REQUIREMENTS FOR BIOLOGY MAJORS

There are four ways to complete a major in Biology. A student can obtain a General Biology Major or may complete one of the three majors that concentrate on a specific level of biological organization: Cellular and Molecular; Physiological and Organismal; or Ecological and Evolutionary.

❖ Introductory Biology and Genetics
All Biology majors must complete the 1500-level introductory sequence followed by a course in Genetics:

- BIOL BC1500 Introduction to Organismal and Evolutionary Biology
- BIOL BC1501 Introductory Lab in Organismal and Evolutionary Biology
- BIOL BC1502 Introduction to Cell and Molecular Biology
- BIOL BC1503 Introductory Lab in Cell and Molecular Biology
- BIOL BC 2100 Molecular and Mendelian Genetics

It is recommended, but not required, that Genetics be taken immediately after completing the 1500-level introductory sequence, as it is a pre-requisite for many upper-level lectures & laboratories. Students without a high-school biology background may begin the introductory sequence with BIOL BC1002 Global Health and Ecology and the co-requisite lab BIOL BC1012 in the fall of their freshman year, but for the major the entire 1500-level sequence must be completed the subsequent spring and fall.

❖ Five Upper-level Elective Courses
All Biology majors must complete five upper-level courses, with category distribution requirements listed in the table on the following page, followed by courses that fulfill each category.

- To complete the Biology Major without a concentration, the five courses must include at least one course from each of the three categories.

- To complete one of the three concentrations, at least four courses must be from the appropriate category and at least one must be from another category.

Although some courses are listed in multiple categories, a student can only use a course towards one of the categories. Additional Columbia courses that can be used to fulfill the major requirements are provided on the Biology website. If a student completes courses that make them eligible for more than one of the four majors, then they may select which one is reflected on their transcript.
### Categories of Upper-level Elective Courses in the Biology Major

(See page 6 of this packet for Biology courses offered in Fall 2020)

Visit [https://biology.barnard.edu/curriculum-courses/course-listings#Columbia](https://biology.barnard.edu/curriculum-courses/course-listings#Columbia) for a comprehensive list of Columbia Courses that count toward the major.

#### Cellular & Molecular Biology:

- BIOL BC2278 Evolution
- BIOL BC2490 Coding in Biology
- BIOL BC3308 Genomics and Bioinformatics
- BIOL BC3304 Topics in Molecular Genetics
- BIOL BC3310 Cell Biology
- BIOL BC3320 Microbiology
- BIOL BC3352 Development
- BIOL BC3362 Molecular and Cellular Neuroscience
- CHEM BC3282 Biological Chemistry
- BIOL UN3034 Biotechnology
- BIOL UN3073 Cellular and Molecular Immunology
- BIOL UN3310 Virology

#### Physiological & Organismal Biology:

- BIOL BC2262 Vertebrate Biology
- BIOL BC2280 Animal Behavior
- BIOL BC3320 Microbiology
- BIOL BC3352 Development
- BIOL BC3360 Physiology
- BIOL W3005 Neurobiology II: Development & Systems
- EEEB UN3011 Behavioral Biology of Living Primates
- EEEB UN3208 Explorations in Primate Anatomy
- EEEB W4112 Ichthyology

#### Ecological & Evolutionary Biology

- BIOL BC2240 Plant Evolution and Diversity
- BIOL BC2262 Vertebrate Biology
- BIOL BC2272 Ecology
- BIOL BC2278 Evolution
- BIOL BC2280 Animal Behavior
- BIOL BC3280 Applied Ecology and Evolution
- EEEB UN3087 Conservation Biology
- EEEB W4110 Coastal and Estuarine Ecology
Three Upper-level Laboratory Courses

Students may take any upper-level Barnard Biology lab courses for which they meet the pre- or co-requisites. A year-long research-seminar course may substitute up to two lab courses, as described below. As is true for lectures, students may also take laboratory courses at Columbia (or other institutions) to satisfy the lab requirement, with permission from the Co-Chair.

