

Program Planning Packet | Fall 2020



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We encourage students to frequently visit our [AY20–21 Course Offerings](#) page for the most up to date information on the upcoming year's courses.

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

*Beginning in fall 2020, all students enrolled in the 3 pt BIOL BC1500 (fall) & BIOL BC1502 (spring) lectures will be required to enroll in a 0 pt 50-minute discussion section. These weekly sessions will cover topics ranging from how to read a scientific journal article to how science impacts society.

**For the 2020–2021 academic year only, students enrolled in BIOL BC1501 (fall) and BIOL BC1503 (spring) will not be required to enroll in the co-requisite BIOL BC1511 (fall) / BIOL BC1513 (spring) recitations. As such, both lab courses will drop from 2 pts to 1.5 pts.

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. In AY20-21, Genetics will be offered as a semester-long course in fall 2020, and as an immersive course in spring block A and summer block A.

In fall 2020, our department will be offering the 3 pt lecture course BIOL BC1008 Healthier Life. This lecture course will be accepted as a co-requisite for BIOL BC1501 lab for those who wish to use this sequence to fulfill the Science Laboratory GER. This course is also an option for students without a sufficiently broad and in-depth high-school biology background. These students may begin the introductory sequence with this 1000-level lecture + 1500-level lab combination in the fall of their freshman year to receive additional preparation in biology before starting the 1500-level sequence in the spring—if they wish to major in biology.

❖ 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 toward one of the categories. Additional Columbia courses that can be used to fulfill the major requirements are provided on the Biology website (linked below). 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 pages 7–11 of this packet for Biology courses offered in AY20–21)

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
BIOL BC3320	Microbiology
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. Often, a lab course requires that a student have taken a pre-requisite lecture offered in the opposite semester (though sometimes, the lecture may be offered as a co-requisite). 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 Chair.

➤ **Guided Research and Seminar (BIOL BC3591 & BIOL BC3592)**

Enrollment in the year-long Guided Research and Seminar course 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. In AY2020–21, lab research projects with remote components will be accepted. For more information, visit our [Undergraduate Research](#) page.

❖ 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: *Regenerative Biology*

This seminar will explore the cellular behavior that underlies complex tissue maintenance and repair. Student discussion and presentations will center on primary literature examining different regenerative model systems, such as zebrafish, salamander, and mouse. This course will explore topics in tissue homeostasis, injury repair, and organ regeneration. In addition, we will discuss new concepts in regenerative medicine including *in vitro* systems and stem cell applications for human disease therapies.

Spring 2021 Topic: *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. In AY2020–21, lab research projects with remote components will be accepted. For more information, visit our [Undergraduate Research](#) page.

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). To see which courses will be offered in fall 2020, we encourage students to visit the [CU Directory of Classes](#) pages for Chemistry at Barnard and at Columbia. This is an important topic to discuss early with your advisor.

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. The lab courses may be replaced by two semesters of Guided Research and Seminar (BIOL BC3591 & 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 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 (4 pts/semester) 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 8 point (4 pts/semester) course, beginning in the fall of your senior year. This series fulfills the senior capstone requirement.

To be fully enrolled in any of these courses, a student must submit a [Project Approval Form](#) to the department administrator. Students enrolled in yearlong courses need only submit one form in the fall; those taking BIOL BC3597 Guided Research should resubmit this form each semester. For AY20–21, this form is due September 21st in the fall and January 25th in the spring. In the summer, this form will be due May 17th for summer A & July 12th for summer B.

BIOLOGY MAJORS-LEVEL COURSES OFFERED FALL 2020

Visit the [CU Directory of Classes](#) for course descriptions, caps, and pre-requisite information

All courses will be taught remotely for fall 2020, with the exception of research & seminar course components where it has been deemed safe for students to participate in in-person lab research. This will be permitted on a case-by-case basis. All participants are expected to adhere to rigorous safety protocols as mandated by the college and the NYS Department of Health.

