

Program Planning Packet | Fall 2020



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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.

Major	Course Selection
Biology	Five courses with at least one course from each of the three categories.
Cell & Molecular Biology (C&M)	Four courses from the C&M category, one from another category.
Physiology & Organismal Biology (P&O)	Four courses from the P&O category, one from another category.
Ecology & Evolutionary Biology (E&E)	Four courses from the E&E category, one from another category.

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> 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.

BIOLOGY MAJORS-LEVEL COURSES OFFERED FALL 2020

COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
<i>INTRODUCTORY BIOLOGY & GENETICS</i>			
BIOL BC1500	Introduction to Organismal & Evolutionary Biology	Paul Hertz	M W F 9:00 - 9:50 am
BIOL BC1501	Introductory Lab in Organismal & Evolutionary Biology (12 sections)	Jessica Goldstein & James Casey Multiple instructors	M T TH 1:10 - 4:00 pm T 9:00 - 11:50 am W F 10:00 am - 12:50 pm
BIOL BC1511	BIOL BC 1501 Lab Recitation (2 sections)	Jessica Goldstein	M 10:00 - 10:50 am <u>or</u> F 1:10 - 2:00 pm
BIOL BC2100	Molecular & Mendelian Genetics	Brian Morton	T TH 10:10 - 11:25 am
<i>UPPER - LEVEL ELECTIVES</i>			
BIOL BC2500	Matlab for Scientists*	Allison Lopatkin	T 1:00 - 4:00 pm
BIOL BC3310	Cell Biology	Jon Snow	M W 10:10 - 11:25 am
BIOL BC3320	Microbiology	JJ Miranda	T TH 10:10 - 11:25 am
BIOL BC3360	Physiology	John Glendinning	T TH 11:40 am - 12:55 pm
BIOL BC3362	Molecular & Cellular Neuroscience	Elizabeth Bauer	T TH 11:40 am - 12:55 pm
<i>UPPER - LEVEL LABS</i>			
BIOL BC3305	Project Lab in Molecular Genetics**	Jennifer Mansfield & Brian Morton	W 1:10 - 6:00 pm
BIOL BC3311	Laboratory in Cell Biology	Jon Snow	TH 1:10 - 6:00 pm
BIOL BC3321	Laboratory in Microbiology	TBD	T 1:10 - 6:00pm
BIOL BC3591	Guided Research & Seminar***	Jessica Goldstein, JJ Miranda, & TBD	M 1:10 - 3:00pm
<i>SENIOR CAPSTONE REQUIREMENT</i>			
BIOL BC3590	Senior Seminar: Data Intensive Approaches in Biology	Hilary Callahan	M 4:10 - 6:00pm
BIOL BC3593	Senior Thesis Research & Seminar***	Jessica Goldstein, JJ Miranda, & TBD	M 1:10 - 3:00pm

*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

COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
HSPP BC1001	Research Apprenticeship Seminar*	Rishita Shah	TBD
BIOL BC1599	Science Journal Club**	Sedelia Rodriguez	T 3:00 - 4:00 pm
<i>INTRODUCTORY BIOLOGY</i>			
BIOL BC1002	Global Health and Ecology	TBD	T TH 10:10 - 11:25 am
BIOL BC1012	BIOL BC1002 Lab	Multiple instructors	M 1:10 - 4:00 pm T 1:10 - 4:00 pm F 10:00 am - 12:50 pm
<i>RESEARCH FOR DEGREE CREDIT</i>			
BIOL BC3597	Guided Research	Sign up for your internal adviser's section	

**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>.