



**First-Year
Planning Guide
Biological Sciences Majors
2017-2018**

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216 Stimson Hall**

VISIT www.biology.cornell.edu/advising for advising walk-in hours with an OUB advisor or schedule an appointment through AdviseStream.

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WELCOME to the Biological Sciences major! This guide has been developed to help you choose classes for your first year and answer many of your questions. Your Student Advisor will also be an invaluable resource for helping you develop an appropriate course load and navigate your first semester at Cornell.

Requirements For The Biological Sciences Major

Requirements for the Biological Sciences Major include courses in biology, chemistry, physics and mathematics and are clearly outlined in the [Courses of Study](#).

Things to Consider When Choosing Your First-Semester Classes:

- AP Biology does not fulfill any requirements for the Biological Sciences major, however you can receive academic (college) credit.
- Take no more than 5 courses or 16 academic credits.
- Be certain that your schedule includes courses that interest you.
- The curriculum is flexible! Don't be concerned if an introductory biology course doesn't fit in your schedule for the fall – it will be offered again in the spring semester.
- Some students may elect to postpone taking biology to the second semester, or chemistry to their sophomore year.
- Consider enrolling in a support class for CHEM 2070 ([CHEM 1007](#) and/or [CHEM 1070](#)) or MATH 1110 ([MATH 1011](#))

Choosing First-Semester Courses

Follow the steps below when planning your schedule. **Introductory bio courses are offered every semester and can be taken in any order.**

Prefix Key:

BIOEE: Ecology and Evolutionary Biology

BIOG: General Biology

BIOMG: Molecular Biology and Genetics

BIOSM: Shoals Marine Lab

BTRY: Biometry and Statistics

STSCI: Statistical Sciences

1. **Introductory Biology Cluster**

- Choose 2 of the 3 subject areas listed below that you find particularly interesting. **Enroll in at least one of these courses your freshman year and make sure to complete the second by the end of sophomore year.** For Biological Sciences majors, any two courses and the lab satisfy the prerequisites for medical school.
 - [BIOMG 1350](#), Introductory Biology: Cell & Developmental Biology (3 credits)
 - [BIOG 1440](#) Introductory Biology: Comparative Physiology (3 credits) **or** [BIOG 1445](#), Introduction to Comparative Anatomy and Physiology, Individualized Instruction (4 credits). BIOG 1445 includes dissection labs.

- [BIOEE 1610](#), Introductory Biology: Ecology & the Environment (3 credits) **or** [BIOSM 1610](#), Ecology and Marine Environment
 - [BIOG1500/BIOSM 1500](#), Investigative Biology Laboratory (2 credits; **Required**):
Decide if you want to take BIOG 1500 in the fall, spring or summer (if you are taking chemistry, decide if you are prepared to take 2 lab courses in your first semester). **BIOG 1500 should be completed by the end of first semester sophomore year.**
2. [BIOEE 1780](#), An Introduction to Evolutionary Biology and Diversity (4-5 credits; **Required; complete in freshman or sophomore year**). The 5-credit option includes a writing intensive section. [BIOSM 1780](#), Evolution and Marine Diversity, is offered at Shoals Marine Laboratory and will also fulfill the evolution requirement.
 3. **General Chemistry**
Most biology majors take chemistry in their first year because it prepares them for upper level courses. However, chemistry can be postponed until sophomore year if time is needed to adjust to Cornell's academic rigor before taking 2 sciences in the same semester. As you make this decision, recognize that general chemistry ([CHEM 2070](#) or [CHEM 2150](#), both 4 credits) is a prerequisite for organic chemistry, which is a prerequisite for biochemistry. In turn, biochemistry is a prerequisite for some upper level biology classes. Only students who LOVE chemistry and have an AP score of 5 in chemistry should take CHEM 2150.
 4. **First-Year Writing Seminar (FWS)**
Complete the ballot for the First-Year Writing Seminar using the following link: <http://knight.as.cornell.edu/fws-ballot>. Please complete this in your freshman or sophomore year since juniors and seniors are not allowed to enroll in a FWS. AP credit policies for testing out of an FWS vary by college. A&S students need an AP score of 5 to test out of one FWS, while in CALS students can earn a 4 or 5 and can test out of two FWS. CALS students can use an FWS to fulfill the college writing requirement, but they can also use other writing intensive courses as well that are identified on CALS DUST.
 5. **Additional Courses to Consider**
Consider taking a course in mathematics, statistics, or an elective:
 - Mathematics: [MATH 1110](#) (Calculus I, 4 credits, fall or spring) or [MATH 1120](#) (Calculus II, 4 credits, fall or spring)
 - or**
 - [MATH 1105](#) (Finite Math, 3 credits, fall)
 - or**
 - Statistics: [STSCI 2150](#) (fall and spring), [MATH 1710](#) (4 credits; fall, spring, summer), [AEM 2100](#) (4 credits, fall), or [BTRY 3010/NTRES 3130](#) (4 credits; fall; prerequisite of Calculus I). Visit <http://www.math.cornell.edu/Courses/FSM/index.html> for more information.
 - or**
 - Elective (such as sociology, psychology or history) or a foreign language.

