

ZOOLOGY (ZOOLOGY)

ZOOLOGY/BIOLOGY 101 – ANIMAL BIOLOGY

3 credits.

General biological principles. Topics include: evolution, ecology, animal behavior, cell structure and function, genetics and molecular genetics and the physiology of a variety of organ systems emphasizing function in humans.

Requisites: Not open to students with credit for BOTANY/BIOLOGY/ZOOLOGY 151 or 152

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/BIOLOGY 102 – ANIMAL BIOLOGY LABORATORY

2 credits.

General concepts of animal biology at an introductory level emphasizing the evolutionary relationships between animals. Learn about general body plans and strategies used to accomplish the basic tasks of staying alive in major animal groups using preserved and live animals. Study the diversity within each group of animals by integrating the body plans with the lifestyle and ecology of animals. Dissections of earthworm, freshwater mussel, squid, sea star, and rat aid the study of these general principles.

Requisites: Not open to students with credit for BOTANY/BIOLOGY/ZOOLOGY 151 or 152

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/BIOLOGY/BOTANY 151 – INTRODUCTORY BIOLOGY

5 credits.

Topics include: cell structure and function, cellular metabolism (enzymes, respiration, photosynthesis), information flow (DNA, RNA, protein), principles of genetics and selected topics in Animal Physiology.

Requisites: Not open to students with credit for BIOLOGY/ZOOLOGY 101, 102 or BIOLOGY/BOTANY 130

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/BIOLOGY/BOTANY 152 – INTRODUCTORY BIOLOGY

5 credits.

Topics include: selected topics in plant physiology, a survey of the five major kingdoms of organisms, speciation and evolutionary theory, and ecology at multiple levels of the biological hierarchy.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151

Course Designation: Gen Ed - Communication Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 153 – INTRODUCTORY BIOLOGY

3 credits.

Topics include: cell structure and function, cellular metabolism (enzymes, respiration, photosynthesis), information flow (DNA, RNA, protein), principles of genetics, and selected topics in Animal Physiology. Designed for engineering majors that do not need a lab component.

Requisites: Not open to students with credit for BIOLOGY/ZOOLOGY 101, 102 or BIOLOGY/BOTANY 130

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/PL PATH 154 – TINY EARTH: ANTIBIOTIC DISCOVERY RESEARCH

2 credits.

Learn basic methodology in scientific research and discovery, including laboratory techniques, quantitative reasoning, scientific communication, and collaboration. Gain hands-on laboratory experience working with microbes to test original hypotheses concerning the discovery of potential antibiotic compounds while addressing the world's antibiotic resistance crisis by contributing data to the global "Tiny Earth" network of researchers to advance potential drug development. Tiny Earth seeks to encourage students to pursue careers in science through real-world, applied research experiences and aims to address a worldwide health threat of the diminishing supply of effective antibiotics by "student-sourcing antibiotic discovery." Concurrent enrollment in BIOLOGY/BOTANY/ZOOLOGY 152 is required for permission to enroll.

Requisites: Consent of instructor**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2025

Learning Outcomes: 1. Demonstrate basic knowledge of microbes and antibiotic resistance by (1) sufficiently explaining the process of natural selection with the accurate use of terminology, (2) describing morphological and physiological variation in bacteria and how this relates to bacterial taxonomy, and (3) summarizing mechanisms of the spread of antibiotic resistance genes across the microbial world.

Audience: Undergraduate

2. Demonstrate scientific competency as shown by their ability to (1) propose an original research question and hypothesis, (2) develop a biological rationale for the hypothesis, (3) select appropriate protocols to test the hypothesis, and (4) perform the research collaboratively with group members in a cordial and respectful way.

Audience: Undergraduate

3. Demonstrate proper techniques in basic micro- and molecular biology by (1) pipetting fluids with volume accuracy, (2) plating microbes via spread, patch, and streak methods, (3) using proper sterile technique, and (4) performing protocols for polymerase chain reaction (PCR), gel electrophoresis, and BLAST analysis for DNA amplification and sequencing.

Audience: Undergraduate

4. Demonstrate quantitative reasoning as shown by their ability to (1) select an appropriate statistical analysis for a given data set and research question, (2) carry out the statistical analysis using a vetted program (e.g. online statistical calculator tool such as Vassarstats.com), and (3) accurately interpret and the translate the results into a meaningful statement.

Audience: Undergraduate

5. Demonstrate scientific communication as shown by their ability to (1) clearly express a hypothesis, general methodology, and results in formal writing, (2) accurately visualize numerical results in the form of graph, (3) satisfactorily deliver aspects of the research project and findings via oral presentation and scientific poster presentation.

Audience: Undergraduate

ZOOLOGY 199 – DIRECTED STUDY

1-3 credits.

Directed study/independent research. Experience hypothesis development, research through faculty mentorship.

Requisites: Consent of instructor**Course Designation:** Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions**Last Taught:** Fall 2022**ZOOLOGY 200 – TOPICS IN BIOLOGY**

1-3 credits.

Introductory topics in biological sciences.

Requisites: None**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions**Last Taught:** Spring 2025

Learning Outcomes: 1. Develop an understanding of various basic key concepts in biological sciences from molecular biology to ecosystem ecology.

Audience: Undergraduate

2. Make connections among biological concepts.

Audience: Undergraduate

3. Appreciate biological sciences in a natural world

Audience: Undergraduate

4. Make connections between biology and societal issues

Audience: Undergraduate

ZOOLOGY/BOTANY/ENVIR ST 260 – INTRODUCTORY ECOLOGY

3 credits.

