

Biology Degree Requirements B.S. 2024-2025

The Bachelor of Science (B.S.) degree in biology requires a minimum of 120 credits. Up to 65 credits earned at other two-year colleges can be applied, as can courses taken at other four-year institutions. All students must maintain a minimum 2.00 cumulative grade point average (GPA) to complete a degree. The final 32 credits of coursework must be taken at Iowa State University.

Students are ultimately responsible for all issues concerning the satisfactory completion of degree requirements and should be aware that many professions require specific coursework beyond the minimum degree requirements for the Biology Program. The B.S. degree in Biology requires the following coursework.

University Requirements

Requirement	Course Description	Credits
International Perspectives	Select course from approved International Perspectives list	3
U.S. Cultures & Communities	Select course from approved U.S. Cultures & Communities list	3
ENGL 1500	Critical Thinking and Communication	3
ENGL 2500	Written, Oral, Visual, and Electronic Composition	3
LIB 1600	Introduction to College Level Research	1

Things to Know

- Students must earn a grade of C or higher in ENGL 1500, ENGL 2500, and the advanced communication course.
- Several International Perspectives and U.S. Cultures & Communities courses can double-count toward college requirements.

College Requirements

Students can major in Biology through either the College of Liberal Arts & Sciences (LAS) or the College of Agriculture & Life Sciences (CALs). Both options lead to the B.S. degree in Biology from Iowa State University.

Biology majors complete the same university requirements and major requirements (biology core, advanced biology, and complementary science courses) regardless of college. The differences in requirements lie in the college requirements. These differences are outlined below:

College Requirement	College of Liberal Arts & Sciences (LAS)	College of Agriculture & Life Sciences (CALs)
World Language	3+ years of same language in high school or 4-8 credits	None required
Advanced Communication	3 credits writing (ENGL 3020-3160) or speech (SPCM 2120)	3 credits writing (COMST 2140) or speech (SPCM 2120)
Math	Math and/or statistics	Math and statistics
Arts & Humanities	12 credits (~4 courses)	3 credits (~1 course)
Social Sciences	9 credits (~3 courses)	3 credits (~1 course)
Ethics	None required	3 credits (~1 course)
Professional Career Prep.	1 credit (LAS 2030)	None required

NOTE: LAS also requires 45 credits of 3000+ level coursework, all but 7 of which are met by completing minimum requirements for the biology major. Lists of approved courses that meet the general education requirements can be found online.

Biology Degree Requirements B.S. 2024-2025

Supporting Sciences

Required coursework in mathematics, chemistry, and physics provides Biology majors with a well-rounded background in complementary sciences.

Mathematics and Statistics

Biology majors must complete at least 2 semesters of math and/or statistics. The specific requirement depends on college.

LAS Options	Course Name & Number	Credits
A) 1 semester of statistics + 1 semester of calculus	Introductory Statistics + Introductory Calculus STAT 1040 or STAT 1010 + MATH 1600 or MATH 1650	7-8
B) 2 semesters of statistics	Introductory Statistics + Intermediate Statistics STAT 1040 or STAT 1010 + STAT 3010	7-8
C) 2 semesters of calculus	Calculus I + Calculus II MATH 1650 + MATH 1660	8

CALS Options	Course Name & Number	Credits
A) 1 semester of statistics + 1 semester of calculus	Introductory Statistics + Introductory Calculus STAT 1040 or STAT 1010 + MATH 1600 or MATH 1650	7-8
B) 2 semesters of statistics + 1 semester of math	Introductory Statistics + Intermediate Statistics + Algebra, Pre-Calc, or Trig. STAT 1040 or STAT 1010 + STAT 3010 + MATH 1400, 1430 or 1450	10-12

Chemistry

Biology majors must complete at least one semester of general chemistry (with lab), organic chemistry (with lab), and biochemistry. Certain career paths may require additional chemistry. Students should consult with their academic advisor regarding chemistry course selection.

Chemistry	1 Semester Option	Credits	2 Semester Option	Credits
General Chemistry	College Chemistry CHEM 1630 & 1630L	5	General Chemistry I + General Chemistry II CHEM 1770 & 1770L + CHEM 1780 & 1780L	10
Organic Chemistry	Elementary Organic Chemistry CHEM 2310 & 2310L	4	Organic Chemistry I + Organic Chemistry II CHEM 3310 & 3310L + CHEM 3320 & 3320L	8
Biochemistry	Principles of Biochemistry BBMB 3160	3	Biochemistry I + Biochemistry II BBMB 4040 + BBMB 4050	6

Physics

Biology majors must complete at least one semester of general physics (with lab). Certain career paths may require additional physics. Students should consult with their academic advisor regarding physics course selection.

Physics	1 Semester Option	Credits	2 Semester Option	Credits
General Physics	Physics for the Life Sciences PHYS 1150 & 1150L	5	General Physics I + General Physics II PHYS 1310 & 1310L + PHYS 1320 & 1320L	10

Biology Degree Requirements B.S. 2024-2025

Biology Major Requirements

Students must earn a minimum 2.00 GPA in the biology core and advanced biology areas of the major.

