

Biology

Disciplinary Major or Minor (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/planning/disciplinary-majors-minors>)
(Bachelor of Science)

Professors – Michael L. Draney, Robert W. Howe

Associate Professors – Mathew E. Dornbush, Craig J. Hanke, Warren V. Johnson, James C. Marker, Daniel Meinhardt, Brian Merkel, Uwe Pott, Donna L. Ritch, Amy T. Wolf (chair)

Assistant Professors – Patrick Forsythe, Lisa Grubisha

The Biology program provides insights into living systems from the subcellular level to the ecosystem level. The Biology major prepares students for careers in cell and molecular biology, biochemistry, plant and animal biology, genetics, physiology, ecology, and field biology. A curriculum can be developed to prepare for medical, dental, veterinary, agriculture, or other professional schools, or for graduate study. The major also establishes a foundation for interdisciplinary careers in biological resources management, human biology, nutritional sciences, and science communications (technical writing, journalism, and nature interpretation).

Biology graduates are employed in industry (pharmaceuticals, paper making, food processing, hospitals and clinics, agriculture, and others); government agencies (Environmental Protection Agency, Food and Drug Administration, Fish and Wildlife Service, Forest Service, Bureau of Land Management, Department of Agriculture, Wisconsin Department of Natural Resources); environmental consulting firms; and educational institutions. About 40 percent of Biology graduates pursue advanced degrees in graduate and professional schools.

Biology majors must combine their studies with an interdisciplinary minor. Human Biology is the minor commonly chosen by Biology majors with interests in health sciences or exercise science. Students interested in ecology, biodiversity, and management of biological resources such as wildlife, forests, and fisheries, typically take a minor in Environmental Science. Other interdisciplinary areas that may be useful, depending upon a student's career goals, include Business Administration and Environmental Policy and Planning.

Students who prefer a Biology minor (rather than a major), coupled with an interdisciplinary major, might consider majors in Environmental Science or Human Biology. Students in Education who desire to become science teachers have found the Biology major important.

A particular advantage of the UW-Green Bay Biology program is the opportunity for undergraduate students to gain practical experience. Many students work with faculty on research projects. There is an active internship program with private, state and national agencies, and with industry. Such experiences are beneficial when entering the job market or seeking admission to graduate and professional schools.

The program has well-equipped laboratories for teaching and student/faculty research. In cellular and molecular biology laboratories, students become familiar with techniques of tissue culture, in situ hybridization, affinity chromatography, agarose and polyacrylamide gel, electrophoresis, polymerase chain reaction, and the use of monoclonal antibodies. In physiology laboratories, students learn techniques to study physiological functions. Teaching and research facilities available to field and ecology students include the Cofrin Center for Biodiversity, the 290-acre Cofrin Memorial Arboretum on the campus, off-campus natural areas managed by the University, the Richter Natural History Museum, small animal laboratory, herbarium, greenhouse, and computer labs.

Students get to practice their knowledge in both field and laboratory settings, and master basic skills including statistical analysis, various laboratory methods and techniques, and taxonomic (identification) skills. Many occupations today require a college-educated individual who can write and speak well, solve problems, learn new information quickly and work well with others on a team. Students in the Biology program develop these skills with excellence.

Students seeking information on teacher certification should contact the Education Office.

This disciplinary major also requires:

Completion of an interdisciplinary major or minor (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/planning/interdisciplinary-majors-minors>)

Completion of one of the following areas of emphasis:

- Animal Biology (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/programs/biology/major/animal-emphasis>)
- Biology for Educators (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/programs/biology/major/educator-emphasis>)
- Cell/Molecular (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/programs/biology/major/cell-emphasis>)
- Ecology and Conservation (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/programs/biology/major/ecology-emphasis>)

This disciplinary minor also requires:

Completion of an interdisciplinary major (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/planning/interdisciplinary-majors-minors>)

- Biology Minor (<http://catalog.uwgb.edu/archive/2014-2015/undergraduate/programs/biology/minor>)

Courses

BIOLOGY 202. Principles of Biology: Cellular and Molecular Processes. 4 Credits.

Study of biological principles, focusing on cellular structure and function, metabolism, genetics, evolution and development. This introductory course is intended for science majors.

P: Env Sci 207 or conc enr or Hum Biol 207 or conc enr AND ACT Science Score of 24 or greater, OR grade of C or better in Hum Biol 102, OR grade of C or better in Biology 203.

Fall and Spring.

