

# College of Arts and Sciences

## Biology

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### **B.S. in Biology**

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#### **Admission to the Program**

Admission is through formal declaration of major. The department counsels freshmen and transfer students.

#### **University Requirements**

- A total of 120 credit hours
- 6 credit hours of college writing
- 3 credit hours of college mathematics or the equivalent by examination

#### **General Education Requirements**

- A total of ten courses, consisting of one foundation course and one second-level course in an approved sequence from each of the five curricular areas
- No more than 6 credit hours may be taken in the same discipline

#### **Major Requirements**

- 72 credit hours with grades of C or better

#### **Course Requirements**

##### **Departmental Requirements**

- BIO-110 General Biology I 5:1 (4)
- BIO-210 General Biology II 5:2 (4)
- BIO-300 Cell Biology with Laboratory (4)
- BIO-356 Genetics with Laboratory (5)
- BIO-499 Senior Seminar in Biology (3)
- 20 credit hours in biology or other courses approved by the department chair at the 300 level or above. No more than 3 credit hours of a combination of BIO-390 Independent Reading, BIO-392 Cooperative Education, BIO-490 Independent Study Project in Biology, or BIO-491 Internship may be counted toward this requirement.

##### **Related Requirements**

- CHEM-110 General Chemistry I 5:1 (4)
- CHEM-210 General Chemistry II 5:2 (4)
- CHEM-310 Organic Chemistry I (3)
- CHEM-312 Organic Chemistry I Laboratory (1)
- CHEM-320 Organic Chemistry II (3)
- CHEM-322 Organic Chemistry II Laboratory (1)
- MATH-221 Calculus I (4)
- MATH-222 Calculus II (4)
- or*
- STAT-202 Basic Statistics (4)
- PHYS-110 University Physics I 5:1 (4) (recommended)
- or*

PHYS-105 College Physics I 5:1 (4)

- PHYS-210 University Physics II 5:2 (4) (recommended)
- or*
- PHYS-205 College Physics II 5:2 (4)

#### **University Honors Program**

All University Honors students must complete at least 12 credit hours of advanced-level (300-level and above) Honors courses including a 3 to 6 credit hour Honors Senior Capstone Project. Students may graduate with University Honors in the major if they complete at least 12 advanced-level Honors courses including the Senior Capstone Project in the department. Each department has three levels of University Honors requirements: Level I Options (100-200-level Honors classes); Level II Options (300-level and above Honors classes); and Level III Options (Honors Senior Capstone). The department Honors coordinator advises students in the University Honors Program regarding departmental options. For more information, go to [www.american.edu/academic.depts/honors/](http://www.american.edu/academic.depts/honors/).

### **B.S. in Marine Science**

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#### **Admission to the Program**

Admission to the program is through formal declaration of the major through the Department of Biology.

#### **University Requirements**

- A total of 120 credit hours
- 6 credit hours of college writing
- 3 credit hours of college mathematics or the equivalent by examination

#### **General Education Requirements**

- A total of ten courses, consisting of one foundation course and one second-level course in an approved sequence from each of the five curricular areas
- No more than 6 credit hours may be taken in the same discipline

#### **Major Requirements**

- 70 credit hours with grades of C or better

#### **Course Requirements**

- BIO-110 General Biology I 5:1 (4)
- BIO-210 General Biology II 5:2 (4)
- CHEM-110 General Chemistry I 5:1 (4)
- CHEM-210 General Chemistry II 5:2 (4)
- CHEM-401 Geology (3)
- CSC-310 Introduction to Geographic Information Systems (3)
- ECON-100 Macroeconomics 4:1 (3)

- ECON-200 Microeconomics 4:2 (3)
- ENVS-104 Issues in Marine Science I (1)
- ENVS-105 Issues in Marine Science II (2)
- ENVS-360 Environment and the Atmosphere (3)
- ENVS-420 Applied Oceanography with Laboratory (4)
- ENVS-492 Senior Capstone in Environmental Studies (3)  
*or*  
ENVS-303 Environmental Issues in the Chesapeake Bay (6)
- MATH-221 Calculus I (4)
- MATH-222 Calculus II (4)  
*or*  
STAT-202 Basic Statistics (3)
- One of the following:  
ECON-379 Economics of Environmental Policy (3)  
ENVS-582 Environmental Law (3)  
SIS-388 International Environmental Politics (3)
- 9 credit hours from the following:  
BIO-340 Marine Biology (3)  
BIO-342 Marine Mammals (3)  
BIO-423 Introduction to Ecology (3)  
BIO-520 Topics in Marine Zoology with Laboratory (4)  
ENVS-303 Environmental Issues in the Chesapeake Bay (6)  
ENVS-425 Advanced Marine Ecology with  
Laboratory (4)
- 9 credit hours at a marine field station with approval from the marine science program advisor

#### **University Honors Program**

All University Honors students must complete at least 12 credit hours of advanced-level (300-level and above) Honors courses including a 3 to 6 credit hour Honors Senior Capstone Project. Students may graduate with University Honors in the major if they complete at least 12 advanced-level Honors courses including the Senior Capstone Project in the department. Each department has three levels of University Honors requirements: Level I Options (100-200-level Honors classes); Level II Options (300-level and above Honors classes); and Level III Options (Honors Senior Capstone). The department Honors coordinator advises students in the University Honors Program regarding departmental options. For more information, go to [www.american.edu/academic.depts/honors/](http://www.american.edu/academic.depts/honors/).