6. Physical Education (PE)

Two PE courses are required for graduation and students are encouraged to complete this requirement in their freshman year. For information about the PE requirement, university swim test requirement, and PE courses offered this fall, please see the Physical Education website at: <http://pe.cornell.edu/classes/> . You can register for many PE classes online during pre-enrollment time.

7. Check your schedule to make sure you have no more than 4-5 courses or 16 academic credits (not including PE).
8. Pre-med/vet/dent students should visit <http://www.career.cornell.edu/resources/additional-ccs-guides.cfm> for more information about completing course requirements for professional school.

Sample Schedules

The majority of students who plan to major in the Biological Sciences take biology cluster lectures or evolution, chemistry, mathematics/elective, a First-Year Writing Seminar, and two PE classes during their first year. Their 4-year plan might look like the following:

Typical Freshman Schedule

	Fall	Spring	Notes:
1st Year	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) General Chemistry (4 cr.) Math (3-4 cr.)* FWS PE	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) General Chemistry (4 cr.) Math (3-4 cr.)* FWS PE	**13-18 credits to fulfill Concentration requirements can be taken in the sophomore, junior, and senior year
2nd Year	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) Organic Chemistry (3 cr.) **	Organic Chemistry (3 cr.) **	Genetics lecture and lab can be taken in the sophomore and junior year. It is not recommended to take Genetics during the senior year.
3rd Year	Biochemistry (3-4 cr.) Physics (4 cr.) **	Biochemistry (2-4 cr.) Physics (4 cr.) **	
4th Year	**	**	

*Please note that Math is easily deferred until sophomore year. Calculus should be taken before physics.

Advantages of taking this "typical" schedule

- You gain a realistic preview of the demands of the biology major
- You gain flexibility in later years because you will meet the prerequisites for upper-level courses as early as possible
- If you're thinking about doing research in a professor's lab, you may be eligible for a spot earlier since you will have a college background in introductory biology and chemistry

Deferring Math, Biology or Chemistry

Do I have to take Biology, Chemistry, and Math during my freshman year?

No! Deferring, biology, chemistry or math may be a good option for students who want to build their confidence in the sciences, or for students who want to try out classes in the major, or use their AP credit. Choosing a deferred schedule helps to lighten your course load as you adjust to college life and shifts a heavier course load to a later semester after you become an "experienced" Cornell student, making room in your freshman schedule for exploring electives or completing a language which can make your schedule more diverse.

Deferring Math

Math can easily be deferred because it is not a prerequisite for most biology courses except for upper level Concentration courses in Computational Biology and Biochemistry.

Schedule for Deferring Math

	Fall	Spring	Notes:
1st Year	Bio Cluster/Evolution (3-5cr.) BIOG 1500 Lab (2 cr.) General Chemistry (4 cr.) FWS Elective or language PE	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) General Chemistry (4 cr.) FWS Elective or language PE	**13-18 credits to fulfill Concentration requirements can be taken in the sophomore, junior and senior year
2nd Year	Bio Cluster/Evolution (3-6 cr.) BIOG 1500 Lab (2 cr.) Organic Chemistry (3 cr.) Math* (3-4 cr.) **	Organic Chemistry (3 cr.) Math* (3-4 cr.) **	Genetics lecture and lab can be taken in the sophomore and junior year. It is not recommended to take Genetics during the senior year.
3rd Year	Biochemistry (3-4 cr.) Physics (4 cr.) **	Biochemistry (2-4 cr.) Physics (4 cr.) **	
4th Year	**	**	

*Calculus should be taken before physics.

Advantages of Deferring Math

- Can start an introductory math sequence in the spring, if desired

Disadvantages

- Math skills may be needed for other coursework
- Confidence in math skills may diminish over this time period

Deferring General Chemistry

Some students decide to try out the biology major by taking a biology course before taking chemistry, so they defer general chemistry until their sophomore year.

Schedule for Deferring General Chemistry to Sophomore Year

	Fall	Spring	Notes:
1st Year	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) Math (3-4 cr.)* FWS Elective or language PE	Bio Cluster/Evolution (3-5 cr.) BIOG 1500 Lab (2 cr.) Math (3-4 cr.)* FWS Elective or language PE	**13-18 credits to fulfill Concentration requirements can be taken in the sophomore, junior and senior year
2nd Year	Bio Cluster/Evolution (3-5cr.) BIOG 1500 Lab (2 cr.) General Chemistry (4 cr.) **	General Chemistry (4 cr.) **	Genetics lecture and lab can be taken in the sophomore and junior year. It is not recommended to take Genetics during the senior year.
3rd Year	Organic Chemistry (3 cr.) **	Organic Chemistry (3 cr.) **	
4th Year	Biochemistry (3-4 cr.) Physics (4 cr.)+ **	Biochemistry (2-4 cr.) Physics (4 cr.)+ **	

*Calculus should be taken before physics.