BIOLOGY 203. Principles of Biology: Organisms, Ecology, and Evolution. 4 Credits.

Biological principles, structure and function of organisms, with consideration of interactions at cellular level and examination of the relationships of organisms to the environment. Includes laboratories.

Fall and Spring.

BIOLOGY 298. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript.

P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.

Fall and Spring.

BIOLOGY 299. Travel Course. 1-4 Credits.

Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.

P: cons of instr & prior trip arr & financial deposit.

BIOLOGY 302. Principles of Microbiology. 4 Credits.

Microorganisms and their activities; their form, structure, reproduction, physiology, metabolism, and identification; their distribution in nature and their relationship to each other and other living things.

P: Biology 202 with at least a C grade AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Fall and Spring.

BIOLOGY 303. Genetics. 3 Credits.

Mechanisms of heredity and variation, their cytological and molecular basis and their implications in biological technology.

P: Biology 202 with at least a C grade; Chem 108 or 212 with at least a C grade; Math 260 with at least a C grade;

Fall and Spring.

BIOLOGY 304. Genetics Laboratory. 1 Credit.

Basic techniques of genetic research; laboratory investigation and analysis of animal, plant, and human patterns of inheritance.

P: Biology 303 with at least a C grade AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Fall Only.

BIOLOGY 307. Cell Biology. 3 Credits.

A lecture course examining the molecular organization of major cellular organelles and their functions in plant and animal cells.

P: Biology 202 with at least a C grade; and Chem 108 or 212 with at least a C grade; Math 260 with at least a C grade.

Spring.

BIOLOGY 308. Cell Biology Laboratory. 1 Credit.

A laboratory course examining a variety of laboratory techniques used by cell biologists to elucidate cell structure and function.

P: Biology 202 with at least a C grade; AND Chem 108 or 212 with at least a C grade; AND Math 260 with at least a C grade; AND Biology 307 with at least a C grade or conc enr; AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Spring.

BIOLOGY 309. Evolutionary Biology. 3 Credits.

Patterns and processes of biological evolution and their significance for modern biology. Topics include the history of life, population genetics, speciation, and evolution in populations today.

P: Biology 202 with at least a C grade and either Biology 203 or Human Biology 204 with at least a C grade.

Fall and Spring.

BIOLOGY 310. Plant Taxonomy. 3 Credits.

Identification and classification of vascular plants of North America, emphasizing flora of Wisconsin and including topics in evolution of vascular plants.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 003.

Spring.

BIOLOGY 311. Plant Physiology. 4 Credits.

General physiology of vascular plants within the context of a plant life cycle: seed dormancy and germination, metabolism, transport systems, mineral nutrition, patterns of plant growth and development, growth regulators, reproduction and senescence.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 003; and Chem 212.

Fall Only.

BIOLOGY 312. Mycology. 3 Credits.

Morphology, taxonomy and studies of fungi in medical mycology, allergies, antibiotic production, brewing, baking and other industries; poisonous edible and plant pathogenic fungi; techniques in collection, isolation, pure culture and identification.

P: Biology 202 with at least a C grade or transfer cse Biology 003.

Spring.

BIOLOGY 317. Structure of Seed Plants. 3 Credits.

Anatomy of seed plants, with special emphasis upon tissue differentiation and structure.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 003.

Fall Even.

BIOLOGY 320. Field Botany. 3 Credits.

Identification and natural history of plants indigenous to northeastern Wisconsin.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 003.

Fall Only.

BIOLOGY 340. Comparative Anatomy of Vertebrates. 4 Credits.

A lecture and laboratory course examining the anatomy of organs and organ systems of the vertebrates with emphasis on adaptations. Specimens primarily studied in the lab are the shark and cat.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade; OR transfer cse Biology 002; AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Fall Only.

BIOLOGY 341. Ichthyology. 4 Credits.

An examination of the biology of fishes including classification, phylogeny, functional morphology and population characteristics. Aspects of the ecology of the fishes will be studied in relation to behavior, distribution, diversity and production in freshwater environments. P: None.

P: Env Sci 405

Spring Even.

BIOLOGY 342. Ornithology. 3 Credits.

Overview of avian biology, emphasizing adaptation and ecology. Identification of North American bird species and other avian families. Region's most interesting birding areas.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 002.

Spring Even.

BIOLOGY 343. Mammalogy. 3 Credits.

Comprehensive study of mammals, including systematics, anatomy, physiology, behavior, and ecology. Laboratory studies include work with specimens from the Richter Natural History Museum.

