithology (Sp).....	3

Physiology Course with Lab Requirement (4-5 credits)

Students must take from the following list one upper-division physiology course with an integrated or separate laboratory:

Courses with integrated laboratories:

BIOL 4400 (QI) Plant Physiology (F).....	4
BIOL 4600 Advanced Human Physiology (Sp).....	5

Courses with separate lecture and lab; one of the following two lecture courses and BIOL 5610 must be taken to meet the requirement:

BIOL 4450 Neurobiology (Sp) OR	
BIOL 5600 Comparative Animal Physiology (F).....	3
WITH	
BIOL 5610 Animal Physiology Laboratory (F).....	2

Biology Electives (10 credits)

Students must select an additional 10 credits of 4000 level and above BIOL or PUBH prefix courses as electives. BIOL 3065 (Genetics Lab) may also be included toward these elective credits, even though it is a 3000 level course. A maximum of 4 credits from BIOL 4250 (1-2 credits), BIOL 4710 (1 credit), BIOL 5800 (1-3 credits), or seminar courses (1-2 credits) may be included among the 10 elective credits.

Required Physical Science Courses (26-33 credits)

Credits

CHEM 1210 Principles of Chemistry I (F, Sp).....	4
CHEM 1215 Chemical Principles Laboratory I (F, Sp).....	1
CHEM 1220 (BPS) Principles of Chemistry II (F, Sp, Su).....	4
CHEM 1225 Chemical Principles Laboratory II (F, Sp).....	1
CHEM 2300/ 2315 Principles of Organic Chemistry (F).....	3/1
OR	
CHEM 2310/2315 Organic Chemistry I (F).....	4/1
CHEM 2320/2325 Organic Chemistry II (SP).....	4/1

CHEM 3700 Introductory Biochemistry (Sp).....	3
CHEM 3710 Introductory Biochemistry Laboratory (Sp).....	1

PHYS 2110 General Physics-Life Science I (F) and	
PHYS 2120 (BPS) General Physics-Life Sciences II (Sp).....	8
OR	

PHYS 2210/2215 (QI) General Physics-Science and Engineering I (F, Sp, Su) and	
PHYS 2220/2225 (BPS/QI) Gen. Physics-Sci and Eng II (F, Sp, Su).....	10

Mathematics and Statistics Requirement (7 credits)

MATH 1210 (QL) Calculus I (F, Sp, Su).....	4
STAT 3000 (QI) Statistics for Scientists (F, Sp, Su).....	3

Human Biology Emphasis

Required Biology Courses (27-28 credits)	Credits
BIOL 1050 Biology Professions.....	1
OR	
BIOL 1060 Pre-Health Professions.....	1
BIOL 1610 Biology I (F).....	3
BIOL 1615 Biology I Laboratory (F).....	1
BIOL 1620 (BLS) Biology II (Sp).....	3
BIOL 1625 Biology II Laboratory (Sp).....	1
BIOL 2220 General Ecology (F, Sp).....	3
BIOL 3060 (QI) Principles of Genetics (F, Sp, Su).....	4
BIOL 5250 (CI) Evolutionary Biology (F, Sp).....	3
BIOL 3300 General Microbiology (F, Sp).....	4
OR	
BIOL 5210 Cell Biology (F).....	3

Physiology Course with Lab Requirement (5 credits)

Students must take from the following list one upper-division physiology course with an integrated or separate laboratory:

Courses with integrated laboratories:	
BIOL 4600 Advanced Human Physiology (Sp).....	5

Courses with separate lecture and lab; one of the following two lecture courses *and* BIOL 5610 must be taken to meet the requirement:

BIOL 4450 Neurobiology (Sp) OR	
BIOL 5600 Comparative Animal Physiology WITH	
BIOL 5610 (QI) Animal Physiology Laboratory (Fa).....	5

Required Supporting Courses (3 credits) Credits

PSY 1010 (BSS) General Psychology.....	3
OR	
SOC 1010 (BSS) Introductory Sociology.....	3
OR	
SOC 1020 (BSS) Introduction to Social Problems.....	3

Emphasis Electives (12 credits)

Students must select an additional 12 credits of 4000 level or above BIOL or PUBH prefix courses as electives. BIOL 2320 (Human Anatomy), BIOL 3065 (Genetics Laboratory) and BIOL 3100 (Bioethics) may also be included toward these elective credits. A maximum of 4 credits from BIOL 4250 (Internship/Co-Op; 1-2 credits), BIOL 4710 (Teaching Internship; 1 credit), BIOL 5800 (Undergraduate Research; 1-3 credits), or up to 2 credits of seminar courses may be included among the 12 elective credits. With the approval of the Director of Undergraduate Studies up to three credits of Emphasis Electives may come from upper division courses at the 3000 level and above from **other departments**.

