

BIOLOGY (BA)

Department Website (<http://as.nyu.edu/biology/>)

NYSED: 07759 **HEGIS:** 0401.00 **CIP:** 26.0101

Program Description

The science of biology reveals the workings of life in all its varied forms. The Department of Biology is home to world-class laboratories with faculty dedicated to pushing the frontiers of knowledge and educating the next generation of scientists and biomedical professionals. Research and teaching span the range of modern biology, from microbes to multicellular animals and plants, and from molecular and cellular processes to genetics, development, behavior, and evolution.

The department is committed to providing an education that is rigorous, exciting, and inclusive. Students are exposed to modern concepts and state-of-the-art methods throughout their studies, from introductory courses to upper-level electives that explore major fields of biology in depth. Education extends beyond the classroom as well. Students are encouraged to participate in laboratory research in the department and at other New York institutions. Students also may study away while advancing in the major, an opportunity for global engagement that science majors elsewhere typically do not have.

The biology majors and minors provide outstanding preparation for careers in research, academia, medicine, dentistry, and related fields. Graduates of the department have a remarkable record of success in acceptance into professional schools and in establishing notable careers in the biomedical sciences.

Tracks

There are three tracks available to students pursuing a major in biology. Each biology major is assigned a faculty adviser from the department and meets with that professor to select courses in the context of the student's academic and career goals. Faculty advisers also guide students in pursuing opportunities for curricular enhancement, such as research experiences and study away.

Standard Biology

The standard biology track gives majors a broad background, with the laboratory, quantitative, and reasoning skills needed for today's biology.

Ecology

The ecology track also provides students with a broad background in modern biology, but with a focus on ecological concepts, approaches, and analytical methods. It is primarily intended for students planning to pursue graduate study in ecology or a related field.

Global Public Health and Science; Concentration in Biology

The global public health and science major with a concentration in biology track provides students with strong foundations in biological science and global public health, with a focus on one of three emphasis areas: genetics and genomics, infectious diseases, or environmental health (see Global Public Health and Science (<https://bulletins.nyu.edu/undergraduate/arts-science/programs/global-public-health-science-bs/>) in this bulletin for program information and requirements).

Honors Program

Candidates for a degree with honors in biology must have an overall GPA of at least 3.65 and a minimum 3.65 GPA in all science and mathematics courses required for the major. It is the student's responsibility to secure a faculty member to sponsor the research and to provide laboratory space and equipment. All research credits should be completed by the end of the junior year.

In addition to all courses required for the biology major, students pursuing honors must also complete the following three courses (10 credits):

- One semester of either Independent Study (BIOL-UA 997, 998; 4 credits per term) or Internship (BIOL-UA 980, 981; 4 credits per term). Department approval of laboratory-based research is required. Application forms are available online on the Department of Biology's website. For biology majors on the standard track or on the ecology track, this research course may count as one of the five required upper-level elective courses. For GPH/science majors with concentration in biology, this research course may count as one of the two additional major electives (not as an emphasis area elective). Note that GPH/science majors with concentration in biology must also take Experiential Learning (UGPH-GU 60) as part of the core GPH requirements. It is recommended that honors track students enroll in section 002 (Individual Project) of UGPH-GU 60 while engaged in mentored research (but not in the same semester as BIOL-UA 980, 981, 997, or 998).
- BIOL-UA 995 Becoming a Scientist (Honors), 4 credits: must be taken in the fall semester before graduation. This course does not count toward the reasoning skill category.
- BIOL-UA 999 Undergraduate Research Thesis, 2 credits: must be taken in the final semester. Students prepare a written thesis based on the research results from their independent study or internship experience and defend the thesis at an oral examination before a faculty committee. Application forms, available online on the Department of Biology's website, must be submitted by the beginning of the final semester.

Admissions

New York University's Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (<https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html>).

Program Requirements

Course	Title	Credits
General Education Requirements		
First-Year Seminar		4
EXPOS-UA 1	Writing The Essay:	4
Foreign Language ¹		16
Texts and Ideas		4
Cultures and Contexts		4
Societies and the Social Sciences		4
Expressive Culture		4
Major Requirements		
Select one of the following tracks:		69-70
Standard Biology (see track requirements below)		
Ecology (see track requirements below)		

Electives

Other Elective Credits	18-19
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Total Credits	128-129
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The foreign language requirement is satisfied upon successful completion through the Intermediate level of a language. This may be accomplished in fewer than 16 credits, but those credits must then be completed as elective credit.