The relationships of organisms and the environment. Population dynamics and community organization, human-environment relationships, action programs.

Requisites: None**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2025

ZOOLOGY 275 – BIOLOGY OF THE DINOSAURS

3 credits.

Biology, ecology and evolution of dinosaurs. Use anatomical correlates and phylogeny to understand physiology, adaptation, and evolutionary transitions. Examples include predator-prey interactions, the evolutionary transition to flight, and how late Mesozoic ecology gave rise to our modern world.

Requisites: None**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Elementary

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Fall 2024**Learning Outcomes:** 1. Demonstrate comprehension of paleobiological processes, and awareness of major concepts and debates.

Audience: Undergraduate

2. Connect the role of phylogeny in shaping terrestrial ecosystems past and present.

Audience: Undergraduate

3. Identify anatomical correlates of physiological processes.

Audience: Undergraduate

4. Assess how changing environments drive major evolutionary transitions.

Audience: Undergraduate

5. Develop initial competency reading scientific articles.

Audience: Undergraduate

6. Evaluate scientific claims about living and extinct animals.

Audience: Undergraduate

ZOOLOGY 299 – DIRECTED STUDIES IN ZOOLOGY

1-3 credits.

Directed study/independent research. Experience hypothesis development, research through faculty mentorship.

Requisites: Consent of instructor**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Intermediate

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions**Last Taught:** Spring 2025**ZOOLOGY 300 – INVERTEBRATE BIOLOGY AND EVOLUTION**

3 credits.

Introduction to invertebrate diversity and biology, with emphasis on anatomy, development, and systematic relationships of the main animal phyla. Phyla are discussed in the context of major themes in animal evolution, such as the origin of tissue layers, the diversity of feeding mechanisms, the evolution of terrestrialization, patterns of diversification through time, and the conservation of transcriptional circuitry. Focus on animal diversity from a phylogenetic and developmental perspective.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), (ZOOLOGY/BIOLOGY/BOTANY 151 and 152) or BIOCORE 381**Course Designation:** Level – Intermediate

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2023**ZOOLOGY 301 – INVERTEBRATE BIOLOGY AND EVOLUTION LAB**

2 credits.

Introduction to invertebrate diversity and biology, with emphasis on anatomy, development, and systematic relationships of the main animal phyla. Phyla are discussed in the context of major themes in animal evolution, such as the origin of tissue layers, the diversity of feeding mechanisms, the evolution of terrestrialization, patterns of diversification through time, and the conservation of transcriptional circuitry. Focus on animal diversity from a phylogenetic and developmental perspective.

Requisites: Concurrent enrollment in ZOOLOGY 300**Course Designation:** Level – Intermediate

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2023**ZOOLOGY/ENTOM 302 – INTRODUCTION TO ENTOMOLOGY**

4 credits.

Principles including morphology and classification.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, ZOOLOGY 153, or BIOCORE 381**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Intermediate

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2025**ZOOLOGY 303 – AQUATIC INVERTEBRATE BIOLOGY**

3 credits.

The form, function, development, basic physiology and ecology of the freshwater and marine invertebrates in the context of their environment. Study live invertebrate specimens, their habitat selection, adaptation and diversity.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Intermediate

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Fall 2024

ZOOLOGY 304 – MARINE BIOLOGY

2 credits.

Explore the biological and ecological systems of the oceans and marginal seas. Focus on understanding how marine organisms interact with their physical environment and how the biological components of the oceans are interconnected through trophic interactions and habitat selection.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Summer 2024

Learning Outcomes: 1. Describe the oceanic environment, its chemical and physical factors and life in a fluid medium.

Audience: Undergraduate

2. Explain the processes in the open sea: Nutrients, productivity, food webs.

Audience: Undergraduate

3. Identify and describe marine organisms in their habitats: How they function and adapt.

Audience: Undergraduate

4. Explain the drivers behind the diversity of marine life: Habitat stability and diversity, evolutionary and ecological connections.

Audience: Undergraduate

5. Explain and discuss the human impact on the sea: Agricultural land to the seas, point and non-point sources of nutrients, increased primary productivity, over fishing.

Audience: Undergraduate

ZOOLOGY/ENVIR ST 315 – LIMNOLOGY-CONSERVATION OF AQUATIC RESOURCES

2 credits.

General limnology. Physical, chemical and biological characteristics and processes of lakes. Environmental problems and rehabilitation of lakes.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381 or graduate/professional standing

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 316 – LABORATORY FOR LIMNOLOGY-CONSERVATION OF AQUATIC RESOURCES

2-3 credits.

Biological, physical, and chemical characteristics and their interrelationships in Wisconsin lakes and streams.

Requisites: ZOOLOGY/ENVIR ST 315 or concurrent enrollment

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 320 – FIELD MARINE BIOLOGY

3 credits.

Provides a hands-on, research-driven experience within a marine environment, centering on exposure to 1) the diverse organisms and ecological interactions of coastal marine habitats 2) conservation issues relevant in these habitats 3) the research process from formulating interesting biological questions to conducting scientific research. Features immersion in a variety of marine habitats along with presentations by experts on marine conservation issues.