Such substitutions, which may include courses in the **humanities and social sciences**, must be appropriate to the Human Biology Emphasis and must be different from the courses used to fulfill University Studies Depth Education requirements.

Required Physical Science Courses (32-39 credits) Credits

CHEM 1210 Principles of Chemistry I (F, Sp, Su).....	4
CHEM 1215 Chemical Principles Laboratory I (F, Sp, Su).....	1
CHEM 1220 (BPS) Principles of Chemistry II (F, Sp).....	4
CHEM 1225 Chemical Principles Laboratory II (F, Sp).....	1
CHEM 2310 Organic Chemistry I (F).....	4
CHEM 2315 Organic Chemistry Laboratory I (F).....	1
CHEM 2320 Organic Chemistry II (Sp).....	4
CHEM 2325 Organic Chemistry Laboratory II (Sp).....	1
CHEM 3700 Introductory Biochemistry (Sp) and	3
CHEM 3710 Introductory Biochemistry Laboratory (Sp).....	1
OR	
CHEM 5700 General Biochemistry I (F) and	3
CHEM 5710 General Biochemistry II (Sp) and	3
CHEM 5720 General Biochemistry Laboratory (Sp).....	3

PHYS 2110 General Physics-Life Science I and	
PHYS 2120 (BPS) General Physics-Life Sciences II.....	8
OR	
PHYS 2210/2215 (QI) General Physics-Science and Engineering I and	
PHYS 2220/2225 (BPS/QI) Gen. Physics-Science and Engineering II.....	10

Mathematics and Statistics Requirement (7 credits) Credits

MATH 1210 (QL) Calculus I (F, Sp, Su).....	4
STAT 3000 (QI) Statistics for Scientists (F, Sp, Su).....	3

Cellular/Molecular Emphasis

Required Biology Courses (30 credits)	Credits
BIOL 1610 Biology I (F).....	3
BIOL 1615 Biology I Laboratory (F).....	1
BIOL 1620 (BLS) Biology II (Sp).....	3
BIOL 1625 Biology II Laboratory (Sp).....	1
BIOL 2220 General Ecology (F, Sp).....	3
BIOL 3060 (QI) Principles of Genetics (F, Sp, Su).....	4
BIOL 5210 Cell Biology (F).....	3
BIOL 5230 Developmental Biology (Sp).....	3
BIOL 5250 (CI) Evolutionary Biology (F, Sp).....	3

Molecular Biology/Biotechnology Course Requirement (6 credits)

Choose two of the following:

BIOL 5160 Methods in Biotechnology: Cell Culture (Sp).....	3
BIOL 5190 Molecular Genetics (Sp).....	3
BIOL 5260 Methods in Biotechnology: Molecular Cloning (F).....	3
BIOL 5280 Animal Molecular Biology (Sp).....	3

Physiology Course with Lab Requirement (4-5 credits)

Students must take from the following list one upper-division physiology course with an integrated or separate laboratory:

Courses with integrated laboratories:	
BIOL 4400 (QI) Plant Physiology (F).....	4
BIOL 4600 Advanced Human Physiology (Sp).....	5

Courses with separate lecture and lab; one of the following two lecture courses *and* BIOL 5610 must be taken to meet the requirement:

BIOL 4450 Neurobiology (Sp) OR	
BIOL 5600 Comparative Animal Physiology (F).....	3
WITH	
BIOL 5610 (QI) Animal Physiology Laboratory (F).....	2

Biology Electives (9 credits)

Students must select an additional 9 credits of 4000-level and above BIOL prefix courses as electives. BIOL 3065 (Genetics Laboratory) and BIOL 3300 (General Microbiology) may also be included toward these elective credits (even though they are 3000-level courses). A maximum of 4 credits from BIOL 4250 (1-2 credits), BIOL 4710 (1 credit), BIOL 5800 (1-3 credits), or seminar courses (1-2 credits) may be included among the 9 elective credits.