Guided Research and Seminar (BIOL BC3591 & BIOL BC3592)

Enrollment in the year-long Guided Research and Seminar can be used to fulfill **up to two** upper-level labs. This course is only available as a fall to spring sequence. Seniors may **not** enroll in Guided Research and Seminar if they are enrolled in Senior Thesis Research and Seminar (see below). In Guided Research and Seminar, students complete an original research project in a lab, and both write a scientific paper and give a poster presentation of their work at the Barnard Biology Research Symposium.

Senior Capstone Experience

All Biology majors must complete the Senior Capstone Experience with either of the following two options:

1. One semester of **Senior Seminar (BIOL BC3590)**

   In Senior Seminar, students participate in a seminar focusing on primary literature, and both compose and give a presentation on a senior thesis in the format of a literature review. Topics vary from semester to semester.

   Fall 2020 Topic: *Data Intensive Approaches in Biology*

   The seminar explores the massive and ongoing transformation of biology by recent technologies. These include: (1) ease of accessing huge amounts of aggregated data using the internet and various software and coding tools, (2) synthesizing from a titanically large and searchable digital repository of historic and more recently published science writing and science-related images, (3) other new technologies available through phones, watches, or other wearables. The goal is to think about how these are complementing, rather than replacing, more traditional and rigorous observation, experimentation, and application in the field, the laboratory, or in clinical settings.

2. The year-long **Senior Thesis Research and Seminar (BIOL BC3593 & BIOL BC3594)**

   In Senior Thesis Research and Seminar, students complete an original research project in a lab, and both write a scientific paper and orally present their work at the Barnard Biology Symposium. This course is only available as a fall to spring sequence.

   *Note:* Seniors enrolled in Guided Research and Seminar to fulfill two upper-level labs for their major cannot take Senior Thesis Research and Seminar at the same time. Instead, they must complete their senior capstone experience with BIOL BC3590 Senior Seminar.

Chemistry Requirement

All majors, regardless of their track, must complete at least one semester of General Chemistry (with laboratory) and at least one semester of Organic Chemistry (with laboratory).
REQUIREMENTS FOR BIOLOGY MINORS

A minor in biology includes:

- One year of introductory biology (BIOL BC1500, BC1501, BC1502, BC1503).
- Three biology lecture courses at the BIOL BC2100 level or higher.
- Two biology laboratory courses. One of the lab courses may be replaced by two semesters of Guided Research and Seminar (BIOL BC3591 followed by BIOL BC3592).

Note: Chemistry, environmental science, physics, and psychology majors need to take only one advanced laboratory instead of two. Check with your major advisor in order to determine whether a guided research course is a suitable selection for your major’s requirements.
MAJOR ADVISING POLICY

In the biology department, students select their advisors rather than having them assigned. Students should contact prospective advisors directly. After contacting them, a student’s choice must be approved and their major declaration form signed by the Co-Chair. Any biology faculty member can serve as an advisor.

ENVIRONMENTAL BIOLOGY

(Potential advisors in the Biology Department are Profs. Callahan and Hertz)

This major is run jointly by faculty in the Departments of Biology and Environmental Science. It examines the interactions between living and non-living components of the environment, and how human activities alter these interactions. For more information, visit: envsci.barnard.edu/environmental-biology-major

RESEARCH OPPORTUNITIES

We strongly encourage students to get involved in research during the summer, academic year, or both. For many students, research is one of the most intellectually rewarding experiences at Barnard. When unpaid research is conducted during the academic year, students can receive academic credit for working in a laboratory at Barnard or anywhere else in New York City. Research can be conducted during any (or all) semesters of the major, and during the summer. You may not receive credit for research that is paid.