Requisites: (BIOCORE 381 and 382), (ZOOLOGY/BIOLOGY 101 and 102), or ZOOLOGY/BIOLOGY/BOTANY 152

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Learning Outcomes: 1. Be able to describe how habitat structures marine fish and invertebrate communities

Audience: Undergraduate

2. Identify common marine fish and invertebrate species and their adaptations to the unique challenges of feeding, predator avoidance, and reproduction in the marine environment

Audience: Undergraduate

3. Describe threats to marine biodiversity and strategies used to mitigate these threats

Audience: Undergraduate

4. Formulate testable scientific hypotheses/questions

Audience: Undergraduate

5. Develop and execute a data collection plan for investigating the hypotheses/questions

Audience: Undergraduate

6. Communicate research findings verbally and in writing, including using data and figures

Audience: Undergraduate

ZOOLOGY/F&W ECOL 335 – HUMAN/ANIMAL RELATIONSHIPS: BIOLOGICAL AND PHILOSOPHICAL ISSUES

3 credits.

An interdisciplinary approach to our complex and often contradictory relationships with non-human animals, including information about the nature, needs and behavior of human and non-human animals in relation to our personal and professional interactions with them.

Requisites: Sophomore standing

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

ZOOLOGY/ENTOM/M M & I/PATH-BIO 350 – PARASITOLOGY

3 credits.

The biology of water-borne, food-borne, soil-borne and vector-borne parasites of animals including humans. Parasites are explored in the context of transmission, associated disease, diagnosis and treatment options, and environmental, cultural and socioeconomic drivers of disease epidemiology.

Requisites: ZOOLOGY/BIOLOGY 101 and 102, or ZOOLOGY/BIOLOGY/BOTANY 152 or ZOOLOGY 153, or BIOCORE 381

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Be conversant in terminology used in the field of Parasitology.

Audience: Undergraduate

2. Recall scientific and common names for parasites and hosts, and the name of the resulting disease in humans or animals.

Audience: Undergraduate

3. Attribute parasite behavior and characteristics to specific disease features in the host.

Audience: Undergraduate

4. Identify appropriate means to diagnose infections with parasites.

Audience: Undergraduate

5. Describe and identify factors that determine when, where, and why parasitic diseases exist.

Audience: Undergraduate

6. Integrate terminology, scientific nomenclature, diagnostic features and demographics to solve case studies where the parasitic culprit is unknown.

Audience: Undergraduate

7. Compare and contrast commonalities in parasite life cycles to demonstrate how flexibility in those life cycles has resulted in many different potential means of transmission.

Audience: Undergraduate

8. Deconstruct the impact of parasitic diseases on human and animal health, from disease symptoms and pathology in an individual, to socioeconomics in communities and countries.

Audience: Undergraduate

9. Identify reliable resources (primarily internet-based) available for researching the biology and epidemiology parasitic diseases.

Audience: Undergraduate

ZOOLOGY/ENVIR ST/F&W ECOL 360 – EXTINCTION OF SPECIES

3 credits.

A comprehensive treatment of the ecology, causes, and consequences of species extinction. Ecology and problems of individual species, habitat alteration and degradation, socio-economic pressures and conservation techniques and strategies.

Requisites: Sophomore standing and ZOOLOGY/BIOLOGY/BOTANY 151, (ZOOLOGY/BIOLOGY 101 and 102), BIOLOGY/BOTANY 130, or (BIOCORE 381 and 382)

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 370 – GENERAL MOLECULAR BIOLOGY

3 credits.

Develop a broad understanding of how life works at the molecular level. Covers structure, chemistry, and functions of macromolecules, focusing primarily on how nucleic acids carry out their central roles in cells, rather than transmission genetics. Other topics include the governing principles by which life evolved, functions, and is organized; the experimental methods used to study these processes; and the historical context for our understanding of them. In other words: soup-to-nuts of nucleic acid biology and chemistry.

Requisites: (ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, or BIOCORE 383) and (CHEM 104, 109, or 116)

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Describe the molecular basis of life and the relationship between the structure and function of biological macromolecules

Audience: Undergraduate

2. Explain the means by which genetic information is stored and organized in biological cells.

Audience: Undergraduate

3. Explain the means by which the genetic information is replicated.

Audience: Undergraduate

4. Explain how information is transformed from the genetic code to structural and catalytic molecular forms.

Audience: Undergraduate

5. Describe the nature, causes, and consequences of changes in the genetic code.

Audience: Undergraduate

6. Define the laboratory techniques of modern biology.

Audience: Undergraduate

7. Describe the nature of the genetic material and its roles in inheritance, evolution and cellular function.

Audience: Undergraduate

8. Be able to integrate the nature of molecular biology with the cultural and historical factors surrounding the scientific enterprise.

Audience: Undergraduate

9. Become equipped to critically assess the primary scientific literature in molecular biology.

Audience: Undergraduate

ZOOLOGY/ENTOM 371 – MEDICAL ENTOMOLOGY: BIOLOGY OF VECTOR AND VECTOR-BORNE DISEASES

3-4 credits.

Explore the biological and molecular adaptations of parasitic arthropods that allow them to feed on vertebrate host and facilitate the transmission of vector-borne pathogens. Examines how anthropogenic activities, behaviors, and effects on climate affect the biology of vectors, the pathogens they transmit, and the emergence of vector-borne epidemics in the world. Emphasis on the molecular and physiological interaction between pathogens, their vector, and the vertebrate host and the fundamentals on how vectors and vector-borne pathogens cause disease in humans. Evaluate real control programs deployed globally for the control of vector-borne diseases.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, BIOCORE 383, ZOOLOGY 153, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Identify vector-borne pathogens of public health importance and their respective vectors.

Audience: Both Grad & Undergrad

2. Distinguish how biological and physiological adaptations facilitate the relationship between vectors and particular pathogens.

Audience: Both Grad & Undergrad

3. Apply information on disease epidemiology, vector ecology, vector distribution, and disease manifestation to solve hypothetical scenarios of vector-borne disease transmission.

