

# Biology (BIOLOGY)

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## Courses

### **BIOLOGY 198. First Year Seminar. 3 Credits.**

First Year Seminar, topics vary.  
Reserved for New Incoming Freshman  
Fall Even.

### **BIOLOGY 200. Principles of Biology Discussion: Cellular and Molecular Processes. 1 Credit.**

This discussion course is designed to supplement the concepts presented in BIOLOGY 201. Activities will focus on deeper exploration of the biology of organisms at the molecular and cellular level and will emphasize skills necessary for success in the introductory biology sequence.

P: Concurrent enrollment in BIOLOGY 201  
Fall and Spring.

### **BIOLOGY 201. Principles of Biology: Cellular and Molecular Processes. 3 Credits.**

Study of biological principles, focusing on macromolecules and biological chemistry, cellular structure and function, energy metabolism, gene expression, genetics, and cell division. This course is intended for science majors and is taught with the expectation that students have a solid background in biology and chemistry gained through prior classes taken at the high school or college level and/or an ACT Science Score of 24 or greater. For students without this background, it is strongly suggested that HUM BIO 102 or BIOLOGY 203 are taken before BIOLOGY 201, or that BIOLOGY 200 is taken concurrently.

P: CHEM 207 (or conc enrl) AND BIOLOGY 202 (or conc enrl). REC: ACT science score 24 or greater OR completion of AP Bio course OR completion of 4 science courses in HS (including a minimum of 2 Bio courses and 1 Chem course) OR conc enrl in BIOLOGY 200  
Fall and Spring.

### **BIOLOGY 202. Principles of Biology Lab: Cellular and Molecular Processes. 1 Credit.**

This lab course offers an introduction to the biology of organisms at the molecular and cellular level. Labs will focus on the chemical, genetic, and microscopic properties shared by cells. This is a beginning biology course for students who wish to major in Biology, Human Biology or Environmental Science.

P: CHEM 207 (or concurrent enrollment) AND grade of C or better in BIOLOGY 201 (or concurrent enrollment).  
Fall and Spring.

### **BIOLOGY 203. Principles of Biology: Organisms and Evolution. 3 Credits.**

Survey of the evolution and diversity of life, with focus on general biological principles, anatomy and physiology, and consideration of interactions from the cellular to organismal level.

P: CHEM 207 or concurrent enrollment AND BIOLOGY 204 or concurrent enrollment  
Fall and Spring.

### **BIOLOGY 204. Principles of Biology Lab: Organisms and Evolution. 1 Credit.**

Hands-on laboratory reinforcing material covered in Biology 203. Laboratory activities explore the structure of seed plants, comparative morphology of animal phyla, dichotomous taxonomic keys, phylogeny, and experimental approaches to plant and animal physiology. This writing emphasis course covers the process and techniques of scientific writing.

P: CHEM 207 or concurrent enrollment AND BIOLOGY 203 or concurrent enrollment.  
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. Course is repeatable for credit.

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. 1-6 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.

### **BIOLOGY 303. Genetics. 3 Credits.**

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

P: Biology 201/202 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 Chem 207 or concurrent enrollment

Fall Only.

**BIOLOGY 306. Principles of Ecology. 4 Credits.**

Ecological principles governing interactions of plants and animals in their physical and biotic environments. Focuses on organisms and their environment, populations, communities, ecosystems, and global dimensions.

P: MATH 104 or Math Placement of MATH 202 or greater; MATH 260 or enrolled concurrently in MATH 260; BIOLOGY 203 all with a C or better

Fall and Spring.

**BIOLOGY 307. Cell Biology. 3 Credits.**

A study of the fundamental biological processes that occur within a cell and its normal environment. Topics include cellular molecules and metabolic processes; membranes and organelles; synthesis and regulation of macromolecules; protein sorting and transport, cytoskeleton; signal transduction, cellular interactions, cell cycle and growth of normal and neoplastic cells.

P: Biology 201 with at least a C grade; AND Chem 108 or 212 with at least a C grade; AND Biology 303 or Hum Biol 310

Fall and Spring.

**BIOLOGY 308. Cell Biology Laboratory. 1 Credit.**

A laboratory course examining the microscopic, biochemical and molecular approaches used to investigate cellular 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 Chem 207 or conc enr

Fall and 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 201/202 with at least a C grade and either Biology 203 or Human Biology 240/241 with at least a C grade

Fall and Spring.

**BIOLOGY 310. Plant Biodiversity. 4 Credits.**

An introduction to the diversity of vascular plants, with an emphasis on flowering plants. Lectures cover both organismal and phylogenetic/evolutionary perspectives on plant systematics, including the use of genetic and genomic data for understanding plant evolution. The laboratory presents a survey of vascular plant diversity, covering structural characteristics of major plant families and the identification of seed plants of Wisconsin to the species level.

P: Biology 201/202 with at least a C grade and Biology 203/204 with at least a C grade, or transfer cse Biology 003.

