Biology

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The undergraduate curriculum in the Department of Biology is diverse and will meet a variety of interests in the rapidly expanding fields of the biological sciences. It is also designed to provide an intensive educational experience for students in other disciplines who have an interest in biology. In addition to courses offered in Macelwane Hall, the department offers courses at the University’s Reis Biological Station located by the Huzzah Creek in the Ozarks.

Programs
The department offers Bachelor of Arts (B.A.), Bachelor of Sciences (B.S.), and minor undergraduate degrees as well as MS, MA and Ph.D. graduate degrees. An Advanced Bachelors/Masters (ABM) degree in Bioinformatics and Computational Biology (in conjunction with the Department of Mathematics and Computer Science) is also available for undergraduates.

Students who pursue either a major or minor in biology must have at least a 2.00 cumulative grade point average in prerequisite(s) for upper division courses in Biology. These are BIOL104, BIOL106 (8 credit hours); CHEM163, CHEM165, CHEM164, and CHEM166 (8 credit hours).

Biology (B.A.)
The department offers a B.A. degree. This degree allows maximum flexibility in selecting upper division courses and will prepare students for entry level employment in the life sciences, health professions, K-12 education and post-graduate advanced study (e.g., medical school, graduate school). The following Introductory and Upper-Division Biology Courses are required:

Required Introductory Courses
BIOL104: Principles of Biology I  4
BIOL106: Principles of Biology II  4
CHEM163: Introduction to Chemistry I  3
CHEM165: Introduction to Chemistry I Lab  1
CHEM164: Introduction to Chemistry II  3
CHEM166: Introduction to Chemistry II Lab  1
MATH142: Calculus I  4
Statistics course: MATH130: Elementary Statistics with Computers or BIOL479: Biometry  3-4

Required Upper-Division Biology Courses
BIOL301: Evolutionary Biology  3
BIOL302: Biochemistry and Molecular Biology  3
BIOL303: Principles of Genetics  3
BIOL304: Cell Structure and Function  3

In addition to these 12 credits, a minimum of 13 additional upper-division credit hours in Biology is required (25 in total). This includes at least one plant science course and a structured laboratory course. (see list of elective courses below). All Biology majors are required to participate in first and second
Biological Science, Biological Chemistry & Molecular Biology, Plant Science, and Ecology Evolution & Conservation. Each concentration requires the following Introductory and Upper-Division Biology Courses:

**Required Introductory Courses**

- BIOL104: Principles of Biology I 4
- BIOL106: Principles of Biology II 4
- CHEM163: Introduction to Chemistry I 3
- CHEM165: Introduction to Chemistry I Lab 1
- CHEM164: Introduction to Chemistry II 3
- CHEM166: Introduction to Chemistry II Lab 1
- MATH 142: Calculus I 4
- Statistics course: MATH130: Elementary Statistics with Computers or BIOL479: Biometry 3-4

16 credits of the following courses:

- CHEM342/344: Prin. of Organic Chemistry I+ Lab 3,1
- CHEM343/345: Prin. of Organic Chemistry II + Lab 3,1
- PHYS131/132: Physics I + Lab 3,1
- PHYS133/134: Physics II + Lab 3,1
- EAS101/102: Earth’s Dynamic Environment I + Lab 3,1
- EAS103/104: Earth’s Dynamic Environment II + Lab 3,1

**Required Upper-Division Biology Courses**

- BIOL301: Evolutionary Biology 3
- BIOL302: Biochemistry and Molecular Biology 3
- BIOL303: Principles of Genetics 3

In addition to these 9 credits, a minimum of 26 upper-division hours of biology is required (35 in total). All B.S. students must complete at least three structured laboratory experiences with at least one from the CMDB category and one from the EEOB category of courses (see below). In addition, B.S. students must complete at least one plant science course and one of several Senior Inquiry options. All Biology majors are required to participate in first and second year mentoring sessions and meet with their mentor when in residence.

**Senior Inquiry Options include:**

- BIOL480 Internship in Conservation 1-3
- BIOL481 Integrative Bioinformatics Internship 1-3
- BIOL482 Internship in Plant Science 1-3

Note: A total of 3 hours of Independent Research (BIOL 496), Library Project (BIOL 497), and/or Advanced Independent Research (BIOL 498) can be counted toward the B.A. degree. Note: these courses do not count as structured lab courses nor can they satisfy elective requirements.

### Biology (B.S.)

The department offers five BS degree concentrations:

### Biological Science, Biological Chemistry & Molecular Biology

- BIOL480 Internship in Conservation
- BIOL481 Integrative Bioinformatics Internship
- BIOL482 Internship in Plant Science

In addition, biology majors are required to complete a minimum of 26 upper-division hours of biology, including at least one from the CMDB category and one from the EEOB category of courses. In addition, B.S. students must complete at least one plant science course and one of several Senior Inquiry options. All Biology majors are required to participate in first and second year mentoring sessions and meet with their mentor when in residence.

**Senior Inquiry Options include:**

- BIOL480 Internship in Conservation 1-3
- BIOL481 Integrative Bioinformatics Internship 1-3
- BIOL482 Internship in Plant Science 1-3

Note: A total of 3 hours of Independent Research (BIOL 496), Library Project (BIOL 497), and/or Advanced Independent Research (BIOL 498) can be counted toward the B.A. degree. Note: these courses do not count as structured lab courses nor can they satisfy elective requirements.