Audience: Both Grad & Undergrad

4. Discuss current issues delaying the development of diagnostics, prevention, treatment, and control of vector-borne diseases.

Audience: Both Grad & Undergrad

5. Evaluate vector control programs currently deployed internationally based on knowledge of vector biology.

Audience: Both Grad & Undergrad

6. Design project proposals to study different aspects of vector physiology, biology, ecology, and pathogen-vector interactions.

Audience: Graduate

ZOOLOGY 400 – TOPICS IN BIOLOGY

1-3 credits.

Various intermediate level topics in Biology. Each section will explore a different topic in biology.

Requisites: Sophomore standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

ZOOLOGY 405 – INTRODUCTION TO MUSEUM STUDIES IN THE NATURAL SCIENCES

2-3 credits.

Provides an overview of natural history museums, including history, field collecting, specimen preparation, collection preservation, ethics, education and employment opportunities. Introduces the natural science museums and library collections located on the UW campus.

Requisites: Junior standing

Course Designation: Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY/ANTHRO/BOTANY 410 – EVOLUTIONARY BIOLOGY

3 credits.

Evolutionary biology, emphasizing how modern scientists study evolution. Topics include: nature and mechanisms of microevolution, macroevolution, adaptation, speciation; systematics and taxonomy; quantitative genetics and measurement of natural selection; phylogenetic analyses of behavior, physiology, morphology, biochemistry; current controversies in evolution.

Requisites: ZOOLOGY/BIOLOGY 101, BIOLOGY/BOTANY 130, ZOOLOGY/BIOLOGY/BOTANY 152, BIOCORE 381, (ANTHRO 105 and satisfied QR-A requirement), or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 415 – GENETICS OF HUMAN HISTORY

3 credits.

Covers a range of topics related to human genetics and evolution. Explores questions about what genetic differences between humans tell us about our species' evolutionary and demographic history, and conversely, how our history has shaped the genetic diversity of people living today. At a time of rapidly increasing ability to sequence huge numbers of genomes such questions play a central role in understanding how genetics impacts individuals' disease risks, how to interpret reported ancestry and family history from direct-to-consumer genotyping kits, and how genetics can (or importantly, cannot) inform descriptions of human diversity and concepts of race. Includes topics of diversity and inclusion in genomics studies, with a focus on the application and limits of results obtained from one group to our understanding of other groups.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Read different types of sources covering current scientific topics

Audience: Undergraduate

2. Learn the vocabulary and concepts needed to read and discuss advances in genomics research, human evolution, and the genetics of diversity

Audience: Undergraduate

3. Read and discuss material where the scientific consensus is unclear, uncertain, or controversial

Audience: Undergraduate

4. Synthesize scientific information as an evolving understanding of complex topics shaped both by new scientific discoveries and broader society

Audience: Undergraduate

5. Explain the science behind our understanding of human genetics

Audience: Undergraduate

ZOOLOGY 425 – BEHAVIORAL ECOLOGY

3 credits.

Explore how organisms make decisions and how these decisions affect their survival. These decisions are key aspects of an organism's life, e.g. foraging behavior, mating behavior, anti-predator behavior, and habitat selection. Approaches these questions with the perspective that understanding the proximal and ultimate basis of behavior requires understanding the ecological and evolutionary context of behavior.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 152, (ZOOLOGY/BIOLOGY 101 and BOTANY/BIOLOGY 130), or (BIOCORE 381 and 382)

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 430 – COMPARATIVE ANATOMY OF VERTEBRATES

5 credits.

Basic vertebrate anatomical systems and a consideration of variations, using functional embryological and evolutionary approaches. Lab dissection and study of representative vertebrate material.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 444 – NEURONAL CELL BIOLOGY IN HEALTH AND DISEASE

2 credits.

Provides an advanced understanding of cell biology as it relates to the nervous system. Covers the neuronal cytoskeleton, molecular motors and their cargos, the secretory system and how it functions in neurons, formation and maintenance of pre- and post-synaptic structures, neuronal organelles and their functions. Discussion of what is known about the disruptions to cell biology of neurons that contributes to neurodevelopmental and neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, Amyotrophic Lateral Sclerosis, Charcot Marie Tooth Disease, Spinal Muscular Atrophy, and others.

Requisites: ZOOLOGY/BIOLOGY 101, BOTANY/BIOLOGY/ZOOLOGY 152, or BIOCORE 384

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Learning Outcomes: 1. Understand vocabulary used to describe and understand cell biology in the context of neuroscience

Audience: Undergraduate

2. Read and critique primary literature related to neuronal cell biology

Audience: Undergraduate

3. Synthesize and disseminate knowledge related to neuroscience, cell biology, and the relationship between concepts discussed and human disease

Audience: Undergraduate

4. Summarize the state of the field of cellular neuroscience

Audience: Undergraduate

5. Ask critical, open questions that have yet to be addressed at the basic science level and in relation to disruptions associated with neurological disease

Audience: Undergraduate

ZOOLOGY/BOTANY 450 – MIDWESTERN ECOLOGICAL ISSUES: A CASE STUDY APPROACH

2 credits.

How ecological principles can be used to address contemporary environmental issues such as water quality, invasive species, and population growth. Emphasis on midwestern issues, practical approaches, the role of history, and geographic context.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 152, BOTANY/BIOLOGY 130, (ZOOLOGY/BIOLOGY 101 and ZOOLOGY/BIOLOGY 102), or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Summer 2024

ZOOLOGY/BOTANY/F&W ECOL 460 – GENERAL ECOLOGY

4 credits.