Biology Core

Course Number	Course Name	Credits
BIOL 1100 & 1110*	Biology Major Orientation & Opportunities in Biology	1.5
BIOL 2110 & BIOL 2110L	Principles of Biology I & Lab	4
BIOL 2120 & BIOL 2120L	Principles of Biology II & Lab	4
BIOL 3120	Ecology (with lab)	4
BIOL 3130 & BIOL 3130L	Principles of Genetics & Lab	4
BIOL 3140	Principles of Molecular Cell Biology	3
BIOL 3150	Biological Evolution	3

* Students transferring to ISU take BIOL 1120 (Transfer Student Orientation, 1 cr.) instead of BIOL 1100 & 1110.

Advanced Biology

Select **21 credits total** from the advanced biology course list.

This must include:

- **2 advanced biology labs**, denoted by a **black dot** on the advanced course list.
- **At least 9 credits from the Biol classes** listed below. The remaining advanced credits can be from Biol or other departments on the advanced list.

Advanced Biology Course List | Biol Courses

Course #	Course Title	Credits	Course #	Course Title	Credits
BIOL 3110X •	Genome Editing and Engineering	1	BIOL 4230	Developmental Biology	3
BIOL 3180	Intro to Ecosystems	3	BIOL 4230L •	Developmental Biology Lab	1
BIOL 3190	Analysis of Environmental Systems	3	BIOL 4280	Cell Biology	3
BIOL 3220	Intro to Bioinformatics	3	BIOL 4300	Principles of Plant Physiology	3
BIOL 3280	Molc. & Cell Bio of Human Disease	3	BIOL 4340	Endocrinology	3
BIOL 3350	Human & Animal Physiology	3	BIOL 4360	Neurobiology	3
BIOL 3350L •	Human & Animal Physiology Lab	1	BIOL 4510 •	Plant Evolution & Phylogeny	4
BIOL 3360	Ecological & Evol. Animal Physiology	3	BIOL 4540 •	Plant Anatomy	4
BIOL 3440	Human Reproduction	3	BIOL 4550 •	Bryophyte & Lichen Diversity	3
BIOL 3490 •	Genome Perspective in Biology	4	BIOL 4560 •	Principles of Mycology	3
BIOL 3500 •	Comprehensive Human Anatomy	4	BIOL 4570	Herpetology	2
BIOL 3510 •	Comprehensive Chordate Anatomy	5	BIOL 4570L •	Herpetology Lab	1
BIOL 3520 •	Vertebrate Histology	4	BIOL 4580	Ornithology	2
BIOL 3530	Introductory Parasitology	3	BIOL 4580L •	Ornithology Lab	1
BIOL 3540	Animal Behavior	3	BIOL 4590	Mammalogy	2
BIOL 3540L •	Animal Behavior Lab	1	BIOL 4590L •	Mammalogy Lab	1
BIOL 3550	Plants and People	3	BIOL 4620	Evolutionary Genetics	3
BIOL 3560 •	Dendrology	3	BIOL 4640	Wetland Ecology	3
BIOL 3570	Biology of Plants	3	BIOL 4650	Macroevolution	4
BIOL 3580	Bee Biology, Mgmt., & Beekeeping	3	BIOL 4710	Intro Conservation Biology	3
BIOL 3640	Invertebrate Biology	3-4	BIOL 4740	Plant Ecology	3
BIOL 3650 •	Vertebrate Biology	4	BIOL 4760	Functional Ecology	3
BIOL 3660 •	Plant Systematics	4	BIOL 4830	Environmental Biogeochemistry	3
BIOL 3700 •	GIS for Ecology & Env. Science	1-6	BIOL 4840	Ecosystem Ecology	3
BIOL 3710 •	Ecological Methods	3	BIOL 4850	Community Ecology	3
BIOL 3750	Marine Ecol. & Ecosystems Dynamics	3	BIOL 4860	Aquatic Ecology	3
BIOL 3930 •	North American Field Trips	1-4	BIOL 4860L •	Aquatic Ecology Lab	1
BIOL 3940 •	International Field Trips	1-4	BIOL 4870	Microbial Ecology	3
BIOL 3950X	Professional Development in Biol. Sci.	2	BIOL 4880 •	Identification of Aquatic Organisms	1
BIOL 4010	Bioinformatics of Sequences	3	BIOL 4890 •	Population Ecology	3
BIOL 4020	Intro to Pathology	3	BIOL 4900 ^a	Independent Study	1
BIOL 4030	Intro to Pathology II	3	BIOL 4910 ^a •	Undergraduate Teaching Experience	1-2
BIOL 4060	Bioinformatics of OMICS	3	BIOL 4940 ^a •	Biology Internship	1-3
BIOL 4140	Life History & Reproductive Strategies	3	BIOL 4950	Undergrad Seminar (various topics)	1-3
BIOL 4210	Biological Principles of Aging	3	BIOL 4990 ^a •	Undergraduate Research	1-3

^a Students can apply a maximum of 7 credits of the following toward advanced biology requirements: BIOL 4900 (2 cr. max), 4910 (2 cr. max), 4940 (6 cr. max) and 4990 (6 cr. max).

