

# ZOOLOGY (ZOOL)

Zoology is a field within the biological sciences that is dedicated to the study of animals: their classification, evolution, and development along with their habits, behaviors, and relationships. The zoology majors (B.S. and B.A.) build on the core biology curriculum by including courses in comparative morphology, physiology, and a wide selection of animal survey classes. In the Bachelor of Science degree program, you will take a series of foundational courses in biology, chemistry, physics, statistics, and ecology while having the flexibility to specialize within the major and/or the pursuance of a minor. The Bachelor of Arts degree in zoology is designed as a flexible program, allowing you to pursue an interdisciplinary or dual major for a career in fields such as education, conservation, and public relations.

The University's location and facilities provide unique opportunities for the study of aquatic and terrestrial animals due to its access to the seacoast and the lakes region of New Hampshire, White Mountain National Forest, and the presence of two coastal marine laboratories, as well as estuarine and freshwater facilities. There is a strong teaching and research emphasis on ecological and physiological processes in aquatic animals and ecosystems. Major strengths of the program are the hands-on approach to teaching and emphasis on involving undergraduates in research.

<https://colsa.unh.edu/biological-sciences>

## Programs

- [Zoology Major \(B.A.\)](#)
- [Zoology Major \(B.S.\)](#)
- [Zoology Minor](#)

## Courses

### Zoology (ZOOL)

#### ZOOL 400 - Professional Perspectives in Zoology

**Credits:** 1

Presentations by departmental faculty provide an informal overview of various zoological topics and professional opportunities. The course acquaints students with faculty, provides information on departmental research projects, and facilitates early research involvement for students. Required for all first-year zoology majors.

**Grade Mode:** Credit/Fail Grading

#### ZOOL 401 - Human Biology

**Credits:** 0 or 4

How does the human body function in the face of constant flux? In this introductory biology course you will explore the molecules, cells, and organ systems that keep you healthy through the multidisciplinary lenses of chemistry, genetics, and homeostasis. Hands-on experimentation allows you to investigate common health-related questions such as the effects of caffeine on reaction time and the effects of handwashing on bacterial growth and transmission. Cannot be taken for credit after BMS 507 and BMS 508. Lab.

**Attributes:** Biological Science(Discovery); Discovery Lab Course

**Equivalent(s):** ZOOL 507, ZOOL 508

**Grade Mode:** Letter Grading

**Special Fee:** Yes

#### ZOOL 518 - Comparative Morphology and Biology of Vertebrates

**Credits:** 0 or 4

Why are vertebrates so successful on Earth? In this hands-on comparative biology course you will systematically examine the evolutionary history of form and function by exploring key adaptations that allowed vertebrates to diversify and thrive in the aquatic, terrestrial, and arboreal habitats they occupy today. In lab you will hone your dissection skills as you track ancestral and derived characteristics in 5 representative species on the vertebrate tree of life. Lab.

**Prerequisite(s):** BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or NR 439 with a minimum grade of D- or BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D-.

**Grade Mode:** Letter Grading

**Special Fee:** Yes

#### ZOOL 529 - Developmental Biology

**Credits:** 0 or 4

Developmental biology explores how organisms construct themselves in each generation, and how those processes interact with ecological and evolutionary forces. The course examines development in various phyla, with an overarching focus on the design and interpretation of experiments using both classical and modern techniques. Labs include student-designed experiments and observation of development in several species of vertebrate embryos. Lab.

**Prerequisite(s):** BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D- and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Grade Mode:** Letter Grading

**Special Fee:** Yes

#### ZOOL 542 - Ornithology

**Credits:** 4

Students explore the biology, behavior and biodiversity of birds in this animal survey course. Ethical birdwatching, census techniques, and identification skills will be developed by observing resident and migrant species throughout the semester. Avian diversity across the UNH campus will be documented and compared at multiple time points and locations. Lecture, Lab, and Optional off-campus field trips.

**Prerequisite(s):** BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-.

**Grade Mode:** Letter Grading

#### ZOOL 555 - Introduction to Entomology

**Credits:** 4

This course is about insects, the animal taxon that represents 50% of all life forms on Earth. During this course students will explore this incredible diversity by studying insects from inside out and learning about major evolutionary events in the last 500 million years that shaped this incredible diversity. This course will also highlight the beneficial and detrimental roles insects play in human society: students will gain insights into medical and veterinary entomology, coastal entomology, principles of sustainable pest management and insect conservation. Throughout the course, students will broadly apply online tools for insect identification and will be exposed to community driven nature conservation and monitoring efforts using online applications, such as iNaturalist and bugguide. Lab.