### Biological Sciences Concentration

**Required Upper-Division Biology Courses**

- BIOL304: Cell Structure and Function 3
- CMDB Elective with Lab 4-5
- EEOB Elective with Lab 4-5
- Additional CMDB or EEOB Lab Course 1-5
- Plant Course 3-4
- Senior Inquiry 0-4
- Electives up to 35

### Biological Chemistry and Molecular Biology Concentration

**Required Upper-Division Biology Courses**

- BIOL304: Cell Structure and Function 3
- Two of: BIOL403: Introduction to Genomics 3
  - BIOL470: Molecular Biology 3
- Two of: BIOL306: Cell Struc. & Func. Lab 1
  - BIOL310: Genetics Lab 1
  - BIOL405: Molecular Techniques Lab 2
  - BIOL416: Microbial Ecology 4
  - BIOL465: Microbiology Lab 2
- EEOB Elective with Lab 4-5
- Plant Course 3-4
- Senior Inquiry 0-4
- Electives up to 35

### Cell Biology & Physiology Concentration

**Required Upper-Division Biology Courses**

- BIOL304: Cell Structure and Function 3
- BIOL454: Human Cellular Physiology 1 3
- One of: BIOL306: Cell Struc. & Func. Lab 1
  - BIOL405: Molecular Techniques Lab 2
  - BIOL461: Developmental Biology Lab 2
  - BIOL465: Microbiology Lab 2
- One of: BIOL342: Comparative Anatomy 5
  - BIOL347: Physiology Lab 2
  - BIOL444: Histology 4
- EEOB Elective with Lab 4-5
- 2 CB&P Elective Courses (see below) 6-8
- Plant Course 3-4
- Senior Inquiry 0-4
- Electives up to 35
Plant Science Concentration
Required Upper-Division Biology Courses
BIOL304: Cell Structure and Function 3
BIOL326: Biology of Plants & Fungi 4
BIOL349: Plant Physiology 3
BIOL409: Plant Ecology 3
CMDB Elective Lab 1-5
EEOB or CMDB Elective Lab 1-5
Senior Inquiry 0-4
Electives up to 35

Ecology, Evolution & Conservation Concentration
Required Upper-Division Biology Courses
BIOL475: General Ecology 4
Plant Course 3-4
Ecology (EC) Elective 3
Evolution (EV) Elective 3
Organisal (O) Elective 3
Tools elective 2
CMDB Elective with Lab 4-5
EEOB Elective with Lab 4-5
Senior Inquiry 0-4
Electives up to 35

Biology Elective Courses*
A. Cellular, Molecular & Developmental Biology
BIOL306: Cell Structure and Function Laboratory 1
BIOL310: Genetics Laboratory 1
BIOL342: Comparative Anatomy (EV, CB&P) 5
BIOL347: General Physiology Laboratory 2
BIOL348: Exercise Physiology (CB&P) 3
BIOL349: Plant Physiology (CB&P) 3
BIOL403: Introduction to Genomics 3
BIOL405: Molecular Techniques Laboratory (T) 2
BIOL407: Advanced Biochemistry 3
BIOL408: Advanced Cell Biology (CB&P) 3
BIOL415: Nerve Cell Mech. in Behavior (CB&P) 3
BIOL416: Microbial Ecology (T) 4
BIOL441: Comp. Animal Physiol. (EV, O, CB&P) 3
BIOL444: Vertebrate Histology (CB&P) 4
BIOL450: Introductory Endocrinology (CB&P) 3
BIOL451: Behavioral Endocrinology (CB&P) 3
BIOL454: Human Cellular Physiology I 3
BIOL460: Developmental Biology (CB&P) 3
BIOL461: Developmental Biology Lab 2
BIOL463: Immunobiology(CB&P) 3
BIOL464: Microbiology (O, CB&P) 3
BIOL465: Microbiology Laboratory 2
BIOL470: Molecular Biology 3
BIOL472: Cancer Biology (CB&P) 3

B. Ecology, Evolutionary and Organismal Biology
BIOL322: Biology of Invertebrates (O) 3

* Courses that satisfy the plant requirement are in italics

Reduced College Core Requirements
Students pursuing a B.S. degree are eligible to reduce the number of credit hours in Philosophy (from 9 to 6), Theology (from 9 to 6), English Literature (from 6 to 3), and Language (from 9 to 6). Note: Students that drop out of the B.S. degree program and seek a B.A. must fulfill the standard set of college core requirements.

Minor
A minor in Biology may be obtained by students who complete the following prerequisite courses: BIOL 104 and 106 or equivalents (8 credits) and CHEM 163/165 and 164/166 or equivalents (8 credits), and a minimum of 12 credits of upper-division Biology electives selected from BIOL301 through 479. For all courses taken as part of the minor, a student must have earned at least a 2.00 grade point average.

Required Courses
BIOL104: Principles of Biology I 4
BIOL106: Principles of Biology II 4
CHEM163: Introduction to Chemistry I 3
CHEM164: Introduction to Chemistry II  3
CHEM165: Introduction to Chemistry I Lab  1
CHEM166: Introduction to Chemistry II Lab  1

**Elective Courses**
12 hours of upper division (BIOL301 – BIOL479) electives

*In accordance with Arts and Sciences graduation requirements, a student must earn an overall 2.00 grade point average in all major and minor (certificate or related) courses that are approved for completion of their degree program.*