Ecology of individual organisms, populations, communities, ecosystems, landscapes, and the biosphere. The interaction of organisms with each other and their physical environment. These relationships are studied, often in quantitative terms, in both field and laboratory settings.

Requisites: Satisfied Quantitative Reasoning (QR) A requirement and ZOOLOGY/BIOLOGY/BOTANY 152, (ZOOLOGY/BIOLOGY 101 and 102), BIOCORE 381, or BOTANY/BIOLOGY 130, or graduate/professional standing

Course Designation: Gen Ed - Quantitative Reasoning Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 470 – INTRODUCTION TO ANIMAL DEVELOPMENT

3 credits.

Introduction to the major features and mechanisms of early embryonic development in animals, including (1) the major stages of early development, (2) how form arises in the embryo (morphogenesis), (3) how differences arise between cells in the embryo, and (4) how specific genes control these processes.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, BIOCORE 381, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/BOTANY/ENTOM 473 – PLANT-INSECT INTERACTIONS

3 credits.

Multiple ways in which arthropods exploit plants, plant traits that deter or augment insects, environmental mediation of these interactions, effects on population dynamics, community ecology and co-evolution, and implications to natural resource management, environmental quality, and sustainable development.

Requisites: F&W ECOL/BOTANY/ZOOLOGY 460, FW ECOL 500, ENTOM/BOTANY/PL PATH 505, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

ZOOLOGY 500 – UNDERGRADUATE NEUROBIOLOGY SEMINAR

1 credit.

A wide range of topics in neurobiology research from molecular neurobiology to integrative systems. Topics discussed by invited UW-Madison faculty researchers might include: ion channels and synaptic plasticity, neural development, sensory and cognitive physiology, biological basis of behavioral disorders and cognitive decline.

Requisites: Declared in Neurobiology and ZOOLOGY/PSYCH 523 or concurrent enrollment.

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

ZOOLOGY/ENVIR ST 510 – ECOLOGY OF FISHES

3 credits.

Interactions of fishes with their physical, chemical, and biotic environment; physiological ecology, community ecology and fisheries sciences. Lake Mendota perch fishery and Shedd Aquarium field trips.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Use facts to guide conceptual thinking and hypothesis tests about ecological systems.

Audience: Undergraduate

2. Draw upon aspects of fish evolution, ecology, and conservation to produce an integrated perspective.

Audience: Undergraduate

3. Summarize the diversity of fishes on Earth, including phylogenetic and geographic patterns.

Audience: Undergraduate

4. Analyze the relationship between form and function of individual fish.

Audience: Undergraduate

5. Place fish in the context of the broader food web and ecological community.

Audience: Undergraduate

6. Describe the management and use of fish by human society.

Audience: Undergraduate

7. Describe the conservation challenges faced by fish now and in the future.

Audience: Undergraduate

8. Write clear, concise scientific reports both individually and in teams.

Audience: Undergraduate

9. Present effective, informative, and persuasive arguments in writing and orally.

Audience: Undergraduate

ZOOLOGY/ENVIR ST 511 – ECOLOGY OF FISHES LAB

2 credits.

Anatomy and taxonomy of Wisconsin fishes and projects in fish ecology.

Requisites: ZOOLOGY/ENVIR ST 510 or concurrent enrollment

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/AN SCI/F&W ECOL 520 – ORNITHOLOGY

3 credits.

Introduction to bird biology, ecology, and behavior. Topics include the evolutionary origin of birds and flight, anatomy and physiology, functional morphology, migration, communication, reproductive strategies, ecological adaptations and roles, and biogeographical patterns.

Requisites: ZOOLOGY/BIOLOGY 101 and 102, ZOOLOGY/BIOLOGY/BOTANY 152, (BIOCORE 381 and 382), or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/AN SCI/F&W ECOL 521 – BIRDS OF SOUTHERN WISCONSIN

3 credits.

Outdoor and indoor labs/lectures emphasizing identification of southern Wisconsin birds by sight and vocalization. Two required Saturday field trips in Southern Wisconsin.

Requisites: ZOOLOGY/BIOLOGY 101 and 102, ZOOLOGY/BIOLOGY/BOTANY 152, (BIOCORE 381 and 382), or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/PSYCH 523 – NEUROBIOLOGY

3 credits.

Basic mechanisms in cellular neurophysiology: electrophysiology and chemistry of nerve signals, mechanisms in integration, simple nervous pathways and their behavioral correlates.

Requisites: (ZOOLOGY/BIOLOGY/BOTANY 151, ZOOLOGY/BIOLOGY 101, or BIOCORE 383) and (CHEM 104, CHEM 109, or CHEM 116)

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Understand the molecular mechanisms of cellular neurophysiology, including the ionic basis of the resting membrane potential and action potential, and mechanisms of synaptic transmission.

Audience: Undergraduate

2. Understand the basis of sensory perception at the receptor level.

Audience: Undergraduate

3. Demonstrate how neuronal signaling is integrated into simple nervous pathways and their behavioral correlates.

Audience: Undergraduate

4. Apply principles of neuronal function to activity-dependent changes in rhythmic neuronal activity, neuronal plasticity, and memory.

Audience: Undergraduate

5. Understand some of the state-of-the-art approaches to neuronal function.

Audience: Undergraduate

6. Understand key steps in the development of the nervous system and explain and apply the experimental approaches underpinning that understanding.

Audience: Undergraduate

7. Elucidate connections between genetics, pharmacology, and the functioning of the nervous system.

Audience: Undergraduate

8. Understand the mechanisms underlying a subset of disorders of the nervous system and the bases of current treatments.

Audience: Undergraduate

ZOOLOGY/ENTOM 540 – THEORETICAL ECOLOGY

3 credits.

