Approved: October 2011

Biology Degree Requirements

2011-12 Iowa State University Catalog
www.biology.iastate.edu

Information in this document is subject to change. See your advisor or the Student Services Office (103 Bessey) for the most current version.

- Biology majors are required to complete 120 credits to graduate.
- A minimum of 32 ISU credits are required to graduate from ISU.
- The final 32 credits must be taken at ISU or approved by the college.
- Students must have a 2.0 minimum GPA to graduate and be in good standing at the university.
- Students are ultimately responsible for all issues concerning the satisfactory completion of degree requirements.
- Courses taken at other institutions may be equivalent to ISU courses or may be substituted to fulfill requirements.
- Many professions require specific courses, investigate specific schools of interest for admission requirements.
- Students are encouraged to take advantage of opportunities available in undergraduate research, internships, field trip courses, seminars, summer field study and study abroad.

University Requirements:

ENGL 150 **Minimum grade of C*	3 credits
ENGL 250 **Minimum grade of C*	3 credits
LIB 160	.5 credits
U.S. Diversity	3 credits
International Perspective	3 credits

International Perspective and US Diversity courses may also apply to Humanity or Social Science requirements. Lists are available at *http://www.public.iastate.edu/~registrar/courses/div-ip-guide.html*

College Requirements:

Students may major in Biology through the College of Liberal Arts & Sciences or the College of Agriculture & Life Sciences.The LAS College requires 45 credits of 300+ level course work from a 4 year college.

	LAS requirement	AgLS requirement
Foreign Language	4-8 cr or 3 years H.S.	---
Communication **Minimum grade of C*	ENGL 302-316 or SP CM 212	SP CM 212
Math **Met by Biology Requirements*	Math *and*/*or* Statistics	Math *and* Statistics
Science **Met by Biology Requirements*	Natural Sciences	Biological and Physical Sciences
Arts and Humanities	12 credits	3 credits
Social Sciences	9 credits	3 credits
Ethics	---	3 credits

Biology Major Requirements:

Students must have a minimum 2.0 GPA in the major (Biology Core + Biology Advanced Coursework) with all grades C- or above. Transfer students (both from other universities and from other majors at ISU) are required to complete Biol 112X and Biol 111. New freshmen students are required to complete Biol 110 and Biol 111. A typical 4 year plan is available on the Biology Program web site.

Biology Core:

BIOL 110 (or 112X R cr for transfers)	Introduction to the Biology Major	1 credit (Rcr)
BIOL 111	Opportunities in Biology	.5 credit
BIOL 211 and 211L	Principles of Biology I	4 credits
BIOL 212 and 212L	Principles of Biology II	4 credits
BIOL 312	Ecology	4 credits
BIOL 313 and 313L	Principles of Genetics	4 credits
BIOL 314	Principles of Molecular Cell Biology	3 credits
BIOL 315	Biological Evolution	3 credits

Biology Advanced Coursework:

Select 21 credits worth of coursework from approved list. (see below)
Students must also complete a minimum of 9 credits in BIOL and have credit for 2 laboratory experiences in BIOL to fulfill the advanced area requirement.

Biology Supporting Requirements:

Chemistry

Two possible sequences:	General Chemistry	Organic Chemistry	Biochemistry
-Minimum: 12 credits	CHEM 163 and 163L	CHEM 231 and 231L	BBMB 316
- Pre-Prof/grad school: 20 credits [Chem 332&L not required for biology]	CHEM 177 and 177L; CHEM 178 and 178L	CHEM 331 and 331L [CHEM 332 and 332L]	BBMB 316 (or 404 or 420)

The minimum course requirement for Biology is one semester of general chemistry and lab, one semester of organic chemistry and lab and one semester of biochemistry. Some sub-disciplinary areas of biology can be met with the minimum, however, certain career paths may suggest or require more than the minimum. Consult an advisor for information.

Physics 5-10 cr

-General Physics I and II (Algebra-based):	PHYS 111 &112
Or Physics for Life Sciences:	PHYS 115X & 115L

One semester of physics is required for biology. Some career paths may require a year of physics or specific physics course requirements.

