Biology (BA)

This program is offered by the College of Science and Health/ Natural Sciences and Mathematics Department and is available at the St. Louis main campus and select international campuses. Please see the Locations Offering Undergraduate Programs section of this catalog for a list of campuses where this program is offered.

Program Description

The bachelor of arts degree is designed for students who seek a broad education in biology. This degree is suitable preparation for a diverse range of careers including health science, science education and ecology-related fields.

Students can earn the BA in biology alone, or with one of four emphases: biodiversity, computational biology, education or health science.

Learning Outcomes

Students who complete any of the bachelor of arts in biology will be able to:

- Describe biological, chemical and physical principles as they relate to the natural world in writings and presentations to a diverse audience.
- Place scientific knowledge into an ethical context, including how biology can contribute to the resolution of ethical, social and environmental issues around the globe.
- Apply the methods of scientific inquiry, including observation, hypothesis testing, data collection and analysis for laboratory research.

Degree Requirements

For information on the general requirements for a degree, see Baccalaureate Degree Requirements under the Academic Policies and Information section of this catalog.

- 54 credit hours core coursework
- 12 additional credit hours in BIOL, CHEM or PHYS at the 2000+ level
  or Courses specific to the selected emphasis
- Applicable University Global Citizenship Program hours, with accommodations for the biology BA
- Electives

Global Citizenship Program for Biology BA

Requirements are modified to allow MATH 1430 to satisfy both a requirement of the major and also the GCP 'Quantitative Literacy' requirement.

Curriculum

All of the bachelor of arts in biology degree options require the same 54 credit hours of core coursework:

Core Courses

- BIOL 1550 Essentials of Biology I (4 hours)
  and BIOL 1551 Essentials of Biology I: Lab (1 hour)
- BIOL 1560 Essentials of Biology II (4 hours)
  and BIOL 1561 Essentials of Biology II: Lab (1 hour)
- BIOL 2010 Evolution (3 hours)
- BIOL 3050 Genetics (3 hours)
  and BIOL 3051 Genetics: Lab (1 hour)
- BIOL 3200 Ecology (3 hours)
  and BIOL 3201 Ecology: Lab (1 hour)
- BIOL 4400 Research Methods (3 hours)
- BIOL 4420 BA Senior Thesis (4 hours)
- CHEM 1100 General Chemistry I (3 hours)
  and CHEM 1101 General Chemistry I: Lab (1 hour)
- CHEM 1110 General Chemistry II (3 hours)
  and CHEM 1111 General Chemistry II: Lab (1 hour)
- CHEM 2100 Organic Chemistry I (3 hours)
  and CHEM 2101 Organic Chemistry I: Lab (1 hour)
- MATH 1430 College Algebra (3 hours)
- MATH 2200 Statistics (3 hours)
  or STAT 3100 Inferential Statistics (3 hours)
  or PSYC 2750 Introduction to Measurement and Statistics (3 hours)
- PHYS 1710 College Physics I (3 hours)
  and PHYS 1711 College Physics I: Lab (1 hour)
- PHYS 1720 College Physics II (3 hours)
  and PHYS 1721 College Physics II: Lab (1 hour)

BA in Biology (66 hours)

The general degree offers the greatest flexibility, allowing students to select 12 hours of electives from any of our 2000+ level BIOL, CHEM or PHYS courses in addition to the 54 credits of core coursework in biology listed above. (Up to 3 credit hours of BIOL 4700/CHEM 4700/PHYS 4700 can be used toward these 12 credit hours.)

Emphasis in Biodiversity (69 hours)

The emphasis in biodiversity is designed for those students that have an interest in understanding the variety and biology of life forms on our planet, and how humans fit into global ecosystems. This emphasis is focused on applying fundamental principles of biology to ecological issues.

Emphasis-Specific Learning Outcomes

In addition to the general learning outcomes, students who complete the emphasis in biodiversity will be able to:

- Describe the global challenges in supporting biodiversity and conservation.

