Biology

Degrees Offered

• Bachelor of Arts
• Bachelor of Science

Areas of Emphasis Offered

• Cellular and Molecular Biology
• Neuroscience
• Genomics
• Ecology and Environmental Biology

Nature of Program

The Department of Biology offers two degree programs: the bachelor of science and the bachelor of arts in biology. These two programs are structured to meet the foundational needs of all students who are interested in a career in the broad area of the life sciences. The two programs are similar during the first two years. They differ primarily in their mathematics and language requirements and in their Biology requirements. A pre-medical track is available in either degree program. Please consult with your academic advisor about these and possibly other track options.

The undergraduate programs in biology provide excellent preparation for students planning to apply to graduate programs in the biological sciences or to professional schools and programs including medical, osteopathic, dental, physical or occupational therapy, optometry, pharmacy, veterinary medicine, physician assistant, and chiropractic. A degree in biology prepares students for a wide range of careers in the biological sciences including medicine, biotechnology, genetics, forensics, ecology, environmental biology, and other biologically-related technical fields in government and private industry. With appropriate electives, a student with a degree in biology may also choose to enter the fields of law, journalism, education, business, health care administration, pharmaceutical sales, or work for a variety of federal agencies.

After completing an initial four-semester core sequence in the biological sciences, students in the biology B.A. program may choose to specialize in courses from four major areas of biology: cellular and molecular biology, organismal biology, ecology and evolution, or integrative biology. Those students pursuing the B.S. degree in biology are required to take at least one course from each of the major areas of biology to ensure an advanced, broad-based knowledge of biology.

Regardless of the degree program chosen, students will experience a wide variety of classroom environments from large lecture sections to small group discussions and intensive laboratory-oriented courses. Laboratory courses include topics such as comparative anatomy, molecular genetics, recombinant DNA technology, plant ecology, and plant physiology as well as many other laboratory experiences across the biological disciplines.

Students who earn a degree in the Eberly College of Arts and Sciences must complete the University requirements, the College requirements for their specific degree program, and their major requirements.

Minors

All students have the possibility of earning one or more minors; follow link for a list of all available minors and their requirements. Please note that students may not earn a minor in their major field.

Certificate of Global Engagement

Students in the Eberly College, regardless of their major, can earn a Certificate of Global Engagement. Completion of the Certificate demonstrates the student’s knowledge of diverse cultures, as well as the ability to communicate and interact effectively with people of different cultural backgrounds. Students will be required to apply their knowledge of contemporary issues and global social contexts to their course work and their broader citizenship. For details regarding Certificate requirements, please visit the Eberly College page.

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FACULTY

CHAIR

• Richard B. Thomas - Ph.D. (Clemson University)

ASSOCIATE CHAIR

• Kevin Daly - Ph.D. (University of Arizona)
  Associate Chair for Graduate Studies
• Dana Huebert Lima - Ph.D. (University of Wisconsin)
  Associate Chair for Undergraduate Studies

PROFESSORS
  • Ashok P. Bidwai - Ph.D. (University of Utah)
    Molecular genetic analysis of protein kinase, CK2 in Drosophila
  • Jonathan R. Cumming - Ph.D. (Cornell University)
    Environmental plant physiology, Ecophysiology of root-mycorrhizal-soil interactions, Urban ecology
  • Steven DiFazio - Ph.D. (Oregon State University)
    Plant genomics, Molecular ecology, Plant population genetics, Biotechnology risk assessment
  • James B. McGraw - Ph.D. (Duke University)
    Plant ecology: Evolutionary ecology of perennial plants, Conservation biology, Demography, Forest remote sensing
  • William T. Peterjohn - Ph.D. (Duke University)
    Ecosystem ecology: Effects of global change on ecosystem dynamics, Nitrogen cycling in natural ecosystems.
  • Richard B. Thomas - Ph.D. (Clemson University)
    Chair. Physiological plant ecology, Forest ecology, Global climate change

ASSOCIATE PROFESSORS
  • Clifton P. Bishop - Ph.D. (University of Virginia)
    Molecular genetics, Developmental biology, Forensic biology
  • Kevin C. Daly - Ph.D. (University of Arizona)
    Sensory neurobiology, Neural coding, Brain-behavior interactions, Comparative psycho-biology
  • Sarah M. Farris - Ph.D. (University of Illinois at Urbana-Champaign)
    Evolution and development of the insect brain, Neuroanatomy
  • Donna Ford-Werntz - Ph.D. (Washington University/Missouri Botanical Garden)
    Plant systematics: Portulacaceae, West Virginia flora.
  • Jennifer Hawkins - Ph.D. (University of Iowa)
    Plant comparative genomics, Molecular evolution.
  • Rita V.M. Rio - Ph.D. (Yale University)
    Symbioses
  • Jennifer Stueckle - Ph.D. (West Virginia University)
    Aquatic toxicology