TERM	COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
<i>INTRODUCTORY BIOLOGY & GENETICS</i>				
Semester	BIOL BC1500	Introduction to Organismal & Evolutionary Biology (2 sections)	Paul Hertz	M W F 9:00 - 9:50 am 7:00 - 7:50 pm
Semester	BIOL BC1501	Introductory Lab in Organismal & Evolutionary Biology (10 sections)	Jessica Goldstein & James Casey Multiple instructors	M T TH 1:10 - 4:00 pm T 9:00 - 11:50 am 7:00 - 9:50 pm W F 10:00 am - 12:50 pm
Semester	BIOL BC2100	Molecular & Mendelian Genetics	Brian Morton	T TH 10:10 - 11:25 am
<i>UPPER - LEVEL ELECTIVES</i>				
Fall A	BIOL BC2500	Matlab for Scientists*	Allison Lopatkin	T 1:00 - 6:00 pm
Fall B	BIOL BC3310	Cell Biology	Jon Snow	MWTHF 1:10 - 2:25 pm
Fall A	BIOL BC3320	Microbiology	JJ Miranda	TWTHF 2:40 - 3:55 pm
Fall A	BIOL BC3360	Physiology	John Glendinning	MTWTH 11:40 am - 12:55 pm
Fall B	BIOL BC3362	Molecular & Cellular Neuroscience	Elizabeth Bauer	MTWTHF 12:00 - 1:00 pm
<i>UPPER - LEVEL LABS</i>				
Semester	BIOL BC2281	Lab in Animal Behavior	Alison Pishedda	W 1:00 - 4:00 pm
Fall B	BIOL BC3305	Project Lab in Molecular Biology**	Jennifer Mansfield & Brian Morton	W 1:00 - 6:00 pm
Fall B	BIOL BC3321	Laboratory in Microbiology	TBA	T 1:00 - 6:00 pm
Semester	BIOL BC3591	Guided Research & Seminar***	Alison Pishedda & JJ Miranda	M 1:10 - 3:00 pm
<i>SENIOR CAPSTONE REQUIREMENT</i>				
Semester	BIOL BC3590	Senior Seminar: Regenerative Biology	Rishita Shah	M 4:10 - 6:00 pm
Semester	BIOL BC3593	Senior Thesis Research & Seminar***	JJ Miranda & Alison Pishedda	M 1:10 - 3:00 pm

*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; must be taken in fall to spring sequence. 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. In order to enroll in either course, you must submit a [Project Approval Form](#) by Sept. 21st for the fall semester.

BIOLOGY NON MAJORS-LEVEL COURSES OFFERED FALL 2020

Visit the [CU Directory of Classes](#) for course descriptions, caps, and pre-requisite information

All courses will be taught remotely for fall 2020, with the exception of independent research where it has been deemed safe for students to participate in in-person lab research. This will be available on a case-by-case basis. All participants are expected to adhere to rigorous safety protocols as mandated by the college and the NYS Department of Health.

TERM	COURSE NO.	COURSE TITLE	PROFESSOR	TIME(S) OFFERED
<i>INTRODUCTORY BIOLOGY</i>				
Semester	BIOL BC1008	Healthier Life*	Hilary Callahan & Henry Truong	T TH 10:10 - 11:25 am
<i>SEMINARS</i>				
Semester	BIOL BC1599	Science Journal Club**	Sedelia Rodriguez	T 3:00 - 4:00 pm
<i>RESEARCH FOR DEGREE CREDIT</i>				
Semester	BIOL BC3597	Guided Research***	Sign up for your internal advisor's section	

**This course will replace BIOL BC1002 + BIOL BC1012 for the AY20-21 only. It may count as a co-requisite for BIOL BC1501 lab for those seeking to fulfill the Science Laboratory GER. See more information on our [Recommended for First Years](#) page. Those who intend on declaring a major in biology or who want to fulfill pre-health/graduate school requirements should consult with the department chair.*

***Enrollment in this course is limited to first years in the Science Pathways Scholar's Program.*

****In order to sign up for a section of Guided Research, you must submit a [Project Approval Form](#) by Sept. 21st for the fall semester.*