Three courses provide credit for research during the academic year. Before signing up for any of these courses, you should examine the Checklist for Enrollment located on the Biology website:

1. **Guided Research (BIOL BC3597)**: This is a variable-credit (1-4 credits) one-semester course, which can be taken during any fall or spring semester as early as your freshman year. This course counts toward degree credit but does not fulfill major requirements, and may be taken in multiple semesters.

2. **Guided Research & Seminar (BIOL BC3591-2)**: This is a year-long 8 point course that begins in the fall and can be taken starting in your sophomore year. This series fulfills two upper-level lab courses toward the major.

3. **Senior Thesis Research (BIOL BC3593-4)**: This is a year-long course 8 point course, beginning in the fall of your senior year. This series fulfills the senior capstone requirement.

*Note:* You cannot get academic credit for research conducted during the summer.
<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>COURSE TITLE</th>
<th>PROFESSOR</th>
<th>TIME(S) OFFERED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTORY BIOLOGY &amp; GENETICS</strong></td>
<td></td>
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</tr>
<tr>
<td>BIOL BC1500</td>
<td>Introduction to Organismal &amp; Evolutionary Biology</td>
<td>Paul Hertz</td>
<td>M W F 9:00 - 9:50 am</td>
</tr>
<tr>
<td>BIOL BC1501</td>
<td>Introductory Lab in Organismal &amp; Evolutionary Biology (12 sections)</td>
<td>Jessica Goldstein &amp; James Casey, Multiple instructors</td>
<td>M T TH 1:10 - 4:00 pm, T 9:00 - 11:50 am, W F 10:00 am - 12:50 pm</td>
</tr>
<tr>
<td>BIOL BC1511</td>
<td>BIOL BC 1501 Lab Recitation (2 sections)</td>
<td>Jessica Goldstein</td>
<td>M 10:00 - 10:50 am, or F 1:10 - 2:00 pm</td>
</tr>
<tr>
<td>BIOL BC2100</td>
<td>Molecular &amp; Mendelian Genetics</td>
<td>Brian Goldstein</td>
<td>T TH 10:10 - 11:25 am</td>
</tr>
<tr>
<td><strong>UPPER-LEVEL ELECTIVES</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>BIOL BC2500</td>
<td>Matlab for Scientists*</td>
<td>Allison Lopatkin</td>
<td>T 1:00 - 4:00 pm</td>
</tr>
<tr>
<td>BIOL BC3310</td>
<td>Cell Biology</td>
<td>Jon Snow</td>
<td>M W 10:10 - 11:25 am</td>
</tr>
<tr>
<td>BIOL BC3320</td>
<td>Microbiology</td>
<td>JJ Miranda</td>
<td>T TH 10:10 - 11:25 am</td>
</tr>
<tr>
<td>BIOL BC3360</td>
<td>Physiology</td>
<td>John Glendinning</td>
<td>T TH 11:40 am - 12:55 pm</td>
</tr>
<tr>
<td>BIOL BC3362</td>
<td>Molecular &amp; Cellular Neuroscience</td>
<td>Elizabeth Bauer</td>
<td>T TH 11:40 am - 12:55 pm</td>
</tr>
<tr>
<td><strong>UPPER-LEVEL LABS</strong></td>
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<tr>
<td>BIOL BC3305</td>
<td>Project Lab in Molecular Genetics**</td>
<td>Jennifer Mansfield &amp; Brian Morton</td>
<td>W 1:10 - 6:00 pm</td>
</tr>
<tr>
<td>BIOL BC3311</td>
<td>Laboratory in Cell Biology</td>
<td>Jon Snow</td>
<td>TH 1:10 - 6:00 pm</td>
</tr>
<tr>
<td>BIOL BC3321</td>
<td>Laboratory in Microbiology</td>
<td>TBD</td>
<td>T 1:10 - 6:00 pm</td>
</tr>
<tr>
<td>BIOL BC3591</td>
<td>Guided Research &amp; Seminar***</td>
<td>Jessica Goldstein, JJ Miranda, &amp; TBD</td>
<td>M 1:10 - 3:00pm</td>
</tr>
<tr>
<td><strong>SENIOR CAPSTONE REQUIREMENT</strong></td>
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<tr>
<td>BIOL BC3590</td>
<td>Senior Seminar: Data Intensive Approaches in Biology</td>
<td>Hilary Callahan</td>
<td>M 4:10 - 6:00pm</td>
</tr>
<tr>
<td>BIOL BC3593</td>
<td>Senior Thesis Research &amp; Seminar***</td>
<td>Jessica Goldstein, JJ Miranda, &amp; TBD</td>
<td>M 1:10 - 3:00pm</td>
</tr>
</tbody>
</table>