ASSISTANT PROFESSORS
  • Craig Barrett - Ph.D. (Ohio State University)
    Plant evolutionary biology
  • Kevin Barry - Ph.D. (University of Maryland)
    Conservation ecology
  • Sadie Bergeron - Ph.D. (University of Massachusetts - Amherst)
    Developmental Neurobiology
  • Edward Brzostek - Ph.D. (Boston University)
    Forest ecology, ecosystem modeling
  • Andrew Dacks - Ph.D. (University of Arizona)
    Neurobiology
  • Timothy Driscoll - Ph.D. (Virginia Tech)
    Bioinformatics, microbial metagenomics
  • Zachariah Fowler - Ph.D (West Virginia University)
    Forest ecology
  • Jennifer Gallagher - Ph.D. (Yale University)
    Functional genomics of yeast
  • Amaris Guardiola - Ph.D. (Duke University)
  • Dana Huebert Lima - Ph.D. (University of Wisconsin)
    Cellular and Molecular Biology, Epigenetics, Science communication
  • Kevin Lee - Ph.D. (Temple University)
    Virology, Cell and molecular biology methods
  • Gary Marsat - Ph.D. (McGill University)
    Neurobiology
• John Navaratnam - Ph.D. (West Virginia University)
  Wetland ecology
• Stephanie T. Young - Ph.D. (West Virginia University)
  Molecular and Forensic biology

SENIOR LECTURERS
• Susan Raylman - Ph.D. (North Carolina State University)
  Animal behavior
• Beth Thomas - M.S. (Clemson University)
  Invertebrate zoology

LECTURER
• Sydha Salihu - Ph.D. (Virginia Tech)

PROFESSORS EMERITI
• David F. Blaydes
• Roy B. Clarkson
• William E. Collins
• Dorothy C. Dunning
• Jorge Flores
• Philip E. Keeting
• Joseph A. Marshall
• Richard P. Sutter
• Leah A. Williams

All students who place in MATH 122 are admitted directly into the Biology major. Students remain in the major provided they meet the benchmark expectations listed below. Students who wish to transfer into the major should meet the benchmarks below before they apply to switch majors.

Benchmark Expectations
• **B.A. Biology**: By the end of their third semester into the major, students intending to graduate with a B.A. in Biology are expected to have completed BIOL 115, BIOL 117, and CHEM 115 with a minimum grade of C- in each course and a 2.0 GPA overall. In addition, students must meet with their Biology adviser every semester. Students who do not meet their benchmarks may be removed from their major.

• **B.S. Biology**: By the end of their third semester into the major, students intending to graduate with a B.S. in Biology are expected to have completed BIOL 115, BIOL 117, and CHEM 115 with a minimum grade of C- in each course and a 2.0 GPA overall. In addition, students must meet with their Biology adviser every semester. Students who do not meet their benchmarks may be removed from their major.

Major Learning Outcomes

**BIOLOGY**

Upon successful completion of the B.A. or B.S. degree, Biology majors will demonstrate competency in these areas:

1. Students will demonstrate competency in five content areas (listed below) at three biological levels - cellular/molecular, organismal/physiological, ecological and populations)
   - Information flow
   - Transformations of energy and matter
   - Structure-function relationships
   - Evolution
   - Systems and interactions

2. Students will be able to apply science process skills, including: reading the primary literature, developing a testable hypothesis, designing and experiment, collecting and analyzing data statistically.

3. Students will be able to communicate effectively with both fellow scientists and non-scientists in both written and oral forms.

4. Students will be able to synthesize knowledge and skills from across the curriculum and apply them to societal issues and problems.
BIOLOGY MINOR
MINOR CODE - U075

Grades of C or higher must be earned in all courses applied to the minor.

Core Courses: 11

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 115</td>
<td>Principles of Biology</td>
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<tr>
<td>BIOL 117</td>
<td>Introductory Physiology</td>
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<tr>
<td>BIOL 219</td>
<td>The Living Cell</td>
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<tr>
<td>or BIOL 221</td>
<td>Ecology and Evolution</td>
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Upper Division Electives: 9

Select any BIOL courses at the 300- or 400-level courses, except BIOL 327, 386, 486, 490, 491, 494 and above.

Total Hours 20