

# Biology

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(Bachelor of Science)

Biology is one of UW-Green Bay's most popular academic programs. The curriculum explores living systems from subcellular organelles to ecosystems. Biology majors can customize their academic plans to emphasize cell and molecular biology, animal biology, or ecology and conservation science. These tracks prepare students for a wide variety of interdisciplinary careers in resource management, fisheries and wildlife biology, health sciences, genetics, microbiology, science communications (technical writing, journalism, and nature interpretation), and many other fields. About 40 percent of Biology graduates pursue advanced degrees in graduate or professional schools in medicine, dentistry, veterinary science, biological sciences, wildlife biology, or ecology and conservation biology. Students at UW-Green Bay also can combine a Biology degree with a program in primary or secondary school education.

Graduates of UW-Green Bay's Biology program are employed today in government agencies (U.S. 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, local government agencies); hospitals and clinics, including veterinary hospitals and zoos; private corporations (pharmaceuticals, food processing, agriculture, etc.); environmental consulting firms; conservation organizations; and educational institutions ranging from elementary schools to universities.

Biology majors often combine their studies with a minor. Human Biology is commonly chosen as a minor by Biology majors with interests in pre-medicine, health sciences or exercise science. Students interested in ecology, biodiversity conservation, and management of biological resources such as wildlife, forests, and fisheries, typically combine a minor in Environmental Science. Other popular subjects for Biology majors include Business Administration and Environmental Policy and Planning.

Students who prefer a Biology minor (rather than a major) often choose majors in Environmental Science or Human Biology. Students who desire to become science teachers often combine the Biology major with the professional program in Education. Information about teacher certification requirements can be found at the UW-Green Bay Education Office (<http://www.uwgb.edu/education/>).

UW-Green Bay's Biology program provides outstanding opportunities for students to gain practical experience. Many undergraduates work with faculty on field or laboratory research projects. Internships are widely available with private industry, public agencies, and non-profit organizations. These hands-on experiences are critical for developing a competitive resume for the job market or admission to graduate and professional schools.

The Biology program has well-equipped laboratories for coursework and faculty-guided 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 ecology and conservation biology students include the Cofrin Center for Biodiversity, the 290-acre Cofrin Memorial Arboretum surrounding the UW-Green Bay campus, four off-campus natural areas managed by the University, the Richter Natural History Museum, small animal laboratory, the Gary A. Fewless Herbarium, a greenhouse, and state-of-the-art computer labs. Advanced undergraduates are able to participate in research projects on Great Lakes ecosystems, northern forests, agroecosystems, rivers, lakes, wetlands, and even tropical forests and mangroves.

Students in the Biology major develop basic skills such as statistical design and analysis, laboratory proficiency, and familiarity with major taxonomic groupings of plants, animals, and microorganisms. Many high paying occupations today require a college-educated individual who can write and speak well, solve problems using a scientific approach, learn new information quickly, and work well with others on a team. UW-Green Bay's Biology students acquire and apply these skills with excellence.

## Biology Program Mission Statement

*The Biology Program at the University of Wisconsin-Green Bay provides a quality educational curriculum in the study of life and living systems, from the molecular level to the ecosystem level. The disciplinary major and minor complement UW-Green Bay's interdisciplinary programs, especially those in Human Biology, Environmental Science, and the professional program in Education. The biology major prepares students for careers in ecology, organismal biology, physiology, genetics, cell and molecular biology, medicine and human health, veterinary science, wildlife management, education, agriculture, and science communication. Faculty and staff teach students to think critically and to solve complex problems scientifically by providing hands-on laboratory and field experiences as well as meaningful scientific research opportunities. The Biology Program contributes intellectual, cultural, and economic outreach activities and scientific research that enriches the quality of life for people in northeastern Wisconsin and elsewhere.*

## Biology Student Learning Outcomes

**Students in the Biology Program will:**

1. Describe the organization and diversity of life at levels of complexity from subcellular to ecosystem.
2. Demonstrate an understanding of genetic information, hereditary processes, and their relevance to evolutionary change as a product of mutation and natural selection
3. Explain the important processes and pathways that sustain living organisms including functional systems for exchange of energy and matter

4. Solve problems by applying a scientific process of inquiry, including the effective use of appropriate techniques, instrumentation, and data analysis
5. Identify and interpret findings of scientists and communicate results of scientific work to others in the scientific community and the general public