Math/Statistics

Four possible sequences:	Calculus	Statistics
-Typical for LAS, Required of AgLS	MATH 160 or 165 or 181 *and*	STAT 101 or 104
-General Calculus only: 8 credits (LAS)	MATH 165 and 166	---
-Calculus for the Life Sciences only: 8 credits (LAS)	MATH 181 and 182	---
-Statistics only: 7-8 credits (LAS)	---	STAT 101 or 104 and 401

Students in AgLS are required to have a math and statistics course. This can be accomplished in several ways, however the Biology math/stat requirements are one calculus course and one statistics course, or year of calculus, or a year of statistics. If two semesters of statistics are completed, an AgLS student may take any acceptable math course as outlined by the AgLS College.

Approved Biology Advanced Course Lists:

Semester offerings change, for specific semesters check the Schedule of Classes: http://classes.iastate.edu/ Check 103 Bessey for most recent list.
**Students may only apply a maximum of 7 credits of the following: BIOL 393, 394, 480, 481, 490, 491, 494, 495 toward advanced biology requirements and no more than 6 credits in each course may apply.*

BIOL Courses (including EEOB and GDCB Courses open to undergraduates by prerequisite or permission)

-minimum of 9 credits to be selected including 2 laboratory courses denoted by ♦ - Some EEOB and GDCB courses may also meet lab requirements

BIOL 306	Metabolic Physiology of Mammals	3 cr
BIOL 328	Cell Physiology of Human Disease	3 cr
BIOL 330	Plant Physiology	3 cr
BIOL 330L ♦	Plant Physiology Laboratory	1 cr
BIOL 335 ♦	Princ. of Human & Other Animal Phys.	4 cr
BIOL 336	Ecological & Evolutionary Animal Phys.	3 cr
BIOL 350X	Comprehensive Human Anatomy	3 cr
BIOL 351 ♦	Comparative Chordate Anatomy	5 cr
BIOL 352 ♦	Vertebrate Histology	4 cr
BIOL 353 ♦	Introductory Parasitology	4 cr
BIOL 354	Animal Behavior	3 cr
BIOL 354L ♦	Laboratory in Animal Behavior	1 cr
BIOL 355	Plants and People	3 cr
BIOL 356 ♦	Dendrology	4 cr
BIOL 364	Invertebrate Biology	3-4 cr
BIOL 365 ♦	Vertebrate Biology	4 cr
BIOL 366 ♦	Plant Systematics	4 cr
BIOL 371 ♦	Ecological Methods	3 cr
BIOL 381 ♦	Environmental Systems I	3 cr
BIOL 382 ♦	Environmental Systems II	3 cr
BIOL 393 ♦	North American Field Trips in Biology	1-4 cr
BIOL 394 ♦	International Field Trips in Biology	1-4 cr
BIOL 423	Developmental Biology	3 cr
BIOL 423L ♦	Developmental Biology Laboratory	1 cr
BIOL 428	Topics in Cell Biology	3 cr
BIOL 434	Endocrinology	3 cr
BIOL 436	Neurobiology	3 cr
BIOL 444	Introduction to Bioinformatics	4 cr
BIOL 451X ♦	Plant Evolution and Phylogeny	4 cr
BIOL 454 ♦	Plant Anatomy	4 cr
BIOL 455 ♦	Bryophyte and Lichen Biodiversity	3 cr
BIOL 456 ♦	Principles of Mycology	3 cr
BIOL 457 ♦	Herpetology	3 cr
BIOL 458 ♦	Ornithology	3 cr
BIOL 459 ♦	Mammology	3 cr
BIOL 462	Evolutionary Genetics	3 cr
BIOL 465 ♦	Morphometric Analysis	4 cr
BIOL 471	Introduction to Conservation Biology	3 cr
BIOL 472 ♦	Community Ecology	3 cr
BIOL 474	Plant Ecology	3 cr
BIOL 476	Functional Ecology	3 cr
BIOL 480 ♦	Studies in Marine Biology	1-8 cr
BIOL 481 ♦	Summer Field Studies	1-8 cr
BIOL 482 ♦	Tropical Biology	1-4 cr
BIOL 484	Ecosystem Ecology	3 cr
BIOL 486	Aquatic Ecology	3 cr
BIOL 486L ♦	Aquatic Ecology Lab	1 cr
BIOL 487	Microbial Ecology	3 cr
BIOL 488 ♦	Identification of Aquatic Organisms	1 cr
BIOL 489 ♦	Population Ecology	3 cr
BIOL 490 ♦	Independent Study	1-6 cr
BIOL 491 ♦	Laboratory Teaching Experience	1-2cr
BIOL 494 ♦	Biology Internship	1-3 cr
BIOL 495	Undergraduate Seminar (various topics)	1-3 cr
BIOL 498	Cooperative Education	R cr

