The New Biology Major Requirements

Who does the new major apply to?
The new requirements automatically apply to any student who is currently in their first year at Barnard - that is, the class of 2019. Any other student, regardless of whether or not they have already declared a Biology major, can elect to follow the new requirements but does not have to do so. If you do wish to follow the new requirements then speak to your adviser and fill out a change of major form (if you have already declared a Biology major) so that the form reflects the track you wish to fulfill.

One caveat is that the 2 lab credits for Guided Research and Seminar (see point 2 below) cannot be applied retroactively. It can be applied to students currently enrolled in the course - and in future years - but not to students who took it previous to the 2015-16 academic year.

If you have any questions at all just speak to The Associate Chair (Professor Morton this semester, Professor Mansfield as of January 1) or with your adviser and we will be happy to help you.

There are 2 main changes in the new major requirements:
  1. You now have the option of selecting a track within biology, either Cell & Molecular Biology, Physiology & Organismal Biology or Ecology & Evolutionary Biology. You simply chose 4 elective lecture courses within the track and 1 additional course from outside your track. Your transcript will indicate your track.

     Notice that you do not have to select a track. You can fulfill the lecture requirements as they were outlined for the old major and get a Biology major. The four possibilities are outlined in the table below.

  2. You still need to take 3 upper level labs. However, Guided Research and Seminar (BIOL BC3591 followed by BIOL BC3592 in the same academic year) will now count for 2 of the required 3 upper level labs.

<table>
<thead>
<tr>
<th>Major</th>
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<tr>
<td>Biology</td>
<td>Five courses with at least one course from each of the three categories</td>
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<td>Cell &amp; Molecular Biology</td>
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New Major Requirements

There are four possible ways to complete a major within 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: Cell and Molecular Biology, Physiology and Organismal Biology, or Ecology and Evolutionary Biology.

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

- BIOL BC1500x Introduction to Organismal and Evolutionary Biology
- BIOL BC1501x Introductory Lab in Organismal and Evolutionary Biology
- BIOL BC1502y Introduction to Cell and Molecular Biology
- BIOL BC1503y 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.

Upper-level Courses
Students must complete five courses from the three categories below. To complete one of the three concentrations, at least 4 courses must be from the appropriate category and at least 1 from another category. To complete the Biology Major without a concentration, the five courses must include at least one course from each of the three categories. 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 elsewhere (click here for details). If a student completes courses which make her eligible for more than one of the four majors then she may select which one is reflected on her transcript.

Cell & Molecular Biology:

- BIOL BC2278 Evolution
- BIOL BC3308 Genomics and Bioinformatics
- BIOL BC3310 Cell Biology
- BIOL BC3320 Microbiology
- BIOL BC3352 Development
- BIOL BC3362 Molecular and Cellular Neuroscience
- CHEM BC3282 Biochemistry I
- BIOL W3034 Biotechnology
- BIOL W3073 Cellular and Molecular Immunology
- BIOL W3310 Virology
The four majors are summarized in the following Table:

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Three upper-level laboratory courses
Students may take any upper-level Biology lab courses for which they meet the pre- or co-requisite. A year long research-seminar course may substitute for lab courses, as described below. Students may also take laboratory courses at Columbia (or other institutions) to satisfy the lab requirement, with permission from the department chair.

Guided Research and Seminar
Enrollment in the year long sequence of Guided Research and Seminar (BIOL BC3591x, 3592y) fulfills two upper-level labs. The courses are only available as a Fall-Spring sequence.

Senior Capstone Experience
Students complete the Senior Capstone Experience with either of the following two options:

- One semester of Senior Seminar BIOL BC3595
- The year-long Senior Thesis Research and Seminar (BIOL BC3592x, 3593y)

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).
The Old Biology Major

(For students in the classes of 2016, 2017, 2018 choosing to continue with their current major)

Introductory Biology:

Students must complete the 1500-level introductory sequence, which consists of

BIOL BC1500x Introduction to Organismal and Evolutionary Biology
BIOL BC1501x Introductory Lab in Organismal and Evolutionary Biology
BIOL BC1502y Introduction to Cell and Molecular Biology
BIOL BC1503y Introductory Lab in Cell and Molecular Biology

Genetics:

Students must complete BIOL BC2100 Molecular and Mendelian Genetics. It is recommended, but not required, that this course be taken immediately after completing the 1500-level introductory sequence

Five Additional Lecture Courses:

One course must be at the physiological level of organization

BIOL BC3360 Animal Physiology OR
BIOL BC3320 Microbiology OR
BIOL BC3367 Ecophysiology

A second course must be at the ecological or evolutionary level of organization

BIOL BC2278 Evolution OR
BIOL BC2272 Ecology OR
BIOL BC3280 Applied Ecology and Evolution OR
BIOL BC2240 Plant Evolution and Diversity OR
BIOL BC3388 Tropical Ecology

Three additional lecture courses (beyond the 2100 level) may be selected from the menu of Barnard Biology courses. Another option is to take courses offered by the Department of Biological Sciences or Department of Ecology, Evolution, and Environmental Biology at Columbia. Speak with your Biology advisor for details about which Columbia courses are suitable.

For a list of courses offered at Columbia click here.

Three Upper-Level Laboratory Courses:

These upper-level laboratory courses will each have an associated lecture course as a co- or pre-requisite (see Barnard catalog for details). You may also use laboratory
courses at Columbia (or other institutions) to satisfy the lab requirement, with permission from the department chair.

**Research Option:**

A student may do research in lieu of one upper-level laboratory course. To this end, a student would need to take two consecutive semesters of Guided Research and Seminar (BIOL BC3591x and BIOL BC3592y).

**Senior Seminar or Individual Research:**

Students must complete a Senior Seminar (BC 3590) or two semesters of Senior Thesis Research (BIOL BC3593x + 3594y). A student cannot take (a) Senior Thesis Research and (b) Guided Research and Seminar at the same time.

**Chemistry Requirement:**

One semester of General Chemistry (with laboratory) and one semester of Organic Chemistry (with laboratory) are required.