Track Requirements

Standard Biology

Course	Title	Credits
Core Courses		
BIOL-UA 11	Principles of Biology I ¹	4
BIOL-UA 12	¹	4
BIOL-UA 21	Molecular and Cell Biology I ²	4
BIOL-UA 22	²	4
Upper-Level Courses		
Select five upper-level biology courses ³		20
Additional Courses		
<i>Chemistry</i>		
CHEM-UA 125	General Chemistry I & Laboratory	5
CHEM-UA 126	General Chemistry II & Laboratory	5
CHEM-UA 225	Organic Chemistry I & Laboratory	5
CHEM-UA 226	Organic Chemistry II & Laboratory	5
<i>Physics</i>		
PHYS-UA 11	General Physics I	5
PHYS-UA 12	General Physics II	5
<i>Mathematics</i>		
MATH-UA 121	Calculus I	4
Total Credits		70

1

Biology majors are not required to register for the 1-credit BIOL-UA 123 . It is intended for prehealth students not majoring in biology.

2

Students may also register for the optional 1-credit BIOL-UA 223 Molecular and Cell Biology Laboratory concurrently with BIOL-UA 21 Molecular and Cell Biology I.

3

Biology majors must complete five additional 4-point upper-level biology courses. In consultation with their adviser or with the director of undergraduate studies, students select at least one course from each of the following three skill categories, plus two additional electives:

1. Laboratory skill courses: "At the Bench" or research courses
2. Quantitative skill courses: math, computational, and modeling courses
3. Reasoning skill courses: reading-intensive courses

The two additional upper-level electives may be satisfied either by taking advanced biology courses (electives covering key areas of biology) or by taking additional reasoning, quantitative, or laboratory skills courses. A current list of advanced biology courses and of courses satisfying each category above is maintained on the official website of the department of biology.

Ecology

Course	Title	Credits
Core Courses		
BIOL-UA 11	Principles of Biology I ¹	4
BIOL-UA 12	¹	4
BIOL-UA 21	Molecular and Cell Biology I ²	4
BIOL-UA 63	Fundamentals of Ecology ²	4
Upper-Level Courses		
Select five upper-level biology courses ³		20
Additional Courses		
<i>Chemistry</i>		
CHEM-UA 125	General Chemistry I & Laboratory	5
CHEM-UA 126	General Chemistry II & Laboratory	5
CHEM-UA 225	Organic Chemistry I & Laboratory	5
CHEM-UA 226	Organic Chemistry II & Laboratory	5
<i>Physics</i>		
PHYS-UA 11	General Physics I	5
<i>Mathematics</i>		
MATH-UA 121	Calculus I	4
MATH-UA 122	Calculus II	4
or MATH-UA 140	Linear Algebra	
Total Credits		69

1

Biology majors are not required to register for the 1-credit BIOL-UA 123 . It is intended for prehealth students not majoring in biology.

2

Students may also register for the optional 1-credit BIOL-UA 223 Molecular and Cell Biology Laboratory concurrently with BIOL-UA 21 Molecular and Cell Biology I.

3

Biology majors must complete five additional 4-point upper-level biology courses. In consultation with their adviser or with the director of undergraduate studies, students select at least one course from each of the following three skill categories, plus two additional electives:

1. Laboratory skill courses: "At the Bench" or research courses
2. Quantitative skill courses: math, computational, and modeling courses
3. Reasoning skill courses: reading-intensive courses

The two additional upper-level electives may be satisfied either by taking advanced biology courses (electives covering key areas of biology) or by taking additional reasoning, quantitative, or laboratory skills courses. A current list of advanced biology courses and of courses satisfying each category above is maintained on the official website of the department of biology. Note that the set of courses that may be used as electives for the ecology track is not identical to the set that may be used for the standard biology track.

General Information

To permit the maximal choice of appropriate upper-level courses, we strongly recommend that students take BIOL-UA 11 Principles of Biology I, BIOL-UA 12, CHEM-UA 125 General Chemistry I & Laboratory, CHEM-UA 126 General Chemistry II & Laboratory, and calculus in the first year. Detailed additional information on course planning is available through the department website and should be discussed with the faculty adviser. Programs of majors must be approved each term by a department adviser.

Suggested Course Plans

For reference, suggested four-year course plans for biology majors, including those on the pre-health track and those in the global public health/science major with concentration in biology, are available on the official website of the Department of Biology.

Study Away

Opportunities for study away that are appropriate for biology majors are available on the official website of the Department of Biology.

Graduate Courses

A number of courses in specialized fields are offered at the graduate level. Courses at the BIOL-GA 1000 level are available to undergraduates who have the necessary prerequisites. To take any of the relevant BIOL-GA 1000-level graduate courses in biology, students must obtain the approval of the course instructor and the director of undergraduate studies and have their registration material approved in the department's graduate office.