Introduction to theoretical ecology, including hands-on experience in computer modeling.

Requisites: STAT/F&W ECOL 571

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

ZOOLOGY/GEOSCI 541 – PALEOBIOLOGY

3 credits.

The evolutionary process as interpreted from the fossil record. Topics include: the study of form; tempo and mode of evolution; levels and mechanisms of evolutionary change; extinction in the fossil record; trends and patterns in the history of life; macroevolution.

Requisites: GEOSCI 304, ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 152, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2016

ZOOLOGY/GEOSCI 542 – INVERTEBRATE PALEONTOLOGY

3 credits.

The evolutionary history, morphology, and ecology of fossil invertebrates. Labs emphasize fossil identification and recognition of basic morphological features.

Requisites: (GEOSCI 110 or 204), (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 152, (BIOCORE 381 and 382), or graduate/professional standing.

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 555 – LABORATORY IN DEVELOPMENTAL BIOLOGY

3 credits.

Developmental anatomy and laboratory manipulations of representative animal embryos used extensively for analysis of developmental phenomena (sea urchins, amphibia, annelids, molluscs, ascidians, insects, chicks, fish, mice).

Requisites: ZOOLOGY 470, 625, ZOOLOGY/PSYCH 523, or BIOCORE 587

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY/F&W ECOL/LAND ARC 565 – PRINCIPLES OF LANDSCAPE ECOLOGY

2 credits.

Emphasizes the importance of spatial patterns at broad scales. Concepts and applications are covered.

Requisites: (ZOOLOGY/BOTANY/F&W ECOL 460 or F&W ECOL 550) and (STAT 301, 371, or F&W ECOL/STAT 571), or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2019

ZOOLOGY 570 – CELL BIOLOGY

3 credits.

Comprehensive course on modern aspects of cell biology.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, or BIOCORE 383

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY 603 – ENDOCRINOLOGY

3-4 credits.

An introduction to the role that hormones play in a variety of physiological processes and behaviors from a molecular to a systems level. Topics include hormonal involvement in growth, development, homeostasis, reproduction, and behavior, with an emphasis on vertebrate systems.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, BIOCORE 383 or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

**ZOOLOGY 604 – COMPUTER-BASED GENE AND DISEASE/
DISORDER RESEARCH LAB**

2 credits.

Learn to navigate open access biological and biomedical databases that include a wealth of information regarding genes, gene expression, gene pathways, behavioral characteristics, and disorders or diseases. This includes extracting information to develop new ideas, and using multiple databases to develop new ideas on which genes may be playing important, but previously underappreciated or unknown roles.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, BIOCORE 381, or graduate/professional standing

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

**ZOOLOGY 611 – COMPARATIVE AND EVOLUTIONARY
PHYSIOLOGY**

3 credits.

Examines general physiological principles by comparing taxa from diverse evolutionary histories and ecological adaptations. Examples include adaptation to environments differing in salinity, temperature, altitude, pressure, or pollution, and examines how nervous and endocrine systems evolved to support the adaptations.

Requisites: ZOOLOGY/BIOLOGY 101, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY/BOTANY 151, or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 612 – COMPARATIVE PHYSIOLOGY LABORATORY

2 credits.

Investigating physiological adaptations in different animals. Design and execute experiments.

Requisites: ZOOLOGY 611 or concurrent enrollment

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

**ZOOLOGY/NEURODPT 616 – LAB COURSE IN NEUROBIOLOGY
AND BEHAVIOR**

4 credits.

Independent experimental modules exploring neurophysiology and behavior will be completed in groups. Learn techniques and develop investigations into three separate areas of neurobiology.

Requisites: ZOOLOGY/PSYCH 523 and PSYCH 454

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2017

ZOOLOGY/ANTHRO/NTP/PSYCH 619 – BIOLOGY OF MIND

3 credits.

Origins and structures of mind, brain, and consciousness. Transitions from early mammalian through primate to hominid intelligence. Genetics and plasticity in brain development. Modern studies of human brain mechanisms and consciousness.

Requisites: Junior standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2023

ZOOLOGY/NTP 620 – NEUROETHOLOGY SEMINAR

2 credits.

A group discussion of primary literature articles relevant to the neural basis of behavior with a purpose to understand the neural basis of behavior in animals, to learn to read papers critically and improve discussion leading skills.

Requisites: PSYCH/ZOOLOGY 523 or graduate/professional standing

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

ZOOLOGY/ENTOM/GENETICS 624 – MOLECULAR ECOLOGY

3 credits.

Basic principles of molecular ecology. Lecture topics include population genetics, molecular phylogenetics, rates and patterns of evolution, genome evolution, and molecular ecology.

Requisites: GENETICS 466, 467, BIOCORE 383, or graduate student standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Identify and describe common molecular genetic techniques.

Audience: Both Grad & Undergrad

2. Demonstrate knowledge about the significance of genetic diversity in species biology.

Audience: Both Grad & Undergrad

3. Differentiate how ecological and evolutionary processes shape genetic variation.

Audience: Both Grad & Undergrad

4. Analyze genetic data and communicate the results.

Audience: Both Grad & Undergrad

5. Evaluate whether genetic data are appropriate for answering scientific questions.

Audience: Both Grad & Undergrad

6. Summarize and critique the primary literature in the field of Molecular Ecology.

Audience: Graduate

ZOOLOGY 625 – DEVELOPMENT OF THE NERVOUS SYSTEM

2 credits.