**Prerequisite(s):** BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D-.

**Grade Mode:** Letter Grading

**Special Fee:** Yes

**ZOOL 566 - Herpetology****Credits:** 4

This course will serve as an introduction to the morphology, behavior, and evolutionary ecology of reptiles (tuataras, turtles, snakes, lizards, and crocodilians) and amphibians (frogs, salamanders, and caecilians), with a special emphasis on New England taxa. The course will include field excursions, short-term research projects, and the comparative examination of specimens.

**Prerequisite(s):** BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-.

**Grade Mode:** Letter Grading**Special Fee:** Yes**ZOOL 600 - Field Experience****Credits:** 1-4

A supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student.

**Repeat Rule:** May be repeated for a maximum of 8 credits.

**Grade Mode:** Credit/Fail Grading**ZOOL 610 - Principles of Aquaculture****Credits:** 4

Introduces the culture practices employed for production of aquatic organisms. Topics include ecological and environmental considerations, selective breeding, nutrition, diseases, processing, and marketing. Emphasis on finfish.

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Grade Mode:** Letter Grading**ZOOL 613W - Animal Behavior****Credits:** 5

In this course we will first investigate the mechanisms of behavior—how do animals behave the way they do? We'll then spend the bulk of the semester exploring the ecology and evolution of behavior—why do animals behave the way they do? In lab, we will use hands-on activities to complement material from class, and you'll gain first-hand research experience when you design and conduct your own animal behavior study. Lab.

**Attributes:** Writing Intensive Course

**Prerequisite(s):** BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-.

**Equivalent(s):** ZOOL 613, ZOOL 713**Grade Mode:** Letter Grading**Special Fee:** Yes**ZOOL 625 - Principles of Animal Physiology****Credits:** 3

Introduces the principles of animal function. The major systems (digestion, metabolism, respiration, circulation, osmotic and ionic regulation, nerve-muscle function, endocrine control) are covered with emphasis on functional mechanisms at the cell and tissue levels.

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Equivalent(s):** ANSC 627**Grade Mode:** Letter Grading**ZOOL 626W - Animal Physiology Laboratory****Credits:** 2

Basic training in the measurement of function in animals, data analysis and expression, and the development of scientific communication skills.

**Co-requisite:** ZOOL 625**Attributes:** Writing Intensive Course**Equivalent(s):** ZOOL 626**Grade Mode:** Letter Grading**Special Fee:** Yes**ZOOL 690 - Evolution****Credits:** 4

Evolutionary biology is about uncovering the past, understanding the present, and predicting the future of animals, plants, and microbes. It also offers insight into how scientific ideas change through time. This course covers natural selection and adaptation, phylogeny, population genetics and structure, origins and extinction of species, domestication, and evolutionary medicine. Additional topics may include human evolution and evolutionary impacts, biogeography, and social evolution, as well as the intersections between evolution, ecology and development.

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Equivalent(s):** ZOOL 690W**Grade Mode:** Letter Grading**ZOOL 690W - Evolution****Credits:** 4

Evolutionary biology is about uncovering the past, understanding the present, and predicting the future of animals, plants, and microbes. It also offers insight into how scientific ideas change through time. This course covers natural selection and adaptation, phylogeny, population genetics and structure, origins and extinction of species, domestication, and evolutionary medicine. Additional topics may include human evolution and evolutionary impacts, biogeography, and social evolution, as well as the intersections between evolution, ecology and development.

**Attributes:** Writing Intensive Course

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Equivalent(s):** ZOOL 690**Grade Mode:** Letter Grading**ZOOL 708 - Stream Ecology****Credits:** 4

Ecological relationships of organisms in flowing water; streams as ecosystems. Lectures on physical and chemical features of streams, floral and faunal communities, and factors controlling populations and behavior of stream organisms. Lab exercises employ both field and laboratory experimental techniques. Lab. (Not offered every year.)

**Grade Mode:** Letter Grading**Special Fee:** Yes

**ZOOL 710 - Sharks and Bony Fishes****Credits:** 0 or 4

Some fish swimming today are hundreds of years old, whereas others complete their life cycle in two months! This course provides an introduction to the diversity of fishes found across the globe, including elasmobranchs (sharks, skates, and rays) and teleosts (bony fishes). Particular attention will be paid to fishes local to New Hampshire and New England. Students will learn about fish anatomy, physiology, and ecology. Lab. (Offered in alternative years.)