Biology Degree Requirements B.S. 2024-2025

NOTE: Course offerings vary by semester. Check the [University Catalog](#) and [Schedule of Classes](#) to view availability.

Advanced Biology Course List | Other Departments

Agronomy Courses

AGRON 3160	Crop Structure-Func. Relationships	3
AGRON 3170	Principles of Weed Science	3
AGRON 3380 •	Seed Science & Technology	3
AGRON 3540	Soils & Plant Growth	3
AGRON 4210	Intro to Plant Breeding	3

Animal Science Courses

ANS 3130	Exercise Physiology of Animals	3
ANS 3190	Animal Nutrition	3
ANS 3310	Domestic Animal Reproduction	3
ANS 3320 •	Lab Methods in Animal Reproduction	1
ANS 3330	Embryo Transfer & Related Technol.	3
ANS 3340 •	Embryo Transfer Lab	1
ANS 3370	Lactation	3
ANS 3450	Growth & Dev. of Domestic Animals	3
ANS 3520 •	Genetic Improv. of Domestic Animals	3
ANS 4190	Advanced Animal Nutrition	2

Anthropology Courses

ANTHR 3070 •	Biological Anthropology	3
ANTHR 3170	Primate Behavior, Ecology & Evolution	3
ANTHR 3190 •	Skeletal Biology	3
ANTHR 4240 •	Forensic Anthropology	3

Biochemistry Courses

BBMB 4050	Biochemistry II	3
BBMB 4110 •	Techniques in Biochem Research	4
BBMB 4200	Mammalian Biochemistry	3
BBMB 4300	Prokaryotic Diversity & Ecology	3

Bioinformatics & Computational Biology Courses

BCBIO 4060	Bioinformatics of OMICS	3
------------	-------------------------	---

Biomedical Sciences Courses

BMS 3290	Anat. & Phys. of Domestic Animals	3
BMS 4380	Principles of Physiology	4
BMS 4480 •	Principles of Human Gross Anatomy	4

Entomology Courses

ENT 3700 •	Insect Biology	3
ENT 3740	Insects & Our Health	3
ENT 3740L •	Insects & Our Health Lab	1
ENT 4250 •	Aquatic Insects	3
ENT 4710 •	Insect Ecology	3

Food Science & Human Nutrition Courses

FSHN 3600	Adv. Nutrition & Metabolism in Health	3
FSHN 3620	Nutrition Throughout the Lifecycle	3
FSHN 3640	Nutrition & Prev. of Chronic Disease	3
FSHN 3670	Medical Terminology for Health Pros.	1

Genetics Courses

GEN 3400	Human Genetics	3
GEN 4090	Molecular Genetics	3
GEN 4100	Analytical Genetics	3

Geology Courses

GEOL 4060	Geology Field Course	1-2
-----------	----------------------	-----

Health Studies Courses

HS 3500	Human Diseases	3
---------	----------------	---

Horticulture Courses

HORT 3210	Horticulture Physiology	3
HORT 3220 •	Plant Propagation	3

Kinesiology Courses

KIN 3550	Biomechanics	3
KIN 3630	Basic Electrocardiography	2

Microbiology Courses

MICRO 3020	Biology of Microorganisms	3
MICRO 3020L •	Microbiology Lab	1
MICRO 3100	Medical Microbiology	3
MICRO 3100L	Medical Microbiology Lab	1
MICRO 3200	Molecular & Cellular Bacteriology	4
MICRO 3600	Global Health	3
MICRO 4020	Microbial Genetics & Genomics	3
MICRO 4080	Virology	3
MICRO 4200	Food Microbiology	3
MICRO 4750	Immunology	3
MICRO 4750L •	Immunology Lab	1

Natural Resource Ecology & Management Courses

AECL 3210 •	Fish Biology	3
AECL 3660 •	Natural History of Iowa Vertebrates	3
AECL 4150 •	Ecol. Freshwater Invert/Plant/Algae	3
AECL 4180 •	Stream Ecology	3
AECL 4420	Aquaculture	3
AECL 4540	Principles of Wildlife Disease	3
FOR 3020 •	Silviculture	4
NREM 3010 •	Natural Resource Ecology & Soils	4
NREM 3450 •	Nat. Resource Photogrammetry & GIS	3
NREM 3900	Fire Ecology & Management	3
NREM 4070 •	Watershed Management	4
NREM 4460 •	Integrating GPS & GIS for Nat. Res.	3
NREM 4520 •	Ecosystem Management	3

Plant Pathology Courses

PLP 4080 •	Principles of Plant Pathology	3
PLP 4160 •	Forest Insects & Diseases	3
PLP 4770	Bacterial-Plant Interactions	3
PLP 4940	Seed Pathology	2
PLP 4940L •	Seed Pathology Lab	1

Psychology Courses

PSYCH 3100	Brain & Behavior	3
PSYCH 3150	Drugs & Behavior	3

Toxicology Courses

TOX 4010	Principles of Toxicology	3
TOX 4500	Pesticides in the Environment	3

NOTE: Courses on this list may have prerequisites not included on this list that do not count toward the advanced biology requirement.