Survey of the principles guiding neuronal development. Covers descriptive and experimental analyses of developmental mechanisms underlying the formation of both vertebrate and invertebrate nervous systems.

Requisites: ZOOLOGY/PSYCH 523 or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2018

ZOOLOGY/BOTANY/ENVIR ST/F&W ECOL 651 – CONSERVATION BIOLOGY

3 credits.

Application of ecological principles and human dimensions to the conservation of biological diversity. Topics: biodiversity science; conservation planning; population ecology; habitat loss, species exploitation, invasive species, pollution; human attitudes and activities as they affect the biosphere; approaches to monitoring interventions.

Requisites: Satisfied Quantitative Reasoning (QR) A requirement and ZOOLOGY/BOTANY 450, F&W ECOL/BOTANY 455, ZOOLOGY/BOTANY/F&W ECOL 460, or graduate/professional standing

Course Designation: Gen Ed - Quantitative Reasoning Part B Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 655 – MODELING NEURODEVELOPMENTAL DISEASE

3 credits.

Systematically explores current animal models of human diseases that affect the central nervous system. Topics will include birth defects that disrupt normal brain architecture (holoprosencephaly and neural tube closure defects), birth defects affecting the visual system, and postnatal disease, e.g. neurodegeneration and stroke.

Requisites: GENETICS 466, ZOOLOGY/PSYCH 523, ZOOLOGY 470, or 570

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. apply and enhance their understanding of genetics and cell biology

Audience: Undergraduate

2. understand the concepts and methods used to model human disease

Audience: Undergraduate

3. read and critically evaluate current scientific literature

Audience: Undergraduate

4. develop and present short lectures on selected topics

Audience: Undergraduate

5. prepare review-style articles based on primary literature research

Audience: Undergraduate

ZOOLOGY/F&W ECOL 660 – CLIMATE CHANGE ECOLOGY

3 credits.

The evidence that the Earth's climate is changing at unprecedented rates is now overwhelming. Environmental tipping points are being crossed and many species are adapting or failing to adapt. Climate change poses a significant problem for conserving and managing wildlife and their habitats. Climate change, its ecological impacts, and the principle of climate change adaptation in natural resources conservation will be discussed.

Requisites: BOTANY/BIOLOGY/ZOOLOGY 152, (BIOLOGY/ZOOLOGY 101 and 102), BIOCORE 381, or BIOLOGY/BOTANY 130, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. explain historic and future trends in climate change within an ecological context.

Audience: Both Grad & Undergrad

2. identify the eco-evolutionary impacts of climate change on biological communities (including changes in phenology and ranges, community dynamics, and altered trophic interactions).

Audience: Both Grad & Undergrad

3. develop a climate change vulnerability assessment for a given species or community.

Audience: Both Grad & Undergrad

4. analyze and incorporate climate and biological data in vulnerability assessments.

Audience: Graduate

ZOOLOGY/BOTANY/F&W ECOL 672 – HISTORICAL ECOLOGY

2 credits.

Study the importance of past events for current ecosystems. Emphasizes concepts and applications.

Requisites: Senior standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

ZOOLOGY/NEURODPT/PSYCH 674 – BEHAVIORAL NEUROENDOCRINOLOGY SEMINAR

2 credits.

Behavior results from a complex interplay among hormones, the brain, and environmental factors. Behaviors and their underlying neural substrates have evolved in response to specific environmental conditions, resulting in vast species diversity in behavioral and neuroendocrine solutions to environmental problems. Designed to explore the primary literature on the neuroendocrine underpinnings of behavior spanning from feeding to sex differences in complex social behaviors. A range of taxonomic groups will be discussed, including (but not limited to) mammals, birds, and fish.

Requisites: ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151, BIOCORE 383 or graduate/professional standing

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2021

Learning Outcomes: 1. Identify how behaviors and their underlying neural substrates have evolved in response to specific environmental conditions

Audience: Both Grad & Undergrad

2. Discuss and explore the primary literature on the neuroendocrine underpinnings of behavior spanning from feeding to sex differences in complex social behaviors

Audience: Both Grad & Undergrad

3. Identify and discuss hormones, the brain, and environmental factors as they relate to behavioral evolution and biological diversity

Audience: Both Grad & Undergrad

4. Develop and apply critical thinking to evaluate neuroendocrinological research

Audience: Graduate

5. Communicate effectively about concepts, theories and approaches of neuroendocrinology and behavioral research

Audience: Graduate

ZOOLOGY 677 – INTERNSHIP IN ECOLOGY

2 credits.

Provides support and structure for those interested in gaining hands-on experience working as a volunteer with local environmental, ecological or conservation groups.

Requisites: Junior standing

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2023

ZOOLOGY 681 – SENIOR HONORS THESIS

1-6 credits.

Mentored individual research and study for students completing a thesis in an Honors program.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Fall 2024

ZOOLOGY 682 – SENIOR HONORS THESIS

1-4 credits.

Mentored individual research and study for students completing a thesis in an Honors program.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 691 – SENIOR THESIS

1-6 credits.

Mentored individual research and study for students completing a senior thesis.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Fall 2024

ZOOLOGY 692 – SENIOR THESIS

1-4 credits.

Mentored individual research and study for students completing a senior thesis.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY 698 – DIRECTED STUDY

1-6 credits.

Selected research projects for juniors and seniors.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

ZOOLOGY 699 – DIRECTED STUDIES IN ZOOLOGY

1-6 credits.

Selected research projects for juniors and seniors.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

ZOOLOGY/BOTANY 725 – ECOSYSTEM CONCEPTS

3 credits.