BIOLOGY MAJORS-LEVEL COURSES OFFERED SPRING 2021

TERM	COURSE NO.	COURSE TITLE	PROFESSOR
<i>INTRODUCTORY BIOLOGY & GENETICS</i>			
Semester	BIOL BC1502	Introduction to Cellular & Molecular Biology	Jon Snow
Semester	BIOL BC1503	Introductory Lab in Cellular & Molecular Biology	Jessica Goldstein & James Casey Multiple instructors
<i>UPPER - LEVEL ELECTIVES</i>			
Spring A	BIOL BC2100	Molecular & Mendelian Genetics	Jennifer Mansfield
Semester	TBA	Modeling	Allison Lopatkin
Spring A	BIOL BC2280	Animal Behavior	Alison Pischedda
Spring A	BIOL BC3304	Topics in Molecular Genetics	Jennifer Mansfield
Spring B	BIOL BC2272	Ecology	TBA
<i>UPPER - LEVEL LABS</i>			
Spring A	BIOL BC3303	Lab in Molecular Biology	TBA
Spring A	BIOL BC3306	Project Lab in Molecular Genetics**	Jennifer Mansfield & Brian Morton
Spring B	BIOL BC3363	Laboratory in Molecular & Cellular Neuroscience	Elizabeth Bauer
Semester	BIOL BC3592	Guided Research & Seminar***	Alison Pischedda & JJ Miranda
<i>SENIOR CAPSTONE REQUIREMENT</i>			
Semester	BIOL BC3590	Senior Seminar: Bacteria by Design	Allison Lopatkin
Semester	BIOL BC3594	Senior Thesis Research & Seminar***	JJ Miranda & Alison Pischedda

**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 BC3305 was required in fall 2020.*

****Full-year courses; BC3591-BC3592 & BC3593-BC3594 can only be taken in a fall to spring sequence. Enrollment in BC3591 or BC3593 was required in fall 2020. Students enrolled in either of these year-long courses do not have to re-submit a Project Approval Form in the spring.*

BIOLOGY NON MAJORS-LEVEL COURSES OFFERED SPRING 2021

TERM	COURSE NO.	COURSE TITLE	PROFESSOR
<i>L A B O R A T O R I E S</i>			
Semester	ANAT BC2574	Lab in Human Anatomy*	Chisa Hidaka
<i>R E S E A R C H F O R D E G R E E C R E D I T</i>			
Semester	BIOL BC3597	Guided Research**	Sign up for your internal advisor's section

**The course requires enrollment in the pre-requisite dance lecture ANAT BC2573 Human Anatomy and Movement offered in fall 2020.*

***In order to sign up for a section of Guided Research, you must submit a [Project Approval Form](#) by Jan. 25th for the spring semester.*

BIOLOGY MAJORS-LEVEL COURSES OFFERED SUMMER 2021

TERM	COURSE NO.	COURSE TITLE	PROFESSOR
<i>U P P E R - L E V E L E L E C T I V E S</i>			
Summer A	BIOL BC2100	Molecular & Mendelian Genetics	Jennifer Mansfield
Summer A	BIOL BC2490	Coding in Biology	Brian Morton
<i>U P P E R - L E V E L L A B S</i>			
Summer A	BIOL BC3311	Lab in Cell Biology	Jon Snow
Summer A	TBA	Lab in Embryology	Rishita Shah

BIOLOGY NON MAJORS-LEVEL COURSES OFFERED SUMMER 2021

TERM	COURSE NO.	COURSE TITLE	PROFESSOR
<i>R E S E A R C H F O R D E G R E E C R E D I T</i>			
Summer A & B	BIOL BC3597	Guided Research*	Sign up for your internal advisor's section

**In order to sign up for a section of Guided Research, you must submit a [Project Approval Form](#) by May 17th for the summer semester A and Jul. 12th for the summer semester B*

Upcoming Events & Announcements

To receive the Zoom links for Launch Week, RSVP to any of the events listed below by emailing the department administrator, Melissa Flores (mflores@barnard.edu). All events will be recorded.

Launch Week: Program Planning Events

Prospective Majors Program Planning
Tues, Jul 21st | 3 pm EST

Majors' Program Planning: Upper-level courses, research, and senior capstone experiences
Wed, Jul 22nd | 4 pm EST

Majors' Program Planning: General Q&A and pre-med/grad school requirements
Thurs, Jul 23rd | 3 pm EST

Majors' Program Planning: General Q&A
Fri, Jul 24th | 3 pm EST

Late August: first meeting of the Barnard Biology Anti-Racism Working Group. To join, fill out [our questionnaire](#). We'll also be hosting a welcome back (iced) coffee hour and a couple of group yoga with Adriene sessions.

Student Employment Opportunities

We are still looking to hire a TA to assist in the remote teaching of BIOL BC3321 Lab in Microbiology (instructor TBA).