### **Minor in Biology**

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- 28 credit hours with grades of C or better and at least 12 credit hours unique to the minor

#### **Course Requirements**

- BIO-110 General Biology I 5:1 (4)
- BIO-210 General Biology II 5:2 (4)
- BIO-300 Cell Biology with Laboratory (4)
- BIO-356 Genetics with Laboratory (5)
- CHEM-110 General Chemistry I 5:1 (4)
- CHEM-210 General Chemistry II 5:2 (4)
- One additional upper-level Biology course approved by the department chair

### **Combined B.S. and M.A. or M.S. in Biology**

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#### **Admission to the Program**

Undergraduate biology majors should apply for admission to the B.S./Master's program by the end of the junior year. Admission is open to undergraduates whose overall grade point average and grade point average in biology course is 3.00 or higher. Applications must be accompanied by two letters of recommendation, a statement of purpose, and Graduate Record Examination (GRE) scores. Each student's file must be approved by the department's Graduate Studies Committee prior to the end of the junior year to assure adequate time to complete degree requirements for the program.

Students should discuss their interest in the program and their course schedules with members of the faculty before submitting a formal application. Interested students are encouraged to enroll in up to 3 credit hours of BIO-490 Independent Study Project to conduct independent study research before applying.

#### **Requirements**

- All requirements for the B.S. in Biology  
Undergraduate students may apply up to 9 credit hours of approved graduate-level course work in biology, CHEM-560 Biochemistry I, and STAT-514 Statistical Methods to satisfy the requirements for both degrees.
- All requirements for the M.A. or M.S. in Biology, including a minimum of 18 credit hours completed in residence in graduate status after the undergraduate degree has been awarded.

## **M.A. in Biology**

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This is a nonthesis degree for students seeking various life science professions, as additional training for students seeking admission to professional schools, or as an intermediate degree for those intending to pursue further graduate study.

### **Admission to the Program**

In addition to meeting the minimum university requirements for graduate study, applicants must take the Graduate Record Examination, including the General Test and the Advanced Test in Biology. International applicants whose first language is not English are required to submit results of the Test of English as a Foreign Language (TOEFL). Applicants must submit two letters of recommendation.

### **Degree Requirements**

- 30 credit hours of approved graduate work
- Comprehensive examination
- Directed literature research (BIO-790) resulting in a significant paper reviewing some aspect of life science; the subject of this review paper is selected by the student subject to approval by the graduate studies committee and the chair of the department
- An oral report presented in the form of a public seminar on the topic of the review paper

### **Course Requirements**

- BIO-566 Evolutionary Mechanisms (3)
- BIO-583 Molecular Biology (3)
- BIO-677 Special Topics in Developmental Biology (1)  
*or*  
BIO-679 Topics in Evolutionary Biology (1)
- BIO-697 Research Methods in Biology (3)
- BIO-790 Biology Literature Research (3)
- STAT-514 Statistical Methods (3) (satisfies tool of research requirement)
- An additional 14 hours of approved graduate course work

## **M.S. in Biology**

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This is a research degree that may serve as an intermediate degree for those intending to pursue further graduate study, as well as a necessary degree for a variety of careers in the life sciences.

### **Admission to the Program**

In addition to meeting the minimum university requirements for graduate study, applicants must take the Graduate Record Examination, including the General Test and the Advanced Test in Biology. International applicants whose first language is not English are required to submit results of the Test of English as a Foreign Language (TOEFL). Applicants must submit two letters of recommendation. Preference is given to applicants with a clear interest in working in the research laboratory of one of the full-time faculty members in the department.

### **Degree Requirements**

- 30 credit hours of approved graduate work
- Comprehensive examination
- Advancement to candidacy, which requires the acceptance of a research proposal by the student's advisor, the graduate studies committee, and the chair of the department at least one semester prior to the oral defense of the thesis.
- Completion, oral defense, and the acceptance of thesis by the thesis committee, chair of the department, and the university

### **Course Requirements**

- BIO-566 Evolutionary Mechanisms (3)
- BIO-583 Molecular Biology (3)
- BIO-677 Special Topics in Developmental Biology (1)  
*or*  
BIO-679 Topics in Evolutionary Biology (1)
- BIO-697 Research Methods in Biology (3)
- BIO-797 Master's Thesis Research (5)
- STAT-514 Statistical Methods (3) (satisfies tool of research requirement)
- An additional 12 hours of approved graduate course work