+Physics may be taken with organic chemistry; discuss this option with an advisor.

Advantages of Deferring Chemistry (freshman schedule includes biology and math)

- Taking biology in the first year provides an opportunity to confirm your interest in pursuing the biology major
- Taking intro biology courses in the first year means you have more time to accommodate Concentration courses that are only offered every other year

Disadvantages

- Delays knowledge of chemistry ability at the college level
- Delays when you can take organic chemistry and biochemistry

Deferring Introductory Biology

Schedule for Deferring Biology to Second Semester Freshman Year

	Fall	Spring	Notes:
1st Year	General Chemistry (4 cr.) Math (3-4 cr.)* FWS Elective or language	General Chemistry (4 cr.) Math (3-4 cr.)* FWS Bio Cluster/Evolution (3-5cr.) BIOG 1500 Lab (2 cr.)	**13-18 credits to fulfill Concentration requirements can be taken in the sophomore, junior and senior year
2nd Year	Bio Cluster/Evolution (3-5 cr.) Organic Chemistry (3 cr.) BIOG 1500 Lab (2 cr.) **	Bio Cluster/Evolution (3-6 cr.) Organic Chemistry (3 cr.) **	Genetics lecture and lab can be taken in the sophomore and junior year. It is not recommended to take Genetics during the senior year.
3rd Year	Biochemistry (3-4 cr.) Physics (4 cr.) **	Biochemistry (2-4 cr.) Physics (4 cr.) **	
4th Year	**	**	

*Calculus should be taken before physics.

Advantages of Deferring Biology until second semester freshman year:

- Taking chemistry in the first year allows the earliest possible completion of chemistry course sequences (general and organic) that are prerequisites to biochemistry and some other upper-level biology courses

Disadvantages:

- Leads to the possibility of becoming discouraged about being a biology major because special-interest course is not in schedule
- Provides less time for determining choice of Concentration within major

*If you decide to delay biology or chemistry, you need to think carefully about which [Concentration](#) within the major you may pursue in the future. This may help you decide which course to defer. Feel free to contact an advisor in the Office of Undergraduate Biology (216 Stimson Hall) for guidance.

Visit the Courses of Study 2017-2018 for more information regarding the [Biological Sciences Major](#).

Bio 1250 Biology Seminar

This course is a 1-2 credit, S/U* course targeting first-year students. It is offered in multiple sections (the prefix designates departmental affiliation – e.g. NB: Neurobiology & Behavior) that vary in topic and scheduled meeting time. The course gives students the opportunity to get to know a scientist, read and discuss scientific papers, work in a team setting, and get a feel for the biology major.

*“S” means a passing grade of C- or above; “U” means D+, D, D- all of which are considered failing

1. BIOG 1250: Understanding Social Evolution: A Brief Introduction to Investigating Animal Behavior 1 cr., 1 cr., S/U, meets Thursdays, August 31-October 12; 10:10 AM-12:05 PM; Corson-Mudd Hall; Dr. Gavin M. Leighton

Central to evolution of life are the behaviors organisms perform so as to acquire fitness and survive in their environment. One critical component of behaviors are social behaviors, and specifically cooperative behaviors that allow groups to flourish. In this course we will explore preliminary topics in evolution and behavior, and then conduct a small-scale experiment on two species of ants.

Students in the course will be exposed to designing experiments in animal behavior, conducting an experiment, and carrying out analysis. This course is intended to introduce you to the method of studying animal behavior, and reporting on results. You will therefore begin to establish important methodological foundations in the biological sciences. The ultimate goal is to show students the scientific method from start to finish on a small scale, so that they may scale this up in research opportunities at Cornell University in the future.

2. BIOG 1250: Birds Can Tell Us Things and We Should Listen: An Introduction to Ornithology and Bird Study Techniques – 1 cr., S/U, meets Thursdays, August 31 – October 12, 1:25-3:20PM; Cornell Lab of Ornithology, Johnson Center for Birds and Biodiversity, (shuttle service to/from campus is available at no charge); Dr. Ron Rohrbaugh

Unlike most mammals that rely on a keen sense of smell, birds, like humans, use sounds and vivid color vision to survive and communicate with each other. Did you know that the sound frequency range of bird song is nearly identical to the range of human hearing? Birds have a lot to tell us, if we know what questions to ask. By using the principles of scientific inquiry to observe and listen to birds, we learn not only about birds, but about ecology, animal behavior, evolution, physics, and potential environmental threats to our planet. Using a multi-disciplinary approach, including bioacoustics, capture and sampling methods, genetics, citizen science, and conservation biology; this course will teach the fundamentals of ornithology and field techniques for studying birds. The seven, two-hour sessions will combine hands-on field and lab exercises

with group discussions about critical thinking and the importance of framing a working scientific question. Bring your boots and binoculars and prepare to have some birding fun!

