

BOTANY (BOTANY)

BOTANY 100 – SURVEY OF BOTANY

3 credits.

Major emphasis on the roles of plants and microbes in past and present global ecology, and the past and present uses of plants and microbes by humans, including emerging applications of biotechnology.

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 2026

Learning Outcomes: 1. Explain what plants are, how they contribute to biological diversity, and how they evolved to dominate life on land.

Audience: Undergraduate

2. Explain the processes fundamental to all life on Earth, including metabolic processes (photosynthesis, respiration, and protein synthesis), cell division, and evolution, and articulate how these processes are important to humans.

Audience: Undergraduate

3. Give examples of how plants influence global climate, animal (including human) nutrition, and ecosystem function.

Audience: Undergraduate

4. Describe how plants are essential to all life on Earth, and the many ways they are utilized by humans.

Audience: Undergraduate

5. Critically analyze scientific information, make informed decisions, and contribute responsibly to the solution of societal problems.

Audience: Undergraduate

BOTANY/PL PATH 105 – MUSHROOMS

3 credits.

An introduction to fungi. The fungal kingdom is made up of millions of species. We use fungi to brew beer and make cheese, as medicines, and as symbols of both rampant decay and unstinting selflessness. Come unpack the mythology and walk away with a deep appreciation of a poorly understood but fascinating part of Earth's biodiversity.

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 2026

Learning Outcomes: 1. Notice, recognize, and catalog fungi as you walk in the world; in Madison and in all of Earth's lands and waters.

Audience: Undergraduate

2. Explain the myriad ecological roles fungi play on planet Earth.

Audience: Undergraduate

3. Talk about fungal biodiversity at length and in depth.

Audience: Undergraduate

4. Think critically about the natural world; be able to not just read but also critique popular science writing.

Audience: Undergraduate

5. Interpret "how science gets done" and what constitutes scientific knowledge.

Audience: Undergraduate

BOTANY/PL PATH 123 – PLANTS, PARASITES, AND PEOPLE

3 credits.

Explores the interaction between society and plant-associated microbes. Topics include: the Irish potato famine, pesticides in current agriculture, role of economics and consumer preference in crop disease management and the release of genetically engineered organisms.

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 2026

Learning Outcomes: 1. Critically examine scientific issues that affect your life.

Audience: Undergraduate

2. Articulate the fundamental concepts from biological sciences that explain the essential roles of food, water, and air in sustaining life.

Audience: Undergraduate

3. Provide examples of how interactions between plants, microbes and human society impact our food, agriculture, environment, and the plant's ability to sustain our lives.

Audience: Undergraduate

4. Apply knowledge of the scientific process to conduct scientific investigations and discern how scientific knowledge differs from other types of knowledge.

Audience: Undergraduate

BOTANY/BIOLOGY 130 – GENERAL BOTANY

5 credits.

Introduction to the basic principles and concepts of the biology of plants. an integrative approach stressing evolutionary sequences and the relationship between structure and function at succeeding levels of organization: molecule, cell, organism, population, community. Correlated lectures, laboratories, and discussions.

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 2026

Learning Outcomes: 1. Identify cellular, molecular, and biochemical features that are shared or not shared between animals and plants.

Audience: Undergraduate

2. Describe the major organs, tissues, and cell types of plants and their primary functions.

Audience: Undergraduate

3. Explain the roles of photosynthesis, water uptake/transport, mineral acquisition in plant growth, and plant physiological processes, regulated by various hormones.

Audience: Undergraduate

4. Summarize the plant life cycle, especially that of flowering plants, and how it differs from that seen in fungi and animals.

Audience: Undergraduate

5. List and distinguish among the organisms that have traditionally been included in the study of Botany (plants, algae, fungi).

Audience: Undergraduate

6. List the major groups of land plants and key events in their evolutionary history.

Audience: Undergraduate

7. Describe the global distribution of biomes and explain the causes and impacts of global climate change.

Audience: Undergraduate

8. Use microscopes and appropriate experimental methods to uncover the biology of plants and other plant-like organisms.

Audience: Undergraduate

BOTANY/BIOLOGY/ZOOLOGY 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 2026

Learning Outcomes: 1. Relate the structures of cellular components, such as water, ions, organic chemicals, macromolecules, membranes, and prokaryotic and eukaryotic organelles, to their functions.

Audience: Undergraduate

2. Outline processes and transformations that cells use to store and release energy via chemical reactions, enzymes, membranes, and the pathways of respiration, fermentation, and photosynthesis.

Audience: Undergraduate

3. Demonstrate how chromosomal DNA stores and replicates information and uses it to direct the synthesis of RNA and proteins.

Audience: Undergraduate

4. Model the relationships between chromosomal behavior, genetic information, and physical traits, and predict how information is transmitted during prokaryotic and eukaryotic reproduction.

Audience: Undergraduate

5. Relate cellular, tissue, and organ structures and processes to their functions in animal physiology and homeostasis, including nervous and endocrine systems, respiration and circulation, digestion and nutrition, and osmoregulation.

Audience: Undergraduate

6. Identify and investigate scientific problems by interpreting the results of prior research, developing hypotheses, designing and conducting experiments, analyzing data, and planning future experiments.

Audience: Undergraduate

7. Demonstrate skills necessary for biological research, including effective teamwork, data collection methods, and scientific communication.

Audience: Undergraduate

8. Integrate concepts and content from biology and other scientific disciplines to explore current global and societal issues.