Spring Even.

**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 201/202 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. 4 Credits.**

Broad taxonomic survey of fungi. Morphology, reproduction, physiology, genetics, evolution, and ecology. Role in nutrient cycling, plant disease, human welfare and biotechnology. Techniques in collection, identification, pure culture isolation, and nucleic acid applications.

P: Biology 201/202 with at least a C grade or transfer cse Biology 003.

Fall Odd.

**BIOLOGY 320. Field Botany. 4 Credits.**

Identification and natural history of plants indigenous to the Great Lakes region. Students will become proficient at using keys to identify unknown plants to the species level, be able to identify at sight the woody plants of northeastern Wisconsin, be able to recognize major plant communities of Wisconsin, and gain an understanding of basic organismal botany. An all-day field trip during one weekend day in mid-September is required.

P: Biology 201/202 with at least a C grade and Biology 203/204 with at least a C grade, or transfer course Biology 003.

Fall Even.

**BIOLOGY 322. Environmental Microbiology. 4 Credits.**

This course will focus on the diversity and role of microorganisms in diverse and complex environments, including the use and management of these organisms for the benefit of ecosystems and society.

P: BIOLOGY 201/202 with at least a C AND CHEM 207 or conc enr

Spring.

**BIOLOGY 323. Principles of Microbiology. 3 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 201 & BIOLOGY 202 with at least a C grade

Fall and Spring.

**BIOLOGY 324. Principles of Microbiology Laboratory. 1 Credit.**

Laboratory Course that accompanies BIOLOGY 323.

P: BIOLOGY 323 or concurrent enrollment AND CHEM 207 or concurrent enrollment  
Fall and Spring.

**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 201/202 with at least a C grade and Biology 203/204 with at least a C grade; OR transfer cse Biology 002; AND CHEM 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: BIOLOGY 306  
Spring Even.

**BIOLOGY 342. Ornithology. 4 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 201/202 with at least a C grade and Biology 203/204 with at least a C grade, or transfer cse Biology 002.  
Spring Even.

**BIOLOGY 343. Mammalogy. 4 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 201, BIOLOGY 202, BIOLOGY 203, and BIOLOGY 204 with at least a C grade  
Spring Odd.

**BIOLOGY 345. Animal Behavior. 3 Credits.**

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

P: Biology 201/202 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 201 & BIOLOGY 202 with at least a C grade) AND (BIOLOGY 203 & BIOLOGY 204 with at least a C grade or HUM BIOL 240 & HUM BIOL 241 with at least a C grade or HUM BIOL 222 with at least a C grade); AND CHEM 212  
Spring.

**BIOLOGY 355. Entomology. 4 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 201/202 with at least a C grade and Biology 203/204 with at least a C grade, or transfer cse Biology 002; REC: Biology 353.  
Fall Odd.

**BIOLOGY 357. Marine Biology. 4 Credits.**

The Ocean covers about 71% of the Earth's surface and so is obviously a huge part of the functioning biosphere. Life emerged in the Ocean but since we are terrestrial beings, Ocean life remains less well known than terrestrial life. This course serves as an overview of marine biodiversity and marine ecosystems in which the concepts learned in general biology courses can be applied to marine life. We will cover the abiotic functioning of the Ocean in order to understand the unique challenges that marine organisms face, and we will focus on an understanding of the diverse array of marine organisms, how they interact ecologically, and how humans are affecting marine ecosystems worldwide.

P: Biology 201/202 with at least a C grade, and Biology 203/204 with at least a C grade. REC: Env Sci 302  
Spring Odd.

**BIOLOGY 360. Early Life History of Fish. 4 Credits.**

This course covers the early life history of freshwater, estuarine, and marine fishes from reproduction through metamorphosis. It will also help students develop an understanding of the history and principles of aquaculture, including common culture systems, biotic and abiotic factors regulating success, and choice of species. Students will extensively cover topics such as: egg and larval development, metamorphosis, larval feeding, behavior, growth, predation and starvation, and factors affecting these processes. Fish larval ecology, factors determining recruitment and sampling methods will also be covered. The course will include a laboratory section where we will study both living and fixed gonads, eggs, larvae and juveniles from selected species.

P: None. REC: BIOLOGY 341 with at least a C grade  
Spring Even.

**BIOLOGY 365. Aquatic Invertebrates. 4 Credits.**

An exploration of the biology, ecology and importance of freshwater invertebrates, with an emphasis on aquatic insects.  
P: BIOLOGY 201 & BIOLOGY 202 with at least a C grade and BIOLOGY 203 & BIOLOGY 204 with at least a C grade  
Spring Odd.

**BIOLOGY 370. Fisheries Research and Management. 3 Credits.**

Field and laboratory techniques for fishery research and management. Principles of designing research projects, assessing and managing aquatic ecosystems. Students will learn the fundamentals of testing hypotheses, sampling fish, analyzing fishery data, reporting results in both written and oral forms, and defending their research and management decisions.  
P: ENV SCI 102/103  
Fall Odd.