Scope and objectives of ecosystem ecology; roles of theory, long-term studies, comparative studies, and large-scale experiments; scaling problems; ecosystem services and ecological economics; adaptive ecosystem assessment and management.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

ZOOLOGY/ATM OCN/ENVIR ST/GEOSCI 750 – PROBLEMS IN OCEANOGRAPHY

3 credits.

Introduction to techniques used in the study of the biology, chemistry, geology, and physics of the marine environment.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

ZOOLOGY/NEURODPT/NTP 765 – DEVELOPMENTAL NEUROSCIENCE

3 credits.

Analysis of neural development with emphasis on experimental approaches. Combination of lectures and discussions of primary literature. Topics include neural induction, patterning, mechanisms of axon guidance, neural crest cell migration and differentiation, cortical development, and synapse formation and elimination.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Gain an extensive understanding of mechanisms of neural development

Audience: Graduate

2. Acquire the ability to critically analyze current studies in neural development

Audience: Graduate

ZOOLOGY 799 – INDEPENDENT STUDY

1-6 credits.

Advanced topics in zoology explored through individual research projects.

Requisites: Consent of instructor**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025**ZOOLOGY 800 – ADVANCED TOPICS IN THE BIOLOGICAL SCIENCES**

1-3 credits.

Various advanced topics in the Biological Sciences

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025**Learning Outcomes:** 1. Apply, analyze, evaluate advanced theories, concepts and methods in the biological Sciences.

Audience: Graduate

2. Identify and describe key theories, concepts and methods in the biological sciences.

Audience: Graduate

3. Explore new approaches in the biological science research, and apply the knowledge gained to own research.

Audience: Graduate

ZOOLOGY/BOTANY/ENTOM/GENETICS 820 – FOUNDATIONS OF EVOLUTION

2 credits.

Explore some of the most important themes and debates that have permeated evolutionary biology over the last 50 years. Read key papers related to each controversial topic, debate the pros and cons of competing viewpoints, and reflect on the relevance of the issue to contemporary evolutionary biology.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2024**ZOOLOGY/BOTANY/ENTOM/F&W ECOL 821 – FOUNDATIONS OF ECOLOGY**

2 credits.

Foundational ideas in the field of ecology. Discussion topics trace the development of ecology as a discipline, and the roots of modern ecological thought, as well as the research approaches in ecology.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2025**Learning Outcomes:** 1. Identify and describe key debates in the history of ecology and ongoing controversies in the field.

Audience: Graduate

2. Differentiate ecological processes and how they sustain ecological systems.

Audience: Graduate

3. Moderate and participate in discussions about the significance of important ecological concepts.

Audience: Graduate

4. Summarize, interpret, and synthesize conceptual theories of ecology orally and in writing.

Audience: Graduate

5. Evaluate peer work and provide constructive, professional feedback.

Audience: Graduate

ZOOLOGY/BOTANY/F&W ECOL 879 – ADVANCED LANDSCAPE ECOLOGY

3 credits.

Emphasizes spatial patterning (its development and importance for ecological processes) and often focuses on large regions. Learn concepts, methods, and applications of landscape ecology.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**ZOOLOGY/ATM OCN/BOTANY/CIV ENGR/ENVIR ST/GEOSCI 911 – LIMNOLOGY AND MARINE SCIENCE SEMINAR**

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025

**ZOOLOGY/AGRONOMY/ATM OCN/BOTANY/ENTOM/ENVIR ST/
F&W ECOL/GEOG 953 – INTRODUCTION TO ECOLOGY
RESEARCH AT UW-MADISON**

1-2 credits.

Introduces new graduate students to the diversity of ecologists across the UW-Madison campus. Includes discussions of key topics in professional development, research presentations by faculty members, and discussions of assigned papers with senior graduate students.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2024**ZOOLOGY/AN SCI/OBS&GYN 954 – SEMINAR IN
ENDOCRINOLOGY-REPRODUCTIVE PHYSIOLOGY**

0-1 credits.

Promotes scientific and professional development. Presenters develop and deliver research presentations to a scientific audience, field questions, and receive critiques about their presentation style and scientific approach. Additional presentations include professional development, career advancement opportunities, and topics of interest to the endocrinology and reproduction community at large.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025**Learning Outcomes:** 1. Demonstrate knowledge of cutting-edge research in and related to one's research area through the development and delivery of research presentations

Audience: Graduate

2. Communicate complex ideas in research presentations and questions in a clear and understandable manner

Audience: Graduate

3. Evaluate presentations and providing effective feedback

Audience: Graduate

ZOOLOGY 955 – SEMINAR-LIMNOLOGY

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Fall 2024**ZOOLOGY 956 – SEMINAR-ECOLOGY**

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Fall 2024**ZOOLOGY 957 – SEMINAR-EVOLUTION**

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Fall 2024**ZOOLOGY 960 – SEMINAR IN CELLULAR BIOLOGY**

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025**ZOOLOGY 962 – SEMINAR-ETHOLOGY**

1 credit.

Sections in various fields of zoological research.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025**ZOOLOGY/ATM OCN/BOTANY/ENVIR ST/F&W ECOL/GEOG/
GEOSCI 980 – EARTH SYSTEM SCIENCE SEMINAR**

1 credit.

Topics in earth system science. Emphasis on the coupling between atmospheric, oceanic and land surface systems, involving physical geochemical and biological processes, and including interactions with human systems.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2024**ZOOLOGY 990 – RESEARCH**

1-9 credits.

Advanced research in biology as part of graduate program requirements arranged with mentoring faculty.

Requisites: Consent of instructor**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2025