P: Biology 202 with at least a C grade and 203 with at least a C grade, or transfer cse Biology 002.

Spring Odd.

BIOLOGY 345. Animal Behavior. 3 Credits.

Biology of animal behavior patterns; behavioral interactions of animals with their environment.

P: Biology 202 with at least a C grade.

Spring Even.

BIOLOGY 346. Comparative Physiology. 3 Credits.

Ways in which dissimilar organisms perform similar functions. Behavioral, physiological, and biochemical solutions to problems imposed on invertebrate and vertebrate animals by their environment.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade and Chem 212; OR transfer cse Biology 002 and Chem 212.

Spring.

BIOLOGY 353. Invertebrate Biology. 4 Credits.

Survey of invertebrate animals. A phylum-by-phylum survey examining defining characters, structure, function, life cycles, and ecology of invertebrate animals. Lab focuses on identification of invertebrates living in Wisconsin.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer course Biology 002..

Fall Odd.

BIOLOGY 355. Entomology. 3 Credits.

Structure, function, diversity, and ecology of insects, as well as their impact on human society. Lab develops ability to identify Wisconsin insects, both in the field and by examining microscopic anatomy.

P: Biology 202 with at least a C grade and Biology 203 with at least a C grade, or transfer cse Biology 002; REC: Biology 353.

Fall Even.

BIOLOGY 402. Advanced Microbiology. 4 Credits.

Study of viruses, bacteria, and viruses in relationship to their environment.

P: Biology 302 with at least a C grade; Math 260 with at least a C grade; AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Spring Even.

BIOLOGY 407. Molecular Biology. 3 Credits.

Molecular approaches to biological problems, emphasizing study of informational macromolecules. Topics include replication, control, expression, organization, and manipulation of genes; RNA processing; protein processing; transposons; oncogenes, growth factors; genetic control of development and the immune system.

P: Biology 303 with at least a C grade or Chem 330 with at least a C grade; REC: Chem 300 or 303.

Spring Odd.

BIOLOGY 408. Molecular Biology Laboratory. 1 Credit.

Molecular biology of nucleic acids and the techniques that form the basis of biotechnology. Topics include electrophoresis, restriction mapping, hybridization, plasmid analysis, and DNA cloning (recombinant DNA library construction, screening, and mapping).

P: Biology 407 or conc enr or Chem 407 or conc enr; and Env Sci 207 or conc enr or Hum Biol 207 or conc enr. REC: Chem 301 or 305.

Spring Odd.

BIOLOGY 410. Developmental Biology. 3 Credits.

This course examines animal development from fertilization to the establishment of the adult body. Emphasis is placed on the molecular and cellular mechanisms that control differentiation, morphogenesis, and growth.

P: Biology 303 or 307 or Hum Biol 310 with at least a C grade.

Spring Odd.

BIOLOGY 411. Developmental Biology Laboratory. 1 Credit.

Laboratory will introduce descriptive and experimental embryological techniques using a variety of model organisms.

P: Biology 410 with at least a C grade or concurrent enrollment; AND Env Sci 207 or conc enr or Hum Biol 207 or conc enr.

Spring.

BIOLOGY 478. Honors in the Major. 3 Credits.

P: min 3.50 all cses req for major and min gpa 3.75 all UL cses req for major. (F,S)

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Fall and Spring.

BIOLOGY 490. Biology Seminar. 1 Credit.

This course provides a capstone experience for upper-level students majoring in biology. Class activities introduce students to academic and professional infrastructures, career opportunities, and major conceptual issues in the biological sciences. During a significant part of the course, students will read and discuss current articles from the primary sci

P: Biology major with jr st

Fall and Spring.

BIOLOGY 495. Research in Biology. 1-5 Credits.

Work closely with a faculty member to plan, perform, evaluate, and report on laboratory research in biology or related area.

P: Hum Biol 207 or Env Sci 207 and approval by faculty mentor.

Fall and Spring.

BIOLOGY 497. Internship. 1-12 Credits.

Supervised practical experience in an organization or activity appropriate to a student's career and educational interests. Internships are supervised by faculty members and require periodic student/faculty meetings.

P: jr st.

Fall and Spring.

BIOLOGY 498. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript.

P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.

Fall and Spring.

BIOLOGY 499. Travel Course. 1-6 Credits.

Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.

P: cons of instr & prior trip arr & financial deposit.