Audience: Undergraduate

BOTANY/BIOLOGY/ZOOLOGY 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 2026

Learning Outcomes: 1. Explain the key mechanisms underlying biological evolution and identify those that drive diverse adaptations and key transitions in the history of life on Earth.

Audience: Undergraduate

2. Relate cellular, tissue, and organ structures and processes to their physiological functions in the plant life cycle to explain how plants acquire and use energy and material resources and respond to environmental stimuli.

Audience: Undergraduate

3. Describe the structure and function of ecological systems at different spatial and temporal scales and how abiotic and biotic factors affect the distribution of species.

Audience: Undergraduate

4. Assess how humans impact biological systems through habitat fragmentation and loss, climate change, overexploitation, invasive species, and pollution.

Audience: Undergraduate

5. Apply vocabulary, concepts, and theories of plant physiology, evolution, and ecology to problems across the biological sciences.

Audience: Undergraduate

6. Identify and investigate scientific problems by interpreting the results of prior research, developing hypotheses, designing and conducting experiments, analyzing data, and planning future experiments.

Audience: Undergraduate

7. Demonstrate skills necessary for biological research, including effective teamwork, data collection methods, and scientific communication.

Audience: Undergraduate

8. Integrate concepts and content from biology and other scientific disciplines to explore current global and societal issues.

Audience: Undergraduate

BOTANY 211 – UNDERSTANDING CHANGED LANDSCAPES: WISCONSIN

3 credits.

Exposure to the changing uses of Wisconsin landscapes: as the home of native peoples; as a source of fur, lead and timber; as part of the new nation of the United States; and as a modern, vibrant collection of communities focused on enterprises as diverse as agriculture and education. Asks what roles science has played in shaping the landscape and in current land use. Covers genetically modified crops, the endangered species act, water use, global change.

Requisites: Sophomore standing and declared in an Honors program

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

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2022

Learning Outcomes: 1. Describe the last 400 years of Wisconsin's environmental history, with a particular focus on human uses of land

Audience: Undergraduate

2. Understand the science behind Wisconsin's environmental history (e.g. whether or not early Wisconsinites recognized it, soil fertility was a driver in the shift from wheat to dairy, and then the green revolution radically changed agriculture, etc.)

Audience: Undergraduate

3. Think critically about the roles science plays in human choices (e.g. does understanding the genetics of genetic modification impact whether or not we plant GMO soybeans?)

Audience: Undergraduate

4. Describe and think critically about the environmental history of a specific place in Wisconsin, based on original research (often drawing on the resources of the Wisconsin Historical Society)

Audience: Undergraduate

BOTANY 240 – PLANTS AND HUMANS

3 credits.

Plant parts and demonstrations of their utility to humans, origins of domesticated plants, modifications of plants by humans, ecosystem services owed to plants, and reasons to sustain plant diversity.

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 2025

Learning Outcomes: 1. Describe the role of plants in our lives.

Audience: Undergraduate

2. Recognize characteristics of the plant families from which we get most of our food.

Audience: Undergraduate

3. Explain the concepts of food security, food sovereignty, and culinary justice.

Audience: Undergraduate

4. Give examples of the role of plant foods in human health.

Audience: Undergraduate

5. Distinguish characteristics of plants (such as the kinds of fibers, oils, wood, phytochemical compounds) that make them useful for different purposes.

Audience: Undergraduate

BOTANY 250 – FORESTS AND HUMANS: FROM THE MIDWEST TO MADAGASCAR

2 credits.

Provides an overview of the geography, ecology, and economic importance of the world's forest biomes. Learn how climate influences vegetation and, in-turn, how forests impact global climate. Meet scientists working to understand the astounding biodiversity and ecological complexity of forest ecosystems, and how these ecosystems support human life. Discuss the threats to forest ecosystems around the world, and hear from the people trying to protect them. Emphasizes the forest resources and services upon which humans depend, and how we can maintain these resources into the future. Analyze the idea of "sustainability" when it comes to forest management, hear alternative viewpoints about what this word means, and discuss potential trade-offs and conflicts. Look at the many real-world programs in place at the global, national, and local level to sustainably manage forests.

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: Summer 2020

BOTANY/ENVIR ST/ZOOLOGY 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 2026

Learning Outcomes: 1. Develop a conceptual framework for ecosystem processes and patterns with humans integral to it.

Audience: Undergraduate

2. Describe how humans interact with nonhuman ecosystem elements.

Audience: Undergraduate

3. Explore how ecological science can help resolve modern environmental problems.

Audience: Undergraduate

4. Integrate new ideas from international and interdisciplinary perspectives on the environment.

Audience: Undergraduate

5. Explain the social, economic, and/or environmental dimensions of the sustainability challenge(s) of protecting ecosystems.

Audience: Undergraduate

6. Analyze the causes of and solutions for the sustainability challenge of protecting biodiversity.

Audience: Undergraduate

BOTANY 265 – RAINFORESTS AND CORAL REEFS

3 credits.

Are you awed by the amazing biodiversity found in rainforests and coral reefs? See these ecosystems first hand and decide if a career in tropical biology or international conservation is for you. Focuses on the ecology of the world's most biodiverse ecosystems, and their global importance. Learn the physical, chemical, and biological processes that make rainforests and coral reefs function, and the history of human dependence upon these ecosystems. Understand why both of these ecosystems currently are threatened and what actions can and must be taken to protect them.