Sample Plan of Study Standard Biology

Course	Title	Credits
1st Semester/Term		
BIOL-UA 11	Principles of Biology I	4
CHEM-UA 125	General Chemistry I & Laboratory	5
MATH-UA 121	Calculus I	4
First-Year Seminar		4
Credits		17
2nd Semester/Term		
EXPOS-UA 1	Writing The Essay:	4

BIOL-UA 12		4
CHEM-UA 126	General Chemistry II & Laboratory	5
Texts and Ideas		4
Credits		17
3rd Semester/Term		
CHEM-UA 225	Organic Chemistry I & Laboratory	5
BIOL-UA 21	Molecular and Cell Biology I ¹	4
Cultures and Contexts		4
Foreign Language		4
Credits		17
4th Semester/Term		
BIOL-UA 22		4
CHEM-UA 226	Organic Chemistry II & Laboratory	5
Foreign Language		4
Expressive Culture		4
Credits		17
5th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 1 of 5 ²	4
PHYS-UA 11	General Physics I	5
Foreign Language		4
Societies and the Social Sciences		4
Credits		17
6th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 2 of 5 ²	4
PHYS-UA 12	General Physics II	5
Foreign Language		4
Elective		4
Credits		17
7th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 3 of 5	4
BIOL-UA XXX	Upper-Level Major Elective 4 of 5	4
Elective		4
Elective		4
Credits		16
8th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 5 of 5	4
Elective		4
Elective		4
Elective		4
Credits		16
Total Credits		134

Note: Students majoring in Biology can lower the number of total credits by reducing the number of credits taken in Degree Electives; the minimum number of credits for the CAS baccalaureate degree is always 128.

1

Majors are advised to also take the optional BIOL-UA 223 Molecular and Cell Biology Laboratory course.

2

For details on these five required courses, see the "Curriculum" tab; majors must complete one course in Laboratory Skills, one in Quantitative Skills, and one in Reasoning Skills, as well as two additional advanced courses in Biology.

Ecology

Course	Title	Credits
1st Semester/Term		
BIOL-UA 11	Principles of Biology I	4
CHEM-UA 125	General Chemistry I & Laboratory	5
MATH-UA 121	Calculus I	4

First-Year Seminar		4
Credits		17
2nd Semester/Term		
EXPOS-UA 1	Writing The Essay:	4
BIOL-UA 12		4
CHEM-UA 126	General Chemistry II & Laboratory	5
MATH-UA 122 or MATH-UA 140	Calculus II or Linear Algebra	4
Credits		17
3rd Semester/Term		
CHEM-UA 225	Organic Chemistry I & Laboratory	5
BIOL-UA 63	Fundamentals of Ecology	4
Cultures and Contexts		4
Foreign Language		4
Credits		17
4th Semester/Term		
BIOL-UA 21	Molecular and Cell Biology I	4
CHEM-UA 226	Organic Chemistry II & Laboratory	5
Foreign Language		4
Texts and Ideas		4
Credits		17
5th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 1 of 5 ¹	4
PHYS-UA 11	General Physics I	5
Foreign Language		4
Societies and the Social Sciences		4
Credits		17
6th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 2 of 5 ¹	4
Expressive Culture		4
Foreign Language		4
Elective		4
Credits		16
7th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 3 of 5 ¹	4
BIOL-UA XXX	Upper-Level Major Elective 4 of 5 ¹	4
Elective		4
Elective		4
Credits		16
8th Semester/Term		
BIOL-UA XXX	Upper-Level Major Elective 5 of 5 ¹	4
Elective		4
Elective		4
Elective		4
Credits		16
Total Credits		133

Note: Students majoring in Biology can lower the number of total credits by reducing the number of credits taken in Degree Electives; the minimum number of credits for the CAS baccalaureate degree is always 128.

1

For details on these five required courses, see the "Curriculum" tab; majors must complete one course in Laboratory Skills, one in Quantitative Skills, and one in Reasoning Skills, as well as two additional advanced courses in Biology. BIOL-UA 16 Ecological Field Methods is recommended but not required.

Learning Outcomes

Upon successful completion of the program, graduates will have:

1. A foundation of knowledge in current concepts of, and the mechanisms underlying, living systems.
2. Skills that enable them to reason critically and to analyze primary literature in the life sciences.
3. Experience in problem-solving, including quantitative analysis.
4. The ability to use the scientific method to design and implement controlled experiments or tests to address explicit hypotheses.
5. Proficiency in communicating scientific ideas in both oral and written formats, and also in collaborating on common scientific projects.

Policies

Advanced Placement

Students who achieve a score of 4 or 5 on the College Entrance Examination Board Advanced Placement Examination in Biology (or have equivalent international exam credits) are exempted from taking the Principles of Biology I, II (BIOL-UA 11, 12) sequence. However, because of medical, dental, and other professional school requirements, students on the pre-health track cannot place out of Principles of Biology.

AP (or equivalent international exam credits) in chemistry cannot count toward any majors or minors offered by the Department of Biology, or substitute for General Chemistry I, II (CHEM-UA 125, 126) wherever this sequence is a corequisite or prerequisite for any BIOL-UA course.

NYU Policies

University-wide policies can be found on the New York University Policy pages (<https://bulletins.nyu.edu/nyu/policies/>).

College of Arts and Science Policies

A full list of relevant academic policies can be found on the CAS Academic Policies page (<https://bulletins.nyu.edu/undergraduate/arts-science/academic-policies/>).