

MAJOR IN ZOOLOGY



Zoologists study animals—their origin, behavior, diseases, and life processes. Some experiment with live animals in controlled or natural surroundings while others study the structure and function of animal cells, tissues, and organ systems. Some zoologists go on to study veterinary medicine. Zoologists participate in research that has practical outcomes in farming, medicine, pharmacy, wildlife conservation, and pest control. Zoology encompasses many specialties. At CSU, students may focus on general training in animal biology or choose a concentration in the following areas: animal behavior, development, aquatic biology, ecology (how animals adapt to their environments), genetics and evolution, invertebrate organisms, cellular/molecular biology and physiology, systematics, and morphology of vertebrate organisms.

The curriculum is designed to provide a basic understanding of zoology through a variety of laboratory experiences in combination with the study of basic theories and defining concepts. The program encourages flexibility, strength, and depth. The course work includes a two-semester introductory biology sequence, one course each in invertebrates and vertebrates, and courses in evolution and ecology. Required courses in the physical sciences include a minimum of one year of introductory chemistry and at least one course in organic chemistry, two courses in physics (all with labs) and one in biochemistry. A course each in calculus and statistics is also required. In addition, students select a minimum of 15 credits of Zoology courses in their chosen areas of concentration.

Learning Objectives

In addition to mastery of biological knowledge and skills, students will:

1. Interpret scientific data.
2. Demonstrate strong organizational and laboratory skills.
3. Define scientific hypotheses and design experiments to test them.

4. Work effectively in groups.
5. Demonstrate strong writing and oral communication skills.

Potential Occupations

This major prepares students to work in various areas of zoology, such as research or private industry, or to begin graduate school or professional studies. Career opportunities include medical biotechnology, research technician, protective agencies such as shelters and refuges, trainers and handlers, animal-related business, aquatic/marine biologists, exotic animal specialists, and wildlife conservation. It is an appropriate major for students planning to attend medical or veterinary school. Graduates often pursue advanced degrees to carry out basic research or advance into leadership positions in industry. Participation in internships, laboratory, or research opportunities is highly recommended and encouraged by the department to enhance practical training and development.

Additional careers for Zoology majors include, but are not limited to: aquarium and museum curator/director; zoo keeper, animal trainer and instructor, science librarian, environmental technician, fish and wildlife technician, veterinary technician/assistant, marine bacteriologist or biologist or ecologist, humane society positions, cytotechnologist, ecologist, fisheries biologist or conservationist, laboratory technician, marketing researcher, medical technologist, park ranger, pharmaceutical sales representative, production supervisor, quality analysis technician in food or pharmaceutical industry, radiation protection technician, research technician, industrial hygienist, wildlife photographer.

Change of Major Process

- **For future or incoming CSU students:** Please contact Admissions (<https://admissions.colostate.edu/>) to declare Zoology.
- **For current on-campus CSU students:** To learn more about Zoology and decide if you are interested in declaring, you must first review the Zoology Major Requirements (<https://www.biology.colostate.edu/undergraduate-students/>). Then sign up for and attend a Major Information Session (<https://www.biology.colostate.edu/advising/>):
 - These are 50-minute group sessions led by advisors with individualized course recommendations and built-in time to answer your questions.
 - If you are exploring the Zoology major, or if you are registering before your session, we recommend you review the Zoology Major Requirements link above and register for any open courses that you are eligible to add.

Requirements Effective Fall 2024

To be qualified for graduation, students in the Zoology major must have a minimum grade of C- in each of their biological, physical science, and mathematical courses used to meet requirements for the major. This applies to courses taken as substitutions for meeting these requirements. The minimum scholastic average acceptable for graduation is 2.000 computed only for courses attempted at CSU.

Freshman

		AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	1

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CO 150	College Composition (GT-CO2)	1A	3
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	4
LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	3A	4
Select one from the following:			4
MATH 155	Calculus for Biological Scientists I (GT-MA1)	1B	
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			6
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)			3
Total Credits			29
Sophomore			
BZ 212	Animal Biology-Invertebrates		4
BZ 214	Animal Biology-Vertebrates		4
BZ 220	Introduction to Evolution		3
CHEM 113	General Chemistry II		3
CHEM 114	General Chemistry Lab II		1
CHEM 245 ²	Fundamentals of Organic Chemistry		4
CHEM 246	Fundamentals of Organic Chemistry Laboratory		1
STAT 301 or 307	Introduction to Applied Statistical Methods		3
	Introduction to Biostatistics		
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			3
Electives ¹			2
Total Credits			31
Junior			
BZ 310	Cell Biology		4
Select one group from the following:			4-6
Group A:			
BC 351	Principles of Biochemistry		
Group B:			
BC 401	Comprehensive Biochemistry I		
BC 403	Comprehensive Biochemistry II		
Select one group from the following:			10
Group A:			
PH 121	General Physics I (GT-SC1)	3A	
PH 122	General Physics II (GT-SC1)	3A	
Group B:			
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
Upper-Division Zoology List			6
Electives ¹			4-6
Total Credits			30
Senior			
BZ 350	Molecular and General Genetics	4A,4B	4
LIFE 320	Ecology	4C	3
Upper-Division Zoology List			9

Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)	2	3
Electives ¹		11

Total Credits **30**

Program Total Credits: **120**

Upper-Division Zoology List

Code	Title	Credits			
ANEQ 320	Principles of Animal Nutrition	3	BZ 492A	Seminar: Behavior	1-3
ANEQ 322	Pet Nutrition	2	BZ 492B	Seminar: Ecology	1-3
ANEQ 323	Zoo Nutrition	2	BZ 492C	Seminar: Genetics	1-3
ANTH 470	Paleontology Field School	4	BZ 492D	Seminar: Ornithology	1-3
BSPM 302	Applied and General Entomology	2	BZ 492E	Seminar: Herpetology	1-3
BSPM 303A	Entomology Laboratory: General	2	BZ 492F	Seminar: Evolution	1-3
BZ 300	Animal Behavior	3	BZ 496	Group Study—Biology	1-3
BZ 311	Developmental Biology	4	BZ 505	Cognitive Ecology	3
BZ 329	Herpetology	4	BZ 515	Physiological Ecology of Marine Vertebrates	3
BZ 330	Mammalogy	4	BZ 525	Advanced Conservation & Evolutionary Genomics	4
BZ 333	Introductory Mycology	4	BZ 535	Behavioral and Cognitive Ecology	3
BZ 335	Ornithology	4	BZ 560	Teaching and Communicating Science	3
BZ 340	Field Mammalogy	4	BZ 562	Computational Approaches in Molecular Ecology	2
BZ 342	Exploring Range Shifts in a Changing World	3	BZ 565/MIP 565	Next Generation Sequencing Platform/ Libraries	1
BZ 348/MATH 348	Theory of Population and Evolutionary Ecology	4	BZ 568/FW 568	Sustaining River Ecosystems in Changing World	3
BZ 349	Tropical Ecology and Evolution	3	FW 300	Biology and Diversity of Fishes	2
BZ 360	Bioinformatics and Genomics	4	FW 301	Ichthyology Laboratory	1
BZ 401	Comparative Animal Physiology	3	FW 400	Conservation of Fish in Aquatic Ecosystems	3
BZ 415	Marine Biology	4	FW 405	Fish Physiology	3
BZ 418	Ecology of Infectious Diseases	4	GEOL 342	Paleontology	3
BZ 420	Evolutionary Medicine	3	NR 312	Applied Insect Ecology	3
BZ 424/BSPM 424	Principles of Systematic Science	3	PHIL 325	Philosophy of Natural Science	3
BZ 425	Conservation and Population Genomics	3	PHIL 326	Philosophy of Biology	3
BZ 430	Animal Behavior and Conservation	3	A maximum of 6 credits may be selected from the following courses:		
BZ 433	Behavioral Genetics	3	BMS 300	Principles of Human Physiology	
BZ 435A	Study Abroad—Honduras: Field Course—Dolphin Behavior and Physiology	2	BMS 305	Domestic Animal Gross Anatomy	
BZ 435B	Study Abroad—Mexico: Practices in Marine Biology and Ecology	3	MIP 300	General Microbiology	
BZ 435C	Study Abroad—Kenya: Biology and Behavior of African Mammals	3	MIP 302	General Microbiology Laboratory	
BZ 449A	Study Abroad: Ecology/Conservation—Ecuadorian Biodiversity	4	MIP 315	Pathology of Human and Animal Disease	
BZ 455	Human Heredity and Birth Defects	3	MIP 342	Immunology	
BZ 460	Genome Evolution	4	MIP 343	Immunology Laboratory	
BZ 462/MIP 462/ BSPM 462	Parasitology and Vector Biology	5	A maximum of 3 credits may be selected from the following courses:		
BZ 471	Stream Biology and Ecology	3	BZ 384	Supervised College Teaching	
BZ 472	Stream Biology and Ecology Laboratory	1	BZ 487	Internship	
BZ 475	Marine Mammalogy	3	BZ 495	Independent Study	
BZ 476/BZ 576	Genetics of Model Organisms	3	BZ 498	Laboratory or Field Research	
BZ 477	Genome Editing Laboratory	2			
BZ 478/VS 478	Biology and Behavior of Cats	3			
BZ 479/VS 479	Biology and Behavior of Dogs	3			

¹ Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- to 400-level).