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 2025

Learning Outcomes: 1. Articulate overarching ecological principles including patterns of biodiversity, process of evolution and natural selection, species interactions, biogeochemical cycles, and community organization, in the context of rainforest and coral reef ecosystems.

Audience: Undergraduate

2. Compare and contrast the geographical, abiotic, and biotic characteristics of the tropical and temperate zones.

Audience: Undergraduate

3. Describe the ecological characteristics of tropical rainforest and coral reef ecosystems and explain the biotic adaptations of plants and animals that inhabit them.

Audience: Undergraduate

4. Identify and describe the major taxonomic groups of organisms found in rainforest and coral reef ecosystems.

Audience: Undergraduate

5. Explain the global importance of rainforest and coral reef ecosystems and the major threats to them.

Audience: Undergraduate

6. Identify and utilize resources to obtain current scientific and conservation information about tropical ecosystems.

Audience: Undergraduate

7. Design a research project and write a proposal for a scientific study.

Audience: Undergraduate

8. Apply the process of scientific inquiry to carry out hypothesis-driven ecological field research from start to finish.

Audience: Undergraduate

BOTANY 299 – DIRECTED STUDY IN BOTANY

1-3 credits.

Introduces students to research questions and facilitates learning in the field of botany by providing guidance and mentorship in a research environment.

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: Spring 2026

BOTANY 300 – PLANT ANATOMY

4 credits.

Plant structure and development of seed plants, primarily of flowering plants. Emphasis is placed on structure in relation to function and on the plant body as a structural and functional entity.

Requisites: Sophomore standing and (ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, 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

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2025

Learning Outcomes: 1. Identify and summarize the defining features of the main plant cell types and tissues.

Audience: Both Grad & Undergrad

2. Analyze compound microscopes for the analysis of plant tissues.

Audience: Both Grad & Undergrad

3. Identify structural principles in plant anatomy with plant development, function, and environmental selection.

Audience: Both Grad & Undergrad

4. Critically evaluate current research in plant anatomy by designing experiments and writing a research paper.

Audience: Both Grad & Undergrad

5. Develop effective testing tools to evaluate students' knowledge on plant anatomy-related topics.

Audience: Graduate

BOTANY 305 – PLANT MORPHOLOGY AND EVOLUTION

4 credits.

A broad survey of the diversity of plants in the context of their evolutionary history. Similarities and differences in structure and reproduction among extant bryophytes, lycopods, ferns, gymnosperms, and flowering plants are emphasized along with the study of fossils representing extinct plant lineages.

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

Learning Outcomes: 1. Observe and describe plant roots, stems, leaves, and reproductive organs. Develop skills in natural history observation and description through the careful examination of roots, stems, leaves, and plant reproductive organs.

Audience: Both Grad & Undergrad

2. Practice the comparative method by documenting patterns of variation and modifications of plant organs.

Audience: Both Grad & Undergrad

3. Exercise detailed scientific writing through a series of laboratory reports focused on leaf venation, morphometric analysis, and fern gametophyte development.

Audience: Both Grad & Undergrad

4. Apply use of both dissecting and compound microscopes for studying micromorphological structures of plants.

Audience: Both Grad & Undergrad

5. Interpret familiarity with primary scientific literature in the broad area of plant morphology, including paleobotany and phylogenetics.

Audience: Both Grad & Undergrad

6. Summarize an understanding of plant diversity (bryophytes, lycopods, ferns, seed plants) and the evolutionary processes that have shaped it.

Audience: Both Grad & Undergrad

7. Through discussion, translate opposing perspectives on a scientific controversy in the field of plant morphology.

Audience: Graduate

BOTANY 330 – ALGAE

3 credits.

Introduction to ecology, evolution, systematics, taxonomy, physiology, biochemistry, cell biology, and molecular biology of freshwater, terrestrial and marine algae. Emphasis on techniques for identification, culture, analysis of growth and reproduction, and community composition assessment.

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: Fall 2025

Learning Outcomes: 1. Comprehend the local-global biogeochemical impacts of the organisms known as algae at a level needed for future graduate or professional work.

Audience: Both Grad & Undergrad

2. Acquire hands-on technical laboratory experience and skills key to future graduate or professional work in biology, particularly microbiology.

Audience: Both Grad & Undergrad

3. Write technical reports with excellent English usage, information content, and accessibility at a level expected by future professional colleagues in biology fields.

Audience: Both Grad & Undergrad

4. Develop skills to search, assess, and summarize relevant scientific literature on algal topics related to research.

Audience: Graduate

BOTANY/PL PATH 332 – FUNGI

4 credits.

Growth, development, variability and dispersal of saprophytic, parasitic, and symbiotic fungi, with a consideration of their ecological and economic significance. Develop skills in microscopy with live fungal materials.

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 2026

Learning Outcomes: 1. Describe the biodiversity of true fungi (Eumycota) and other organisms traditionally included in studies of mycology.

Audience: Both Grad & Undergrad

2. Describe the fundamentals of fungal systematics, life cycles, genetics, pathology, evolution, ecology.

Audience: Both Grad & Undergrad

3. Describe the practical uses of fungi in agriculture, industry, medicine, and as model organisms.

Audience: Both Grad & Undergrad

4. Manipulate fungi in the laboratory by isolating and culturing them from the environment, use both dissecting and compound microscopes to see living and preserved organisms, extract and sequence their DNA, and implement bioinformatics pipelines.