Required Physical Science Courses (37-39 credits) Credits

CHEM 1210 Principles of Chemistry I (F, Sp).....	4
CHEM 1215 Chemical Principles Laboratory I (F, Sp).....	1
CHEM 1220 (BPS) Principles of Chemistry II (F, Sp, Su).....	4
CHEM 1225 Chemical Principles Laboratory II (F, Sp).....	1
CHEM 2310 Organic Chemistry I (F).....	4
CHEM 2315 Organic Chemistry Laboratory I (F).....	1
CHEM 2320 Organic Chemistry II (Sp).....	4
CHEM 2325 Organic Chemistry Laboratory II (Sp).....	1
CHEM 5700 General Biochemistry I (F).....	3
CHEM 5710 General Biochemistry II (Sp).....	3
CHEM 5720 (CI) General Biochemistry Laboratory (Sp).....	3

PHYS 2110 General Physics-Life Science I (F) and	
PHYS 2120 (BPS) General Physics-Life Sciences II (Sp).....	8
OR	
PHYS 2210/2215 (QI) General Physics-Science and Engineering I (F, Sp, Su) and	
PHYS 2220/2225 (BPS/QI) General Physics-Sci and Engineering II (F, Sp, Su).....	10

Mathematics and Statistics Requirement (7 credits)

MATH 1210 (QL) Calculus I (F, Sp, Su).....	4
STAT 3000 (QI) Statistics for Scientists (F, Sp, Su).....	3

Environmental Emphasis

Required Biology Courses (24 credits)	Credits
BIOL 1610 Biology I (F)	3
BIOL 1615 Biology I Laboratory (F)	1
BIOL 1620 (BLS) Biology II (Sp)	3
BIOL 1625 Biology II Laboratory (Sp)	1
BIOL 2220 General Ecology (F, Sp)	3
BIOL 3060 (QI) Principles of Genetics (F, Sp, Su)	4
BIOL 3220 (QI) Field Ecology (F)	2
BIOL 3300 General microbiology (F, Sp)	4
BIOL 5250 (CI) Evolutionary Biology (F, Sp)	3

Plant Identification (2-4 credits)

BIOL 4430 Introduction to Plant Pathology (Sp)	4
WILD 3820 Forest Plants: Identification, Biology and Function (F)	3
WILD 3830 Range Plant Taxonomy and Function (F)	3
Plant-related class approved by advisor	3-4

Physiology Course with Lab Requirement (4-5 credits)

Students must take from the following list one upper-division physiology course with an integrated or separate laboratory:

Courses with integrated laboratories:

BIOL 4400 (QI) Plant Physiology (F)	4
BIOL 4600 Advanced Human Physiology (Sp)	5

Courses with separate lecture and lab; one of the following two lecture courses and BIOL 5610 must be taken to meet the requirement:

BIOL 4450 Neurobiology (Sp) OR	
BIOL 5600 Comparative Animal Physiology (F)	3
WITH	
BIOL 5610 (QI) Animal Physiology Laboratory (F)	2

Biology Elective Courses (12 credits)

Students must take 12 credits from the following list or others approved by advisor. Up to 3 credits of BIOL 5800 may be included.

BIOL 4250 Internship/Co-op (F, Sp, Su)	1-2
BIOL 4430 Introduction to Plant Pathology (Sp)	4
BIOL 4500 Applied Entomology (Sp)	3
BIOL 5310 Soil Microbiology (F)	3
BIOL 5400 Environmental Toxicology (Sp)	3
BIOL 5800 Undergraduate Research (F, Sp, Su)	1-3
CEE/PSC 5620 Aquatic Chemistry (F)	3
GEO 1110 (BPS) The Dynamic Earth: Physical Geology (F, Sp)	3
GEO 1115 Physical Geology Laboratory (F, Sp)	1
PSC 3000 Fundamentals of Soil Science (F)	4
PUBH 3610 Environmental Management (F)	3

Required Physical Science Courses (36credits)

Required Physical Science Courses (36credits)	Credits
CHEM 1210 Principles of Chemistry I (F, Sp, Su)	4
CHEM 1215 Chemical Principles Laboratory I (F, Sp, Su)	1
CHEM 1220 (BPS) Principles of Chemistry II (F, Sp, Su)	4
CHEM 1225 Chemical Principles Laboratory II (F, Sp)	1
CHEM 2310 Organic Chemistry I (F)	4
CHEM 2315 Organic Chemistry Laboratory I (F)	1
CHEM 2320 Organic Chemistry II (Sp)	4
CHEM 2325 Organic Chemistry Laboratory II (Sp)	1
CHEM 3000 (QI) Quantitative Analysis (F)	3
CHEM 3005 Quantitative Analysis Laboratory (F)	1
CHEM 3700 Introductory Biochemistry (Sp)	3
CHEM 3710 Introductory Biochemistry Laboratory (Sp)	1

PHYS 2110 General Physics-Life Science I (F) and

PHYS 2120 (BPS) General Physics-Life Sciences II (Sp)8

OR

PHYS 2210/2215 (QI) General Physics-Science and Engineering I (F, Sp, Su)

and
PHYS 2220/2225 (BPS/QI) Gen. Physics-Sci and Eng II (F, Sp, Su)