*May be used to fulfill either an upper level elective or an upper level laboratory course for the major.
**BC3305-BC3306 is a full-year course and counts as two upper level labs for the major. Enrollment in BC3306 is required in spring 2021.
***Full-year courses: BC3591-BC3592 & BC3593-BC3594 can only be taken in a fall to spring sequence. Enrollment in BC3592 or BC3594 is required in spring 2021.
BIOLOGY NON MAJORS-LEVEL COURSES OFFERED FALL 2020

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>COURSE TITLE</th>
<th>PROFESSOR</th>
<th>TIME(S) OFFERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSPP BC1001</td>
<td>Research Apprenticeship Seminar*</td>
<td>Rishita Shah</td>
<td>TBD</td>
</tr>
<tr>
<td>BIOL BC1599</td>
<td>Science Journal Club**</td>
<td>Sedelia Rodriguez</td>
<td>T 3:00 - 4:00 pm</td>
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**INTRODUCTORY BIOLOGY**

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>COURSE TITLE</th>
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<th>TIME(S) OFFERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL BC1002</td>
<td>Global Health and Ecology</td>
<td>TBD</td>
<td>T TH 10:10 - 11:25 am</td>
</tr>
<tr>
<td>BIOL BC1012</td>
<td>BIOL BC1002 Lab</td>
<td>Multiple instructors</td>
<td>M 1:10 - 4:00 pm</td>
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<td>T 1:10 - 4:00 pm</td>
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<td>F 10:00 am - 12:50 pm</td>
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**RESEARCH FOR DEGREE CREDIT**

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<tr>
<th>COURSE NO.</th>
<th>COURSE TITLE</th>
<th>PROFESSOR</th>
<th>TIME(S) OFFERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL BC3597</td>
<td>Guided Research</td>
<td>Sign up for your internal adviser's section</td>
<td></td>
</tr>
</tbody>
</table>

*Full year course; HSPP BC1001 can only be taken in a fall to spring sequence – enrollment in HSPP BC1002 is required in spring 2021. This course is only open to first years who apply through the Dean of Studies Office.

**Limited to first-year students in the Science Pathways program.
Biology Department Announcements & Events

Upcoming Departmental Events

Program Planning

Fri, Apr. 17th | 12:00 pm | Zoom ID: 290 207 231

Afternoon Tea & Check-in

Mon, Apr. 20th | 4:30 pm | Zoom ID: 290 035 548

Major’s Toast: Celebrating our Seniors & New Majors!

Fri, May 1st | 11 am | Zoom ID: 564 055 579

Biology Research Symposium

Wed, May 6th | 9:30 am | Zoom ID: TBA

Student Employment (Fall 2020)

The department is seeking teaching and/or lab assistants for the following courses:

- Global Health & Ecology Lab
- Introductory Lab in Organismal & Evolutionary Biology
- Matlab for Scientists
- Lab in Microbiology
- Lab in Cell Biology

Listings will be available the week of April 20th through BarnardWorks. Questions about introductory lab student employment can be directed to Henry Truong (htruong@barnard.edu). For more information, visit https://biology.barnard.edu/employment/student-employment.