Audience: Both Grad & Undergrad

5. Elucidate major unanswered questions in the field of mycology.

Audience: Graduate

BOTANY/PL PATH 333 – BIOLOGY OF THE FUNGI

2 credits.

Growth, development, variability and dispersal of saprophytic, parasitic, and symbiotic fungi, with a consideration of their ecological and economic significance.

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 2026

Learning Outcomes: 1. Will have a detailed knowledge of the biodiversity of Fungi, and organisms traditionally included in mycology courses, including but not limited to systematics, life cycles, genetics, pathology, ecology.

Audience: Both Grad & Undergrad

2. Apply knowledge of Fungi and fungal-like organisms for use in agriculture and industry.

Audience: Both Grad & Undergrad

3. Communicate about fungi in either an outreach or professional capacity.

Audience: Graduate

BOTANY/AN SCI/MICROBIO 335 – THE MICROBIOME OF PLANTS, ANIMALS, AND HUMANS

3 credits.

Examination of the structure and function of microbial communities that live inside and on host organisms (plants, animals, and humans).

Introduction to general concepts of the microbiome and microbiota, and their relationship to host nutrition, health, and disease.

Requisites: MICROBIO 101 or 303 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: Spring 2026

Learning Outcomes: 1. Describe how microorganisms interact with plant and animal (including human) hosts in beneficial, neutral or detrimental ways.

Audience: Undergraduate

2. Express how the environment affects these host-microbe interactions.

Audience: Undergraduate

3. Summarize new molecular and bioinformatic methods that allow for the study of microbial communities.

Audience: Undergraduate

4. Describe how microbial communities are essential for life as we know it, and the processes that support life.

Audience: Undergraduate

5. Articulate several ways in which microbial communities are essential to plant and animal (including human) health.

Audience: Undergraduate

6. Explain our current knowledge about the diversity of microbial life and why its effects and potential benefits have not been fully explored.

Audience: Undergraduate

BOTANY/GEOG 338 – ENVIRONMENTAL BIOGEOGRAPHY

3 credits.

Explores how physical and biological factors affect the distribution of terrestrial biomes, ecosystem types, and biodiversity, as well as the role of disturbance and recent human activities on differences in past and modern day species distributions.

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: Fall 2025

Learning Outcomes: 1. Identify patterns and mechanisms of local to global gene, species, ecosystem and biome distributions.

Audience: Both Grad & Undergrad

2. Describe how past, current and future environmental change affect biogeography.

Audience: Both Grad & Undergrad

3. Explain how humans affect geographic patterns of biodiversity.

Audience: Both Grad & Undergrad

4. Discuss major paradigm changes in biogeography and how changes in conceptual frameworks and technology have altered interpretations of data and understanding of processes.

Audience: Both Grad & Undergrad

5. Apply concepts from biogeography to current environmental problems.

Audience: Both Grad & Undergrad

6. Explain how legacies of colonialism and scientific racism affect historical and current biases in the representation, methods, practice, and applications of biogeography.

Audience: Both Grad & Undergrad

7. Discuss and critique the primary literature (scientific articles in peer-reviewed journals) in biogeography.

Audience: Both Grad & Undergrad

8. Identify a controversy in biogeography and state the problem, trace its origins in the literature, provide arguments on opposing sides from the peer-reviewed literature, and what implications it has on current thinking and practice in conservation or sustainable use.

Audience: Graduate

BOTANY 400 – PLANT SYSTEMATICS

4 credits.

Plant systematics: the integration of taxonomy (identification, nomenclature, classification emphasizing flowering plants), evolution (speciation, reproductive biology, adaptation, convergence, biogeography), and phylogenetics. Emphasis on representative families and genera of flowering plants in Wisconsin, use of keys, manuals, and iNaturalist, plant collection.

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: Fall 2025

Learning Outcomes: 1. Summarize major themes of land plant evolution and identify the major clades of plants.

Audience: Both Grad & Undergrad

2. List significant families and genera in the Wisconsin flora and their key characteristics.

Audience: Both Grad & Undergrad

3. Use keys, manuals, or apps to identify plant species from anywhere in the world.

Audience: Both Grad & Undergrad

4. Make high quality herbarium collections with appropriate labels.

Audience: Both Grad & Undergrad

5. Conduct phylogenetic analysis of a lineage of plants using DNA data.

Audience: Graduate

BOTANY 401 – VASCULAR FLORA OF WISCONSIN

4 credits.

Taxonomic survey of the vascular plants of Wisconsin. Emphasis on in forest identification.

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 2026

Learning Outcomes: 1. Summarize key features of the local flora, including overall species diversity, biogeographical patterns, rarity, natural history, and ethnobotany.

Audience: Both Grad & Undergrad

2. Identify local plant species using keys, manuals and apps, such as iNaturalist.

Audience: Both Grad & Undergrad

3. Document and identify local biodiversity using apps and by making plant collections for deposition in a plant herbarium.

Audience: Both Grad & Undergrad

4. Take "ownership" of a forest site and learn the woody and herbaceous plants that exist there.

Audience: Both Grad & Undergrad

5. Utilize online data sources to document the invasion history of non-native species.

Audience: Graduate

BOTANY/F&W ECOL 402 – DENDROLOGY: WOODY PLANT IDENTIFICATION AND ECOLOGY

3 credits.

Identification, ecological characteristics, ranges, adaptations to environment, and uses of evergreen and deciduous woody plants, with emphasis on species native to Wisconsin; lab and field work.

