

Program Planning Packet | Spring 2020



Department Chair: Jennifer Mansfield, Professor | jmansfie@barnard.edu | 212.854.4381

Co-Chair: Brian Morton, Professor | bmorton@barnard.edu | 212.854.5454

Department Administrator: Melissa Flores | mflores@barnard.edu | 212.854.2437

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 first 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 her 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.

Commonly Enrolled Upper-level Elective Courses in the Biology Major

(See the end of this packet for Biology courses offered in Spring '20)

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 BC2286	Statistics and Research Design
BIOL BC3320	Microbiology
BIOL BC3352	Development
BIOL BC3360	Physiology
BIOL W3005	Neurobiology II: Development & Systems
EEEE UN3011	Behavioral Biology of Living Primates
EEEE UN3208	Explorations in Primate Anatomy
EEEE 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 BC2286	Statistics and Research Design
BIOL BC3280	Applied Ecology and Evolution
EEEE UN3087	Conservation Biology
EEEE 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 Seniors 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 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.

Spring 2020: *Bacteria by Design*

In this course, students will explore in-depth the field of synthetic biology with a focus on engineered bacteria. Topics include fundamental design principles, environmental and clinical applications, as well as ethical implications.

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 adviser 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 advisers rather than having them assigned. Students should contact prospective advisers *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 adviser.

ENVIRONMENTAL BIOLOGY

(Potential advisers 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

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 first year.
2. **Guided Research & Seminar (BIOL BC3591-2)**: This is a year-long 4 point course that begins in the fall and can be taken starting in your sophomore year.
3. **Senior Thesis Research (BIOL BC3593-4)**: This is a year-long 4 point course, beginning in the fall of your senior year.

Note: You cannot get academic credit for research conducted during the summer.

BIOLOGY MAJORS-LEVEL COURSES OFFERED SPRING 2020

COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
BIOL BC1502	Introduction to Cell & Molecular Biology	Jon Snow	M W F 9:00 - 9:50 am
BIOL BC1503	Introductory Lab in Cell & Molecular Biology (13 sections)	Jessica Goldstein & James Casey	M T TH 1:10 - 4:00 pm T 9:00 - 11:50 am W F 10:00 am - 12:50 pm W 2:00 - 5:00 pm
BIOL BC1513	BIOL BC 1503 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	Jennifer Mansfield	T TH 10:10 - 11:25 am
<i>U P P E R - L E V E L E L E C T I V E S</i>			
BIOL BC2262	Vertebrate Biology	Paul Hertz	M W 10:10 - 11:25 am
BIOL BC2272	Ecology	Hilary Callahan	M W 8:40 - 9:55 am
BIOL BC2278	Evolution	Brian Morton	T TH 10:10 - 11:25 am
BIOL BC2280	Animal Behavior	Alison Pischedda	T TH 11:40 am - 12:55 pm
BIOL BC2490	Coding in Biology	Brian Morton	M W 10:10 - 11:25 am
BIOL BC2500	MATLAB for Scientists	Allison Lopatkin	T 1:00 - 4:00 pm
BIOL BC3304	Topics in Molecular Genetics	Jennifer Mansfield	T TH 1:10 - 2:25 pm
BIOL BC3360	Physiology	John Glendinning	T TH 10:10 - 11:25 am
<i>U P P E R - L E V E L L A B S</i>			
BIOL BC2841	Laboratory in Plant Evolution & Diversity	Hilary Callahan	T 1:10 - 6:00 pm
BIOL BC3303	Laboratory in Molecular Biology	Rishita Shah	W 1:10 - 6:00 pm
BIOL BC3321	Laboratory in Microbiology	JJ Miranda	TH 1:10 - 6:00 pm
BIOL BC3361	Laboratory in Physiology	John Glendinning	W 1:10 - 6:00 pm
BIOL BC3592*	Guided Research & Seminar	Jessica Goldstein, Alison Pischedda, & JJ Miranda	M 1:10 - 3:00 pm
<i>S E N I O R C A P S T O N E R E Q U I E R E M E N T</i>			
BIOL BC3590	Senior Seminar: Bacteria by Design	Allison Lopatkin	M 4:10 - 6:00 pm
BIOL BC3594*	Senior Thesis Research & Seminar	Jessica Goldstein, Alison Pischedda, & JJ Miranda	M 1:10 - 3:00 pm

*Denotes a full year course; BC3592 & BC3594 can only be taken in a fall to spring sequence – enrollment in BIOL BC3591 or BC3593 was required in fall 2019.

BIOLOGY NON MAJORS-LEVEL COURSES OFFERED SPRING 2020

COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
HSPP BC1002	Research Apprenticeship Seminar*	Rishita Shah	M 4:10 - 6:00 pm
BIOL BC1599	Biology Journal Club**	Paul Hertz	M 12:00 - 1:00 pm
<i>INTRODUCTORY BIOLOGY</i>			
BIOL BC1001	Revolutionary Concepts in Biology	Diana Heller	T TH 10:10 - 11:25 am
<i>RESEARCH FOR DEGREE CREDIT</i>			
BIOL BC3597	Guided Research	Sign up for your internal adviser's section	

**Denotes a full year course; HSPP BC1002 can only be taken in a fall to spring sequence – enrollment in HSPP BC1001 was required in fall 2019. This course is only open to first years who apply through the Dean of Studies Office.*

***Limited to first-year students who received a 4 or 5 on the AP and are currently enrolled in BIOL BC1500 sequence.*

Biology Department Announcements & Events

Upcoming Departmental Events

Annual Honey Extraction

Fri, Dec. 6th | 12 pm | 12th Floor Altschul

RSVP to mflores@barnard.edu by Monday, Dec. 2nd (at: tinyurl.com/y4y6pz87)

Annual Holiday Party

Fri, Dec. 13th | 12 pm | Sulzberger Parlor

RSVP to mflores@barnard.edu by Monday, Dec. 9th (at: tinyurl.com/y2u7bqx9)

Student Employment (Spring 2020)

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

- Introduction to Cellular & Molecular Biology
- Introductory Lab in Cellular & Molecular Biology
- Lab in Microbiology
- Lab in Molecular Biology

Listings will be available soon through BarnardWorks. Questions about introductory lab student employment can be directed to James Casey (jcasey@barnard.edu).