Required Courses for the Emphasis in Biodiversity

In addition to the 54 credit hours of core coursework in biology, the following courses are required for the emphasis in biodiversity:

- BIOL 2400 Zoology (3 hours)
- BIOL 2500 Botany (3 hours)
- PHIL 2360 Environmental Ethics (3 hours)
- An additional 6 credit hours of 2000+ level BIOL, CHEM or PHYS electives. (Up to 3 credit hours of BIOL 4700/CHEM 4700/PHYS 4700 can be used toward these 6 credit hours.)

Emphasis in Bioinformatics (66 hours)

The emphasis in bioinformatics prepares students with a diverse scientific foundation in biology and computer languages, to prepare students for careers in bioinformatics that require data analysis skills, such as: biotechnology, academic research labs, medicinal chemistry, pharmaceuticals research, agriculture technology, personalized healthcare, or any biology-related field that involves data analysis.

Emphasis-Specific Learning Outcomes

In addition to the general learning outcomes, students who complete the emphasis in bioinformatics will be able to:

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- Use computational and bioinformatics methods to analyze data for studying biological processes, and relate results back to core principles in biological sciences.

Degree Requirements for the Emphasis in Bioinformatics

- MATH 2200 is the required statistics course for this emphasis, in place of STAT 3100 or PSYC 2750

For students completing a dual degree in mathematics, or a minor in mathematics that requires MATH 2200 Statistics, that will satisfy the statistics requirement for the BA in biology with an emphasis in bioinformatics. If the student drops the mathematics major or minor, the courses will be required and counted toward the BA in biology.

In addition to the 54 credit hours of core coursework in biology, the following courses are required for the emphasis in bioinformatics:

- BIOL 2000 Bioinformatics (3 hours)
- COSC 1800 Python Programming (3 hours)
- CSIS 2500 Introduction to Data Science (3 hours)
- CSIS 3300 R Programming - Data Analytics (3 hours)

*Students planning to enter a graduate program in bioinformatics or a related field involving data analysis after graduation are encouraged to choose from the following courses to fulfill some of their free elective choices:

- 1500+ level COSC courses
- 2000+ level CSIS courses
- 1440+ level MATH electives

Emphasis in Education (72 hours)

The emphasis in education is designed for students interested in science education. Those students pursuing a biology/education dual major can take advantage of this emphasis to help satisfy some of the requirements for their certification in secondary education. Interested students should contact the Office of Teacher Certification for applications and copies of current admission requirements.

Emphasis-Specific Learning Outcomes

In addition to the general learning outcomes, students who complete the emphasis in education will be able to:

- Plan a path toward teaching certification in unified science when double-majoring in education.

Required Courses for the Emphasis in Education

In addition to the 54 credit hours of core coursework in biology, the following courses are required for the emphasis in education:

- BIOL 2120 Microbiology (3 hours)
  and BIOL 2121 Microbiology Lab (1 hour)
- BIOL 3010 Human Anatomy & Physiology I (3 hours)
  and BIOL 3011 Human Anatomy & Physiology I: Lab (1 hour)
- PHIL 2330 Philosophy and Technology (3 hours)
- SCIN 1470 Earth and Universe (3 hours)
  and SCIN 1471 Earth and Universe: Lab (1 hour)
- SCIN 1510 Global Climate Change (3 hours)

Emphasis in Health Science (72 hours)

The emphasis in health science features upper-level courses that apply to health-related fields. Students can take advantage of this emphasis to help prepare for a career in health sciences.

Emphasis-Specific Learning Outcomes

In addition to the general learning outcomes, students who complete the emphasis in health science will be able to:

- Discuss basic principles of human anatomy and physiology and how they apply to health and medicine.