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: Fall 2025

Learning Outcomes: 1. Identify all native Wisconsin trees, some common shrubs and vines, and a few important woody exotics by common and scientific name, in summer or winter condition.

Audience: Both Grad & Undergrad

2. Demonstrate a basic understanding of wood structure and use a key to identify blocks of wood.

Audience: Both Grad & Undergrad

3. Recognize the characteristic tree taxa of some of the world's major forest types and some interesting examples of the diversity of trees and their adaptations to their environments.

Audience: Both Grad & Undergrad

4. Compare the morphology, life history, and ecology of woody species to their distribution and habits.

Audience: Both Grad & Undergrad

5. Understand how humans affect the composition, structure and economic value of tree communities and apply this information to questions about management of woody vegetation under changing conditions.

Audience: Both Grad & Undergrad

6. Compare at least two methods for learning to identify a plant species using evidence from your experience in this course.

Audience: Both Grad & Undergrad

7. Construct new materials to teach woody plant ID or tree management issues to a particular target audience.

Audience: Graduate

8. Survey current scientific literature on a particular topic relevant to management of woody vegetation under changing conditions, and summarize current knowledge and knowledge gaps. Recommend next steps in research to improve management.

Audience: Graduate

BOTANY 403 – FIELD COLLECTIONS AND IDENTIFICATION

1-4 credits.

An independent experience in collecting plant specimens, identifying the specimens to species, making labels, and mounting of some specimens.

Requisites: Consent of instructor

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

BOTANY/ANTHRO/ZOOLOGY 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 2026

Learning Outcomes: 1. Explain the major biological transitions and climatic events that shaped the history of life on Earth.

Audience: Both Grad & Undergrad

2. Use phylogenetic trees to study and describe evolution.

Audience: Both Grad & Undergrad

3. Describe sources of variation within populations and distinguish those that can or cannot be acted upon by selection.

Audience: Both Grad & Undergrad

4. Apply the principles of population genetics to explain microevolution and conservation genetics.

Audience: Both Grad & Undergrad

5. Apply the principles of quantitative genetics and developmental biology to predict trait evolution.

Audience: Both Grad & Undergrad

6. Explain how microevolutionary phenomena yield macroevolutionary patterns.

Audience: Both Grad & Undergrad

7. Deploy evolutionary principles to develop and evaluate plausible adaptive hypotheses.

Audience: Both Grad & Undergrad

8. Analyze and summarize primary literature in evolutionary biology.

Audience: Graduate

BOTANY 422 – PLANT GEOGRAPHY

3 credits.

Biogeography of plants. Relationship to climate and geology; paleobiogeography, historical biogeography and island biogeography; history and distribution of floras of North America and Wisconsin.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, BIOCORE 381, ENVIR ST/GEOG 120, 127, 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

Learning Outcomes: 1. Relate features of earth's rotation and revolution (and the resulting seasonality) atmospheric and oceanic currents, latitude, and elevation to patterns of vegetation and associated animals seen across the globe today.

Audience: Both Grad & Undergrad

2. Explain how climate, geology, and geography account for the major biomes of plants and animals across the globe and the remarkable structural convergence in vegetation in different parts.

Audience: Both Grad & Undergrad

3. Describe the evolution of earth and of life and its impact on the distribution of floras and faunas through time.

Audience: Both Grad & Undergrad

4. Summarize the history and assembly of the North American, and specifically Great Lakes, biota from the Cretaceous through the Pleistocene and Holocene.

Audience: Both Grad & Undergrad

5. Develop appreciation for how present accelerated changes in climate, land use, and invasive species affect distribution patterns of native flora and fauna.

Audience: Graduate

BOTANY/ZOOLOGY 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 2025

BOTANY 455 – THE VEGETATION OF WISCONSIN

4 credits.

Ecology of Wisconsin plant communities: floristic composition, community structure; relationship to history, climate, soil, and geology; response to human perturbation.

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: Fall 2024

Learning Outcomes: 1. Recognize how ecologists learn about the composition, structure, dynamics, and diversity of Wisconsin plant communities and ecosystems.

Audience: Both Grad & Undergrad

2. Summarize how the patterns in plant communities relate to spatial variation in climate, soils, glacial history, and recent disturbance regimes.

Audience: Both Grad & Undergrad

3. Determine the biological properties of species in different communities and how those properties set their distributions along environmental gradients.

Audience: Both Grad & Undergrad

4. Identify the ongoing and likely future human impacts on Wisconsin's environment and vegetation.

Audience: Both Grad & Undergrad

5. Articulate how ecologists conceptualize problems, form hypotheses, test predictions, and relate such predictions to issues of land management and public policy.

Audience: Both Grad & Undergrad

6. Apply field and/or data science methods to analyze vegetation patterns, community assembly dynamics, and responses to environmental change.

Audience: Graduate

BOTANY/F&W ECOL/ZOOLOGY 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 2026

BOTANY/ENTOM/ZOOLOGY 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 2026

Learning Outcomes: 1. Identify the fundamental mechanisms mediating interactions of plants and insects.

Audience: Both Grad & Undergrad

2. Describe the implications of plant and insect interactions for population, community, and ecosystem ecology.

Audience: Both Grad & Undergrad

3. Discuss the implications of plant and insect interactions for natural resource management and sustainable ecosystems.

Audience: Both Grad & Undergrad

4. Communicate relevant and current scientific literature to peers.

Audience: Both Grad & Undergrad

5. Synthesize current research findings in plant and insect interactions and apply this knowledge to evaluate implications of plant-insect co-evolution.