EEOB 507	Advanced Animal Behavior	3 cr
EEOB 514	Evolutionary Ecology	3 cr
EEOB 531	Conservation Biology	3 cr
EEOB 534	General & Compar. Endocrinology	Var.
EEOB 535	Restoration Ecology	3 cr
EEOB 537	Plant Stress Biology	3 cr
EEOB 539	Environmental Physiology	Var.
EEOB 542	Intro to Molec Biol Techniques	1 cr
EEOB 551	Plant Evolution and Phylogeny	4 cr
EEOB 553	Agrostology	3 cr
EEOB 555	Bryophyte and Lichen Biodiversity	3 cr
EEOB 557	Herpetology	3 cr
EEOB 558	Ornithology	3 cr
EEOB 559	Mammalogy	3 cr
EEOB 560	Resource Ecology	3 cr
EEOB 561	Plant Diversity and Evolution	4 cr
EEOB 562	Evolutionary Genetics	3 cr
EEOB 563	Molecular Phylogenetics	3 cr
EEOB 564	Wetland Ecology	3 cr
EEOB 564l	Wetland Ecology	4 cr
EEOB 565	Morphometric Analysis	4 cr
EEOB 566	Molecular Evolution	3 cr
EEOB 567	Empirical Population Genetics	3 cr
EEOB 568	Advanced Systematics	3 cr
EEOB 569	Biogeography	3 cr
EEOB 570	Landscape Ecology	3 cr
EEOB 573	Techniques for Biology Teaching	Var.
EEOB 575	Field Mycology	4 cr
EEOB 575l	Field Mycology	4 cr
EEOB 576	Functional Ecology	3 cr
EEOB 580l	Ecology and Systematics of Diatoms	4 cr
EEOB 581	Environmental Systems : Intro to	4 cr
EEOB 584	Ecosystem Ecology	3 cr
EEOB 585	Advanced Community Ecology	3 cr
EEOB 586	Aquatic Ecology	3 cr
EEOB 586L	Aquatic Ecology Lab	1 cr
EEOB 587	Microbial Ecology	3 cr
EEOB 589	Population Ecology	3 cr
EEOB 590	Special Topics	Var.
EEOB 596	Ecology and Society	3 cr
EEOB 599	Creative Component	Var.
GDCB 508	Biotech in Ag, Food, & Human Health	3 cr
GDCB 510	Transmission Genetics	3 cr
GDCB 511	Molecular Genetics	3 cr
GDCB 512	Plant Growth and Development	2 cr
GDCB 513	Plant Metabolism	2 cr
GDCB 520	Genetic Engineering	3 cr
GDCB 528	Cellular Growth and Regulation	3 cr
GDCB 529	Plant Cell Biology	2 cr
GDCB 533	Principles of Developmental Biology	3 cr
GDCB 536	Statistics for Population Genetics	3 cr
GDCB 537	Statistics for Molecular Genetics	3 cr
GDCB 538	Computational Genomics & Evolution	3 cr
GDCB 539	Statist. Methods Computational Bio	3 cr
GDCB 542	Intro to Molecular Biol Techniques	1 cr
GDCB 544	Intro to Bioinformatics	4 cr
GDCB 545	Plant Molecular Biology	3 cr
GDCB 556	Cell, Molec, & Develop Neuroscience	Var.
GDCB 557	Advance Neuroscience Techniques	2 cr
GDCB 568	Bioinformatics II	3 cr
GDCB 570	Bioinformatics IV	3 cr
GDCB 590	Special Topics	Var.
GDCB 596	Genomic Data Processing	3 cr

Approved Advanced LIFE SCIENCE Courses from other ISU Departments (courses may have pre-requisites not included in the list and that do not meet advanced course requirements)

Agronomy

AGRON 317	Principles of Weed Science	3 cr
AGRON 354	Soils and Plant Growth	3 cr
AGRON 354L	Soils and Plant Growth Lab	1 cr
AGRON 417	Evolutionary Ecology of Weeds	3 cr
AGRON 421	Introduction to Plant Breeding	3 cr
AGRON 485	Soil Microbiology Ecology	3 cr