² CHEM 341, CHEM 343, and CHEM 344 may be taken as an alternative to CHEM 245 and CHEM 246.

Major Completion Map

Distinctive Requirements for Degree Program:

TO PREPARE FOR FIRST SEMESTER: The curriculum for the Zoology major assumes students enter college prepared to take calculus. Entering students who are not prepared to take calculus will need to fulfill pre-

calculus requirements in the first semester. LIFE 102 requires high school chemistry as a prerequisite; CHEM 111 requires Algebra II as a prerequisite (this prerequisite is met by having Algebra II by test credit, transfer credit, or placement out of MATH 117 and MATH 118 on Math Placement Exam). Earned grade of C or better is required in each of their biological, physical science, and mathematical courses used to meet requirements for the major. Term 5 may have to be adjusted if the student chooses 2 semesters of Organic Chemistry. It is recommended that you do not take BZ 310 and BZ 350 together.

Freshman

Semester 1	Critical	Recommended	AUCC	Credits
CO 150 College Composition (GT-CO2)	X		1A	3
LIFE 102 Attributes of Living Systems (GT-SC1)	X		3A	4
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		X	3B	3
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		X	1C	3
MATH 117, MATH 118, MATH 124, MATH 125 may be necessary for some students to fulfill pre-calculus requirements.	X			
Total Credits				13

Semester 2	Critical	Recommended	AUCC	Credits
CHEM 111 General Chemistry I (GT-SC2)	X		3A	4
CHEM 112 General Chemistry Lab I (GT-SC1)	X		3A	1
LIFE 103 Biology of Organisms-Animals and Plants (GT-SC1)	X		3A	4
Select one course from the following:	X			4
MATH 155 Calculus for Biological Scientists I (GT-MA1)			1B	
MATH 160 Calculus for Physical Scientists I (GT-MA1)			1B	
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		X	3B	3
CO 150 must be completed by the end of Semester 2.	X			
Total Credits				16

Sophomore

Semester 3	Critical	Recommended	AUCC	Credits
BZ 212 Animal Biology-Invertebrates	X			4
BZ 220 Introduction to Evolution	X			3
CHEM 113 General Chemistry II	X			3
CHEM 114 General Chemistry Lab II	X			1
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		X	3D	3
Elective		X		2
MATH 155 or MATH 160 must be completed by the end of Semester 3.	X			
Total Credits				16

Semester 4	Critical	Recommended	AUCC	Credits
BZ 214 Animal Biology-Vertebrates	X			4
CHEM 245 Fundamentals of Organic Chemistry	X			4
CHEM 246 Fundamentals of Organic Chemistry Laboratory	X			1
Select one course from the following:	X			3
STAT 301 Introduction to Applied Statistical Methods				
STAT 307 Introduction to Biostatistics				
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		X	3C	3
Total Credits				15

Junior					
Semester 5		Critical	Recommended	AUCC	Credits
Select one course from the following:		X			3-4
BC 351	Principles of Biochemistry				
BC 401	Comprehensive Biochemistry I				
Select one course from the following:		X			5
PH 121	General Physics I (GT-SC1)			3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)			3A	
Upper-Division Zoology Course (See List on Requirements Tab)		X			3
Elective			X		2-3
STAT 301 or STAT 307 must be completed by the end of Semester 5.		X			
Total Credits					14
Semester 6		Critical	Recommended	AUCC	Credits
BZ 310	Cell Biology	X			4
Only complete if BC 401 was previously taken in semester 5:		X			0-3
BC 403	Comprehensive Biochemistry II				
Select one course from the following:		X			5
PH 122	General Physics II (GT-SC1)			3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)			3A	
Upper-Division Zoology Course (See List on Requirements Tab)		X			3
Elective			X		1-4
Total Credits					16
Senior					
Semester 7		Critical	Recommended	AUCC	Credits
BZ 350	Molecular and General Genetics	X		4A,4B	4
Upper-Division Zoology Course (See List on Requirements Tab)		X			3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
Electives			X		5
PH 121 must be completed by the end of Semester 7.		X			
Total Credits					15
Semester 8		Critical	Recommended	AUCC	Credits
LIFE 320	Ecology	X		4C	3
Upper-Division Zoology Courses (See List on Requirements Tab)		X			6
Electives			X		6
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.		X			
Total Credits					15
Program Total Credits:					120