.....10

Mathematics and Statistics Requirement (7 credits)

MATH 1210 (QL) Calculus I (F, Sp, Su)	4
STAT 3000 (QI) Statistics for Scientists (F, Sp, Su)	3

Ecology/Biodiversity Emphasis

Required Biology Courses (24 credits)	Credits
BIOL 1610 Biology I (F)	3
BIOL 1615 Biology I Laboratory (F)	1
BIOL 1620 (BLS) Biology II (Sp)	3
BIOL 1625 Biology II Laboratory (Sp)	1
BIOL 2220 General Ecology (F, Sp)	3
BIOL 3060 (QI) Principles of Genetics (F, S, Su)	4
BIOL 3220 (QI) Field Ecology (F)	2
BIOL 3300 General microbiology (F, Sp)	4
BIOL 5250 (CI) Evolutionary Biology (F, Sp)	3

Physiology Course with Lab Requirement (4-5 credits)

Students must take an upper-division physiology course with an integrated or separate laboratory:

Courses with integrated laboratories:

BIOL 4400 (QI) Plant Physiology (F)	4
BIOL 4600 Advanced Human Physiology (Sp)	5

Courses with separate lecture and lab; one of the following two lecture courses and BIOL 5610 must be taken to meet the requirement:

BIOL 4450 Neurobiology (Sp) OR	
BIOL 5600 Comparative Animal Physiology (F)	3
WITH	
BIOL 5610 (QI) Animal Physiology Laboratory (F)	2

Clusters (8-11 credits)

Students must take at least one course from each of the following clusters.

Plant Biology Cluster (2-4 credits):

BIOL 4430 Introduction to Plant Pathology (Sp)	4
WILD 3820 Forest Plants: Identification, Biology and Function (F)	3
WILD 3830 Range Plant Taxonomy and Function (F)	3
Plant-related class approved by advisor	3-4

Animal Biology Cluster (3 credits):

BIOL 4500 Applied Entomology (Sp)	3
BIOL 5530 Insect Systematics and Evolution (F Alt. Years)	3
BIOL 5550 Freshwater Invertebrates (Sp)	3
BIOL 5560 Ornithology (Sp)	3
BIOL 5570 Herpetology (Sp)	3
BIOL 5580 Mammalogy (F)	3

Ecology/Evolution Cluster (3-4 credits):

BIOL 4060 (CI) Exploring Animal Behavior (F)	3
BIOL 5010 Biogeography (Sp)	3
BIOL 5380 Evolutionary Genetics (F)	4
BIOL 5590 Animal Community Ecology (F)	4
WILD 4600 Conservation Biology (Sp)	3

Electives (2-3 credits)

Students must take one additional course from this list or the clusters above or other upper – division courses approved by advisor.

BIOL 3065 Genetics Laboratory (F)	2
BIOL 4250 Internship/Co-op (F, Sp, Su)	1-2
BIOL 4410 Plant Structure (Sp)	3
BIOL 5310 Soil Microbiology (F)	3
BIOL 5800 Undergraduate Research (F, Sp, Su)	2-3

Required Physical Science Courses (34-36 credits)

Required Physical Science Courses (34-36 credits)	Credits
CHEM 1210 Principles of Chemistry I (F, Sp, Su)	4
CHEM 1215 Chemical Principles Laboratory I (F, Sp, Su)	1
CHEM 1220 (BPS) Principles of Chemistry II (F, Sp, Su)	4
CHEM 1225 Chemical Principles Laboratory II (F, Sp)	1
CHEM 2300 Principles of Organic Chemistry (F)	3
CHEM 2315 Organic Chemistry Laboratory I (F)	1
CHEM 3700 Introductory Biochemistry (Sp)	3
CHEM 3710 Introductory Biochemistry Laboratory (Sp)	1
GEO 1110 (BPS) The Dynamic Earth: Physical Geology (F, Sp)	3
GEO 1115 Physical Geology Laboratory (F, Sp)	1
PSC 3000 Fundamentals of Soil Science (F)	4

PHYS 2110 General Physics-Life Science I (F)and

PHYS 2120 (BPS) General Physics-Life Sciences II (Sp)8

OR

PHYS 2210/2215 (QI) General Physics-Science and Engineering I (F, Sp, Su)

and PHYS 2220/2225 (BPS/QI) Gen. Physics-Sci and Eng II (F, Sp, Su)10

Mathematics and Statistics Requirement (7 credits)

MATH 1210 (QL) Calculus I (F, Sp, Su)	4
STAT 3000 (QI) Statistics for Scientists (F, Sp, Su)	3