Required Courses for the Emphasis in Health Science

In addition to the 54 credit hours of core coursework in biology, the following courses are required for the emphasis in health science:

- BIOL 3010 Human Anatomy & Physiology I (3 hours)
  and BIOL 3011 Human Anatomy & Physiology I: Lab (1 hour)
- CHEM 3100 Biochemistry I (3 hours)
  and CHEM 3101 Biochemistry I: Lab (1 hour)
- An additional 10 credit hours of 2000+ level BIOL, CHEM or PHYS electives. (Up to 3 credit hours of BIOL 4700/CHEM 4700/PHYS 4700 can be used toward these 10 credit hours.)

Dual Degree Option: BS in Psychological Science/BA in Biology

Students who wish to pursue a dual degree of the bachelor of arts in biology and the bachelor of science in psychological science may do so. Two separate diplomas are issued at the same time. The two degrees cannot be awarded separately or sequentially under this arrangement.

Degree Requirements

For information on the general requirements for a degree, see Baccalaureate Degree Requirements under the Academic Policies and Information section of this catalog. For information on the general requirements for dual degrees, see Dual Majors and Dual Degrees under the Academic Policies and Information section of this catalog.

- 108 required credit hours
- Applicable University Global Citizenship Program hours, with accommodations*

*All students pursuing a dual degree will complete the Global Citizenship Program requirements of one of the programs. Students should review the GCP accommodations for each degree before making their selection of which GCP program to pursue.

Curriculum

- WRIT 1010 The Craft of College Writing (3 hours)
- MATH 1430 College Algebra (3 hours)
- PSYC 1100 Introduction to Psychology (3 hours)
- PSYC 1800 Careers in Psychology (1 hour)
- PSYC 2750 Introduction to Measurement and Statistics (3 hours)
- PSYC 2825 Introduction to Research Methods (3 hours)
- PSYC 3025 Psychology and Ethics (2 hours)
- PSYC 4750 Advanced Statistics (3 hours)
- PSYC 4825 Senior Thesis (3 hours)
- PSYC 4925 Senior Capstone: History, Philosophy and Systems of Psychology (3 hours)

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- PSYC 4950 Senior Assessment (1 hours)
- Psychology electives *(at least 3 hours at the 4000-level)* (6 hours)
- Psychology content areas (15 hours)
- BIOL 1550 Essentials of Biology I (4 hours)
  and BIOL 1551 Essentials of Biology I: Lab (1 hour)
- BIOL 1560 Essentials of Biology II (4 hours)
  and BIOL 1561 Essentials of Biology II: Lab (1 hour)
- BIOL 2010 Evolution (3 hours)
- BIOL 3010 Human Anatomy & Physiology I (3 hours)
  and BIOL 3011 Human Anatomy & Physiology I: Lab (1 hour)
- BIOL 3020 Human Anatomy & Physiology II (3 hours)
  and BIOL 3021 Human Anatomy & Physiology II: Lab (1 hour)
- BIOL 3050 Genetics (3 hours)
  and BIOL 3051 Genetics: Lab (1 hour)
- BIOL 3200 Ecology (3 hours)
  and BIOL 3201 Ecology: Lab (1 hour)
- BIOL 4400 Research Methods (3 hours)
- BIOL 4420 BA Senior Thesis (4 hours)
- CHEM 1100 General Chemistry I (3 hours)
  and CHEM 1101 General Chemistry I: Lab (1 hour)
- CHEM 1110 General Chemistry II (3 hours)
  and CHEM 1111 General Chemistry II: Lab (1 hour)
- CHEM 2100 Organic Chemistry I (3 hours)
  and CHEM 2101 Organic Chemistry I: Lab (1 hour)
- PHYS 1710 College Physics I (3 hours)
  and PHYS 1711 College Physics I: Lab (1 hour)
- PHYS 1720 College Physics II (3 hours)
  and PHYS 1721 College Physics II: Lab (1 hour)
- BIOL, CHEM or PHYS electives *(2000-level or above)* (3 hours)