Animal Science

AN S 319	Animal Nutrition	3 cr
AN S 331	Domestic Animal Reproduction	3 cr
AN S 332	Lab Methods in Animal Reproduction	2 cr
AN S 333	Embryo Transfer and Related Technology	2 cr
AN S 334	Embryo Transfer Laboratory	1 cr
AN S 337	Lactation	2 cr
AN S 345	Growth & Devel. of Domestic Animals	3 cr
AN S 419	Advanced Animal Nutrition	2 cr

Anthropology

ANTHR 307	Biological Anthropology	3 cr
ANTHR 319	Skeletal Biology	3 cr
ANTHR 350	Primate Behavior	3 cr
ANTHR 424	Forensic Anthropology	3 cr
ANTHR 438	Primate Evolutionary Ecology and Behavior	3 cr

Biochemistry

BBMB 403	Microbial Biochemistry and Biotechnology	3 cr
BBMB 405	Biochemistry II	3 cr
BBMB 411	Techniques in Biochemical Research	3 cr
BBMB 420	Physiological Chemistry	3 cr
BBMB 430	Procaryotic Diversity and Ecology	3 cr
BBMB 440	Microbial Phys., Diversity, & Genetics Lab	3 cr
BBMB 451	Physical Biochemistry	2 cr

Biomedical Studies

B M S 329	Anatomy & Physiology of Domestic Animals	3 cr
B M S 401	Intro Aquatic Animal Health & Medicine	1 cr
B M S 415	Anatomy of Laboratory Animals	2 cr
B M S 416	Avian Anatomy	2 cr

Community and Regional Planning

C R P 451	Intro to GIS	3 cr
C R P 452	Geographic Data Mngmt & Plan Analy.	3 cr

Entomology

ENT 370	Insect Biology	3 cr
ENT 374	Insects and Our Health	3 cr
ENT 410	Insect-Virus Interactions	3 cr
ENT 425	Aquatic Insects	3 cr
ENT 471	Insect Ecology	3 cr
ENT 478	Molecular Biology of Protozoa	3 cr

Food Science and Human Nutrition

FS HN 360	Adv. Human Nutrition and Metabolism	4 cr
FS HN 361	Nutrition and Health Assessment	3 cr
FS HN 364	Nutrition and Prevention of Chronic Disease	3 cr
FS HN 461	Medical Nutrition and Disease I	3 cr
FS HN 464	Medical Nutrition and Disease II	3 cr

Horticulture

HORT 321	Horticulture Physiology	3 cr
HORT 322	Plant Propagation	3 cr
HORT 423	Plant Tissue, Cell and Protoplast	3 cr

Genetics

GEN 340	Human Genetics	3 cr
GEN 409	Molecular Genetics	3 cr
GEN 410	Analytical Genetics	3 cr

Kinesiology

KIN 355	Biomechanics	3 cr

Microbiology

MICRO 302	Biology of Microorganisms	3 cr
MICRO 302L	Microbiology Lab	1 cr
MICRO 310	Medical Microbiology	3 cr
MICRO 310L	Medical Microbiology Lab	1 cr
MICRO 320	Microbial Physiology and Genetics	3 cr
MICRO 402	Microbial Genetics	3 cr
MICRO 408	Virology	3 cr
MICRO 410	Insect-Virus Interactions….	3 cr
MICRO 475	Immunology	3 cr

Natural Resources and Ecology Management

NREM 301	Forest Ecology and Soils	4 cr
NREM 345	Nat. Resource Photogrametry & GIS	3 cr
NREM 390	Fire Ecology and Management	3 cr
NREM 407	Watershed Management	3 cr
NREM 446	Integrating GPS & GIS for Nat. Res. Mgmnt.	3 cr
A ECL 321	Fish Biology	3 cr
A ECL 366	Natural History of Iowa Vertebrates	3 cr
A ECL 418	Stream Ecology	3 cr
A ECL 454	Principles of Wildlife Disease	3 cr
A ECL 442	Aquaculture	3 cr
FOR 302	Silviculture	

Plant Pathology

PL P 408	Principles of Plant Pathology	3 cr
PL P 416	Forest Insect & Disease Management	3 cr
PL P 477	Bacteria-Plant Interactions	3 cr

Psychology

PSYCH 310	Brain and Behavior	3 cr
PSYCH 315	Drugs and Behavior	3 cr

Iowa Lakeside Laboratory *-Courses are taught Summer Sessions only at the Lakeside Facility in Milford, IA. Please check for available courses on the Lakeside Lab web page and consult your advisor for those that apply.*