Audience: Graduate

BOTANY/AMER IND/ANTHRO 474 – ETHNOBOTANY

3-4 credits.

Study of the interactions between human cultures and plants. Topics include: traditional resource management and agriculture; crop domestication, evolution, and conservation; archaeobotany; indigenous knowledge; folk taxonomy; plants in symbolism and religion; dietary patterns; phytochemistry; global movement of plants and peoples.

Requisites: Sophomore standing

Course Designation: Ethnic St - Counts toward Ethnic Studies requirement

Breadth - Either Biological Science or Social Science

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 2026

Learning Outcomes: 1. Provide examples of practices that fall on the continuum between foraging and cultivation (i.e., practices considered TRM or Traditional Resource Management).

Audience: Both Grad & Undergrad

2. Describe the rationale behind practices of "traditional" agriculture and how these practices compare to industrialized agriculture.

Audience: Both Grad & Undergrad

3. Summarize the process of crop domestication and the importance of conserving the diversity of crop plants and their wild relatives.

Audience: Both Grad & Undergrad

4. Describe Traditional Ecological Knowledge (TEK) and Indigenous Knowledge (IK) and give examples of how they can complement the research of professional ("Western") science.

Audience: Both Grad & Undergrad

5. Describe human uses of different classes of plant secondary compounds and evaluate health claims made about plant foods or their components.

Audience: Both Grad & Undergrad

6. Describe the processes by which North American Indigenous nations lost their land, and often their agricultural traditions, from 1492 to the present day. Describe impacts of these losses on the health of Indigenous peoples, and how Native nations are now responding to this health crisis.

Audience: Both Grad & Undergrad

7. Question your own and others' claims and assumptions regarding the knowledge and practices of Indigenous cultures of the USA and elsewhere.

Audience: Both Grad & Undergrad

8. Analyze and critique the primary ethnobotanical literature.

Audience: Graduate

BOTANY 499 – INTERMEDIATE DIRECTED RESEARCH

1-3 credits.

Explore research questions that facilitate learning in the field of botany through guidance and mentorship in a research environment.

Requisites: Consent of instructor

Course Designation: 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 2026

BOTANY 500 – PLANT PHYSIOLOGY

3-4 credits.

An in-depth look at plant growth, development, respiration, photosynthesis, mineral nutrition, and water relations. Experimental approaches will be used to demonstrate principles described.

Requisites: Satisfied Quantitative Reasoning (QR) A requirement, sophomore standing, and (ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, or BIOCORE 381), 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 2026

Learning Outcomes: 1. Describe fundamental processes that control plant growth and development at the molecular, cellular, and organismal levels, by study of physical, chemical, and biological principles and mechanisms.

Audience: Both Grad & Undergrad

2. Identify, perform, and interpret experimental techniques commonly used in plant physiology through both lecture and laboratory instruction.

Audience: Both Grad & Undergrad

3. Analyze physiological processes across biological scales (from genes and cells to tissues and organs), using both qualitative and quantitative data.

Audience: Both Grad & Undergrad

4. Construct and interpret graphs and other data visualizations to analyze trends, make predictions, and draw evidence-based conclusions.

Audience: Both Grad & Undergrad

5. Critically evaluate primary literature in plant physiology and synthesize experimental findings to propose research questions and experimental approaches.

Audience: Graduate

BOTANY/ENTOM/PL PATH 505 – PLANT-MICROBE INTERACTIONS: MOLECULAR AND ECOLOGICAL ASPECTS

3 credits.

Molecular and ecological aspects of the interactions between plants and microorganisms. Explores many of the themes, from genetic to integrative, of modern biology, and illustrates how study of plant-microbe interactions contributes to understanding of fundamental plant science.

Requisites: MICROBIO 303, GENETICS 466, 468, BIOCHEM 501, 508, 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 2026

Learning Outcomes: 1. Assess research papers from the peer-reviewed science literature by critically reading.

Audience: Both Grad & Undergrad

2. Discuss our current understanding of molecular plant-microbe interactions.

Audience: Both Grad & Undergrad

3. Present ideas at a professional level, in both oral and written form.

Audience: Both Grad & Undergrad

4. Facilitate an in-depth discussion about the complex relationships between plants and microbes.

Audience: Graduate

BOTANY/ENVIR ST/F&W ECOL/ZOOLOGY 516 – CONSERVATION BIOLOGY

3 credits.

Investigate the science behind the protection of nature and preservation of biodiversity by focusing on both the biological and socioeconomic factors that underlie the challenges to and the impacts of conservation efforts. Explore the theory, research, and application of biological conservation from an interdisciplinary, international, solutions-focused perspective. Learn about the many threats to Earth's biodiversity but also examine in-depth and apply approaches to overcome them.

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

Course Designation: Gen Ed - Quantitative Reasoning Part B
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 2026

Learning Outcomes: 1. Distinguish conservation biology from other scientific disciplines and describe its over-arching principles.

Audience: Both Grad & Undergrad

2. Articulate many reasons why the conservation of biological diversity (at many levels) is important.

Audience: Both Grad & Undergrad

3. Quantify biodiversity at the individual, population, and species level by applying various commonly used models and indices.