**BIOLOGY 375. Conservation Genetics. 3 Credits.**

This course focuses on the application of genetic analyses tools and bioinformatics to management and recovery of species of interest. This course will include extensive use of public-domain genetic analysis programs to address general questions in wildlife and fisheries management. Throughout this course, students will gain an understanding of molecular markers and their application in a conservation context as well as methods of analysis.  
P: BIOLOGY 303 or HUM BIOL 310  
Spring Even.

**BIOLOGY 401. Fish and Wildlife Population Dynamics. 4 Credits.**

The course will introduce students to principles of population ecology and how such principles relate to basic models of wildlife and fish population dynamics. This course will also give students practical experience manipulating population dynamics models using computer applications.  
P: BIOLOGY 203. REC: ENV SCI 302  
Spring Odd.

**BIOLOGY 402. Advanced Microbiology. 4 Credits.**

Study of viruses, bacteria, and viruses in relationship to their environment.  
P: BIOLOGY 323 & BIOLOGY 324 or HUM BIOL 323 & HUM BIOL 326 with at least a C grade; MATH 260 with at least a C grade; AND CHEM 207 or conc enr  
Fall Only.

**BIOLOGY 407. Molecular Biology. 3 Credits.**

Molecular approaches to biological problems, emphasizing study of informational macro molecules. 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; and Chem 207 or conc enr  
Spring Odd.

**BIOLOGY 410. Developmental Biology. 3 Credits.**

This course covers both the classical experiments that contributed to our understanding of developmental biology and the recent explosion of information about development made possible by a combination of genetic, cellular, and molecular approaches. Examples from vertebrate and invertebrate systems will be used to illustrate underlying principles and concepts. Topics include axis formation, induction, morphogenesis, embryonic pattern formation, cell differentiation, and organogenesis.  
P: Biology 303 or 307 or Hum Biol 310 with at least a C grade.  
Spring.

**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 Chem 207 or conc enr  
Spring.

**BIOLOGY 449. Wetland Ecology. 3 Credits.**

This course explores the ecology and conservation of wetlands, including biological, physical, chemical and hydrological attributes of wetland ecosystems. The curriculum will survey major wetland types in both freshwater and marine environments, the general biogeochemical dynamics of wetland ecosystems, and the ecological diversity of wetland vegetation and fauna. Field trips and in-class exercises will provide training in the identification of wetland types and features, including biological and physical characteristics of wetlands in the western Great Lakes. A field project will focus on wetland delineation and assessment of wetland quality, including analysis of restoration methods and conservation management.  
P: BIOLOGY 306 or consent of instructor  
Spring Even.

**BIOLOGY 450. Ecological Restoration. 3 Credits.**

Overview of how ecological and biological processes can inform and guide restoration of degraded systems. What can the science of ecology bring to the practice of restoration? Exploration of case studies and on-the-ground field experiences.

P: BIOLOGY 306

Spring Even.

**BIOLOGY 469. Conservation Biology. 4 Credits.**

Overview of the major issues and ecological principles underlying the field of conservation of biology, including patterns and measurement of biological diversity from genetic to community scales.

P: BIOLOGY 306 with at least a C grade or consent of instructor

Fall Only.

**BIOLOGY 478. Honors in the Major. 3 Credits.**

Honors in the Major is designed to recognize student excellence within interdisciplinary and disciplinary academic programs.

P: min 3.50 all cses req for major and min gpa 3.75 all UL cses req for major.

Fall and Spring.

**BIOLOGY 490. Biology Seminar. 1 Credit.**

This course provides an interdisciplinary 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, including the socioeconomic impacts of new advances in biology. During a significant part of the course, students will read and discuss current articles from the primary scientific literature. Teams of students will lead class discussions about cutting-edge discoveries and new concepts conveyed in the selected articles.

Presentations will fulfill the communication objective for a capstone experience in the UW-Green Bay General Education curriculum. The class discussions will address the interdisciplinary implications of new biology discoveries and their relevance to current socioeconomic problems. Course is repeatable for credit; may be taken 3 times for a total of 3 credits.

P: Biology major with jr st

Fall and Spring.

**BIOLOGY 495. Teaching Assistantship. 1-6 Credits.**

The student and supervising teacher must prepare a statement that identifies the course with which the assistantship will happen, objectives for the assistantship, and expectations in order to fulfill the course objectives. Students are not eligible to receive credit in both the course they assist the instructor with and the teaching assistantship in the same semester. Typically student has previously taken the course prior to enrollment in the assistantship. Course is repeatable for credit.

**BIOLOGY 496. Project/Research Assistantship. 1-6 Credits.**

The student must prepare a research proposal, and both parties should identify the research arrangement and how the student will complete the work to fulfill the course objectives within the assigned term.

P: Chem 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. Course is repeatable for credit.

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. Course is repeatable for credit.

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.