## Major Area of Emphasis (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)

Students must complete requirements in one of the following areas of emphasis: (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)

- Animal Biology (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
  - Animal Biology (Accelerated) - Integrated with graduate Environmental Science & Policy program (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
- Aquatic Ecology and Fisheries Emphasis (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
- Cell/Molecular (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
- Ecology and Conservation (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
  - Ecology and Conservation (Accelerated) - Integrated with graduate Environmental Science & Policy Program (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
- Microbiology (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)
- Pre-Veterinary (<http://catalog.uwgb.edu/undergraduate/programs/biology/major/>)

## Minor

Code	Title	Credits
<b>Supporting Courses</b>		<b>18</b>
BIOLOGY 201 & BIOLOGY 202	Principles of Biology: Cellular and Molecular Processes and Principles of Biology Lab: Cellular and Molecular Processes	
BIOLOGY 203 & BIOLOGY 204	Principles of Biology: Organisms and Evolution and Principles of Biology Lab: Organisms and Evolution	
CHEM 211 & CHEM 213	Principles of Chemistry I and Principles of Chemistry I Laboratory	
CHEM 212 & CHEM 214	Principles of Chemistry II and Principles of Chemistry II Laboratory	
<b>Upper-Level Courses</b>		<b>17-18</b>
BIOLOGY 303	Genetics	
BIOLOGY 306	Principles of Ecology	
BIOLOGY 309	Evolutionary Biology	
<b>Cell or Microbiology (Choose one option):</b>		
BIOLOGY 307 & BIOLOGY 308	Cell Biology and Cell Biology Laboratory	
BIOLOGY 323 & BIOLOGY 324	Principles of Microbiology and Principles of Microbiology Laboratory	
HUM BIOL 323 & HUM BIOL 326	Medical Microbiology and Medical Microbiology Lab	
<b>Choose one of the following courses:</b>		
BIOLOGY 311	Plant Physiology	
BIOLOGY 346	Comparative Physiology	
<b>Total Credits</b>		<b>35-36</b>

## Curriculum Guides (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)

The following are curriculum guides for a four-year Biology degree program and is subject to change without notice. Students should consult a Biology program advisor to ensure that they have the most accurate and up-to-date information available about a particular four-year degree option. (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)

- Biology Major with Emphasis in Animal Biology Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)
- Biology Major with Emphasis in Aquatic Ecology and Fisheries Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)
- Biology Major with Emphasis in Cell/Molecular Biology Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)

- Biology Major with Emphasis in Ecology & Conservation Biology Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)
- Biology Major with Emphasis in Microbiology Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)
- Biology Major with Emphasis in Pre-Vet Curriculum Guide Example (<http://catalog.uwgb.edu/undergraduate/programs/biology/cg/>)

## Faculty

**Rebecca Abler**; Professor; Ph.D., Virginia Polytechnic Institute and State University

**Mathew E Dornbush**; Professor; Ph.D., Iowa State University\*

**Michael L Draney**; Professor; Ph.D., University of Georgia\*

**Patrick S Forsythe**; Professor; Ph.D., Michigan State University\*

**Richard Hein**; Professor; Ph.D., University of Rhode Island

**Amy T Wolf**; Professor; Ph.D., University of California - Davis, chair\*

**Lisa Grubisha**; Associate Professor; Ph.D., University of California - Berkeley

**Carly Kibbe**; Associate Professor; Ph.D., University of Wisconsin - Madison

**James C Marker**; Associate Professor; Ph.D., Brigham Young University\*

**Daniel J Meinhardt**; Associate Professor; Ph.D., University of Kansas\*

**Brian J Merkel**; Associate Professor; Ph.D., Virginia Commonwealth University

**Uwe Pott**; Associate Professor; Ph.D., University of Zurich (Switzerland)

**Karen Stahlheber**; Associate Professor; Ph.D., University of California - Santa Barbara

**Paul R Mueller**; Assistant Professor; Ph.D., California Institute of Technology

**Paolo Segre**; Assistant Professor; Ph.D., University of British Columbia

**Keir Wefferling**; Assistant Professor; Ph.D., University of Wisconsin - Milwaukee

**Christopher Houghton**; Assistant Teaching Professor; Ph.D., University of Wisconsin - Milwaukee