Audience: Both Grad & Undergrad

4. Explain orally and in writing the principal threats to biodiversity, to both scientific and layperson audiences (habitat loss and fragmentation; industrial agriculture; climate change; overexploitation; invasive species; pollution) and the specific biological effects of these threats.

Audience: Both Grad & Undergrad

5. Outline strategies to implement at the personal, local, and global scales for solving the biodiversity crisis.

Audience: Both Grad & Undergrad

6. Critically analyze, apply, and communicate recommendations for changing personal behaviors to mitigate the biodiversity and climate crises.

Audience: Both Grad & Undergrad

7. Assess the strengths and weaknesses of various conservation strategies or policy approaches.

Audience: Both Grad & Undergrad

8. Synthesize multiple investigations of conservation strategies to assess tradeoffs and synergies among them.

Audience: Graduate

9. Make science-based recommendations for the appropriate conservation approach or strategy for a given situation.

Audience: Graduate

10. Manipulate quantitative data using multi-step arguments to evaluate, interpret, and express solutions to problems in biodiversity estimation, population monitoring, and genetics in the context of conservation.

Audience: Both Grad & Undergrad

BOTANY/PL PATH 563 – PHYLOGENETIC ANALYSIS OF MOLECULAR DATA

3 credits.

Theory and practice of phylogenetic inference from DNA sequence data.

Requisites: (ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, or BIOCORE 381) and (STAT 240, 301, 324, or 371) 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 2026

Learning Outcomes: 1. Explain in details all the steps in the pipeline for phylogenetic inference and how different data and model choices affect the inference outcomes

Audience: Both Grad & Undergrad

2. Plan and produce reproducible scripts with the analysis of real biological data

Audience: Both Grad & Undergrad

3. Justify the data and model choices made for the data analysis

Audience: Both Grad & Undergrad

4. Interpret the results of the most widely used phylogenetic methods in biological terms

Audience: Both Grad & Undergrad

5. Orally present the results of phylogenomic data analyses based on the best scientific and reproducibility practices

Audience: Graduate

BOTANY 575 – SPECIAL TOPICS

1-3 credits.

Topics of interest focusing on specific subjects or groups of organisms of plants, algae, or fungi.

Requisites: (ZOOLOGY/BIOLOGY 101, 102 and BIOLOGY/BOTANY 130), ZOOLOGY/BIOLOGY/BOTANY 152, 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: Yes, unlimited number of completions

Last Taught: Spring 2026

BOTANY/BIOCHEM 621 – PLANT BIOCHEMISTRY

3 credits.

Biochemistry of photosynthesis, respiration, cell walls, and other metabolic and biosynthetic processes in plants.

Requisites: BIOCHEM 501, 507, 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 2025

Learning Outcomes: 1. Explain how CO₂ and other nutrients are converted to various metabolites in plants through different metabolic pathways

Audience: Both Grad & Undergrad

2. Employ various analytical tools used in the field of plant biochemistry

Audience: Both Grad & Undergrad

3. Apply critical scientific thinking skills (e.g. how to read literature, critically evaluate data, and identify unresolved questions) to support scientific arguments

Audience: Both Grad & Undergrad

4. Synthesize and critically evaluate scientific claims and hypotheses

Audience: Graduate

BOTANY/GENETICS/M M & I/PL PATH 655 – BIOLOGY AND GENETICS OF FUNGI

3 credits.

Fungal genetics, genomics, and physiology using plant pathogenic fungi and the genetic models *Aspergillus nidulans* and *Neurospora crassa* as model systems to explore the current knowledge of fungal genetics and plant/fungal interactions.

Requisites: Graduate/professional standing

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

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Demonstrate a basic understanding of fungal biology and genetics

Audience: Graduate

2. Analyze current research topics in fungal genetics/biology

Audience: Graduate

3. Identify members of the fungal research community

Audience: Graduate

4. Write and critique research grants

Audience: Graduate

5. Critique and discuss peer reviewed manuscripts

Audience: Graduate

6. Develop and deliver oral presentations (research paper and own research)

Audience: Graduate

7. Improve communication skills (oral and written)

Audience: Graduate

BOTANY/F&W ECOL/ZOOLOGY 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

BOTANY 681 – SENIOR HONORS THESIS

3 credits.

Individual research for students completing theses for honors in the Botany major as arranged with a faculty member.

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:** Fall 2024**BOTANY 682 – SENIOR HONORS THESIS**

3 credits.

Individual research for students completing theses for honors in the Botany major as arranged with a faculty member.

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**BOTANY 691 – SENIOR THESIS**

2-3 credits.

Individual research for students completing theses as arranged with a faculty member.

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:** Fall 2025**BOTANY 692 – SENIOR THESIS**

2-3 credits.

Individual research for students completing theses as arranged with a faculty member.

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 2026**BOTANY 698 – DIRECTED STUDY**

1-4 credits.

Advanced directed research projects as arranged with a faculty member.

Requisites: Consent of instructor**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 2017**BOTANY 699 – DIRECTED STUDY**

1-4 credits.

Explore research questions that facilitate learning in the field of botany through guidance and mentorship in a research environment.

Requisites: Consent of instructor**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 2026**BOTANY/ZOOLOGY 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**BOTANY 801 – ADVANCED PLANT COMMUNITY ECOLOGY**

4 credits.