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Grade Mode:** Letter Grading**Special Fee:** Yes**ZOOL 726 - Conservation Behavior****Credits:** 4

What's the best way to deter an elephant from raiding crops? Is it with chili peppers? Bees? This is one example from the new interdisciplinary field of "conservation behavior," which uses the study of animal behavior to inform how we manage wildlife populations. This course targets students well-versed in either animal behavior or wildlife ecology who wish to learn more about the other side. We will focus heavily on reading, writing, discussion, and career preparation.

**Prerequisite(s):** ZOOL 613 with a minimum grade of D- or ZOOL 613W with a minimum grade of D- or NR 433 with a minimum grade of D- or NR 650 with a minimum grade of D-.

**Grade Mode:** Letter Grading**ZOOL 733W - Behavioral Ecology****Credits:** 0 or 4

Behavioral ecology is the evolution of animal behavior played out on the stage of ecology--why might a certain behavior be adaptive in a certain context? In this course, we will pursue in-depth, high-level explorations of the central topics of animal behavior, all through the lens of evolution. We will also focus heavily on improving reading, writing, and presentation skills.

**Attributes:** Writing Intensive Course

**Prerequisite(s):** ZOOL 613 with a minimum grade of D- or ZOOL 613W with a minimum grade of D-.

**Equivalent(s):** ZOOL 733**Grade Mode:** Letter Grading**ZOOL 736 - Genes and Behavior****Credits:** 4

Genes and behavior examines the genetic underpinnings of animal behavior, and how behavior evolves on a genetic level. The course primarily relies on readings from the primary literature, using examples from laboratory model organisms, animals in their natural habitats, and humans. Topics include aggressiveness, social behavior, personality, parental care, communication, mating behavior, novelty seeking behavior, and foraging. This interdisciplinary course examines these behaviors at multiple levels, including genomics, population genetics, molecular genetics, epigenetics, endocrinology, and neurobiology.

**Prerequisite(s):** (GEN 604 with a minimum grade of D- or ANSC 612 with a minimum grade of D-) and (ZOOL 613 with a minimum grade of D- or ZOOL 613W with a minimum grade of D-).

**Grade Mode:** Letter Grading**ZOOL 740 - Acoustic Ecology****Credits:** 4

This course examines the acoustic environment and how alterations to the acoustic environment from human activities and climate change result in permanent changes to animal behavior and the resulting soundscape. Focusing on using acoustics as a tool to monitor species and habitats, students will learn quantitative approaches and best practices for acoustic ecology investigations. Students will explore the emerging field of ecological acoustics through primary literature and hands-on, independent research in habitats surrounding UNH campus. This course is intended for advanced undergraduate or graduate students interested in animal behavior, ecology, wildlife and conservation biology, or zoology.

**Prerequisite(s):** BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-.

**Grade Mode:** Letter Grading**Special Fee:** Yes**ZOOL 777W - Neuroethology****Credits:** 4

Students taking this course will discover how some of the most remarkable behavioral adaptations in animals can be understood by examining specialized sensory systems and neural circuits. By exploring the complex interactions between animal behavior, neural systems, evolutionary relationships, anatomy, physiology and ecology, students will be better equipped to understand the neural basis of behavior. A culminating writing project will help sharpen students' scientific writing skills, and the ability to understand the primary neuroethology literature.

**Attributes:** Writing Intensive Course

**Prerequisite(s):** (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-).

**Equivalent(s):** ZOOL 777**Grade Mode:** Letter Grading**ZOOL 795 - Independent Investigations in Zoology****Credits:** 1-4

Independent study in a topic related to Zoology, arranged by the student with a faculty sponsor. Enrollment by permission only.

**Repeat Rule:** May be repeated for a maximum of 8 credits. May be repeated up to 5 times.

**Grade Mode:** Letter Grading**ZOOL 799H - Honors Senior Thesis****Credits:** 1-4

Working under the direction of a faculty sponsor, the student plans and carries out independent research resulting in a written thesis. Limited to students entering their senior year; required for students in the honors program or working toward honors-in-major. A two-semester sequence. 2-4 credits each semester. IA (continuous grading) given at the end of the first semester.

**Attributes:** Honors course; Writing Intensive Course

**Repeat Rule:** May be repeated for a maximum of 8 credits.

**Equivalent(s):** ZOOL 799**Grade Mode:** Letter Grading

## Faculty

Department of Biological Sciences Faculty