Ecological determinants of plant community structure, dynamics, and diversity from an evolutionary perspective. Relations of vegetation types, physiognomy and phenology to plant adaptation and constraints. Gradient analysis, succession, nutrient cycling, plant-herbivore interactions, species richness.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2023**BOTANY 802 – PHYSIOLOGICAL PLANT ECOLOGY**

3 credits.

Gas exchange at the individual plant and community level, energy balance and water relations, nutrient cycling, biomechanical adaptations; growth analysis; adaptations to sun and shade, primary productivity models, physiological ecology of selected plant communities (arctic/alpine, boreal, chaparral, desert, tropical, aquatic).

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2026

BOTANY/ENTOM/GENETICS/ZOOLOGY 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 2025

Learning Outcomes: 1. Explain important evolutionary concepts, including basic population and quantitative genetics.

Audience: Graduate

2. Identify key ideas and controversies in evolutionary biology.

Audience: Graduate

3. Develop an ability to think about evolution in the manner of a professional in the field.

Audience: Graduate

4. Interpret and critique conceptual theories using rigorous logic and references to established biological phenomena.

Audience: Graduate

5. Summarize, interpret, and synthesize scientific concepts orally and in writing.

Audience: Graduate

6. Communicate and debate in a respectful and constructive manner with fellow evolutionary biologists, including as a peer reviewer.

Audience: Graduate

BOTANY/ENTOM/F&W ECOL/ZOOLOGY 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 2026

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

BOTANY/BIOCHEM/GENETICS 840 – REGULATORY MECHANISMS IN PLANT DEVELOPMENT

3 credits.

Molecular mechanisms whereby endogenous and environmental regulatory factors control development; emphasis on stimulus perception and primary events in the signal chain leading to modulated gene expression and cellular development.

Requisites: Graduate/professional standing

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

Repeatable for Credit: No

Last Taught: Fall 2020

BOTANY 858 – SPECIAL TOPICS IN PLANT PHYSIOLOGY

1-3 credits.

Topics of interest in the area of Plant Physiology.

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 2026

BOTANY 860 – PLANT CELL BIOLOGY

2 credits.

Structure/function relationships at the cellular level. Topics include the biogenesis of organelles, vesicle traffic, ion transport and signalling processes, and organization of the cytoskeleton and cell wall.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2025**BOTANY/ZOOLOGY 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**BOTANY/ATM OCN/CIV ENGR/ENVIR ST/GEOSCI/ZOOLOGY 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 2026**Learning Outcomes:** 1. Explain important research in current limnology.
Audience: Graduate

2. Utilize different research presentation methods.

Audience: Graduate

3. Assess scientific information and ask thoughtful questions.

Audience: Graduate

BOTANY/PL PATH 930 – SEMINAR-MYCOLOGY

1 credit.

Topics, recent advances literature in the area of Mycology.

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 2025**Learning Outcomes:** 1. Assess current studies and methodologies in the study of fungi.

Audience: Graduate

BOTANY 940 – SEMINAR IN PLANT SYSTEMATICS AND EVOLUTION

1 credit.

Topics, recent advances literature in the area of Plant Systematics and Evolution.

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 2025**BOTANY 950 – SEMINAR-PLANT ECOLOGY**

1 credit.

Topics, recent advances literature in the area of Plant Ecology.

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 2026**BOTANY/AGROECOL/ATM OCN/ENTOM/ENVIR ST/GEOG/ZOOLOGY 953 – INTRODUCTION TO ECOLOGY RESEARCH AT UW-MADISON**

1-2 credits.

Introduction to diverse ecological research across the UW-Madison Campus. Discussions on adapting to graduate school and graduate-level ecological research, key topics in professional development, and research presentations by faculty members.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2025**Learning Outcomes:** 1. Develop an appreciation for the foundations and legacy of ecology research and conservation science at UW-Madison
Audience: Graduate

2. Recognize the diversity and strength of current research in ecology at UW-Madison

Audience: Graduate

3. Differentiate expectations between undergraduate education and those of independent research for graduate degrees in ecology

Audience: Graduate

4. Develop appropriate expectations for advisors and advisees

Audience: Graduate

5. Reason through hypothetical ethical challenges and identify potential solutions based on professional codes of ethics

Audience: Graduate

6. Develop an understanding of the suite of skills associated with success in graduate school and in science

Audience: Graduate

BOTANY 960 – SEMINAR-PLANT PHYSIOLOGY

1 credit.

Topics, recent advances literature in the area of Plant Physiology.

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 2025

BOTANY/ATM OCN/ENVIR ST/GEOG/GEOSCI/ZOOLOGY 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

BOTANY 990 – RESEARCH-PHYCOLOGY

1-12 credits.

Independent research in the area of Phycology.

Requisites: Consent of instructor

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

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Fall 2019

BOTANY 993 – RESEARCH: FUNGAL BIOLOGY

1-12 credits.

Independent research in the area of Fungal Biology.

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 2026

BOTANY 994 – RESEARCH-PLANT SYSTEMATICS

1-12 credits.

Independent research in the area of Plant Systematics.

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 2026

BOTANY 995 – RESEARCH-PLANT ECOLOGY

1-12 credits.

Independent research in the area of Plant Ecology.

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 2026

BOTANY 996 – RESEARCH-PLANT PHYSIOLOGY

1-12 credits.

Independent research in the area of Plant Physiology.

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 2026

BOTANY 999 – INDEPENDENT WORK

1-3 credits.

Mentored reading and research for dissertators.

Requisites: Consent of instructor

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

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Summer 2011