Is there room for an elective in my freshman schedule?

If you decide to defer a science or math course, or if you have AP credit, you will have space in your schedule for an elective or a language class. Most 1000-level classes are usually open to everyone, with no pre-requisites necessary. Most 2000-level classes are also open to everyone, but usually they are a bit more advanced in topic or course content. Many 3000 and 4000-level classes have pre-requisites listed that should be taken before entering the class. These pre-requisites are not to keep certain students out, rather they provide guidelines for helping students recognize the base knowledge necessary to be successful in the class. There are exceptions to these 1000, 2000, 3000, 4000 ‘rules’; students without prerequisite courses can check with course instructors about eligibility. In selecting an elective, you should always choose a back-up alternate course in case you are blocked out of your first choice.

What if I’m Pre-med?

The Biological Sciences major offers the courses and competencies in biology, biochemistry, general chemistry, organic chemistry, physics, calculus, and statistics required for admission to all medical schools. The major also helps students develop analysis and reasoning skills.

In addition to courses in the biology major, premed students should take two writing classes plus courses in the social sciences. Students should consult with a premed advisor when choosing Sociology, Development Sociology, Human Development and Psychology courses.

Please visit <http://www.career.cornell.edu/resources/additional-ccs-guides.cfm> for more information

I have checked my schedule and it includes:

- ✓ At least one course that I find extremely interesting
- ✓ One introductory biology class (either BIOMG 1350 or BIOG 1440/BIOG 1445 or BIOG 1500 or BIOEE 1610 or BIOEE 1780)
- ✓ Chemistry or Math or an Elective or a Language
- ✓ A First-Year Writing Seminar
- ✓ 4-5 courses
- ✓ A minimum of 12 academic credits but no more than 16 academic credits
- ✓ PE

Academic Support Resources

Many academic support resources can be found outside of class which include:

- Attending office hours that are held weekly by professors and TAs .
- Attending a Study Group or an Active Learning Seminar; more information about these resources will be provided through the course.
- Studying with friends.
- Making an appointment to meet with a [Student Advisor](#) who provides tutoring in specific courses.
- Utilizing resources in the [Learning Strategies Center](#) (LSC) including supplement courses.

Frequently Asked Questions

Q: I'm really excited about research, how do I go about finding research opportunities?

A: Adjusting to college life is a full time job, so students are strongly encouraged to wait one semester or one year before beginning research. When you feel ready to work in a lab, browse the OUB's online list of [research opportunities](#) for the many ways you can get involved in research. The searchable [research faculty database](#) will provide ideas on the kind of research being done by Cornell faculty. Also, talk with your academic advisor who may know of labs that match your interests. Colleen Kearns, Associate Director of Undergraduate Research, is an excellent resource for learning more about undergraduate research opportunities. Visit Colleen during her office hours or schedule an appointment.

Q: I don't know if I want to study Biology yet. Should I be worried?

A: The short answer is no. College is a time to explore different interests, passions, and beliefs. It's better to explore and find out what areas intrigue you than to feel pressured into studying something that doesn't excite you. Arts & Sciences students will have until the end of their sophomore year to declare a major, so don't feel rushed, just don't wait too long. The requirements for the biology major need to be spread out over a few years.

Q: My high school didn't offer biology AP courses. Will this put me at a disadvantage?

A: No, there is no evidence that students with AP biology credit do better than those with high school biology.

Q: Cornell is such a big place. Who will be there to help me if I start falling behind?

A: The first step to keeping up is to stay on top of all the assigned reading for the course and go to all the lectures. It is also helpful to use a planner and map out the days and times you have prelims, quizzes and papers due. You should attend the professor's office hours, since this is one of the most useful, but underused resources and a great opportunity for getting to know a faculty member. TAs also offer weekly office hours. Supplemental courses are offered once a week to review recent material and complement large lecture courses like chemistry and math. Also, you can always seek out a Student Advisor tutor, form a study group with classmates, or talk with your faculty advisor.

Q: *Will I ever get to know the professors in my big introductory courses?*

A: Yes, but you have to be proactive. Professors enjoy talking with students, and can be great resources for you down the road. **It's your responsibility to go to office hours, email your professors, and approach them after class.** Besides answering course material-related questions, professors can also help you gain insight into possible research opportunities or career options.

Q: *I already pre-enrolled for courses, but I'm not sure if I made the right choices. What should I do?*

A: Don't worry, you can add and drop courses throughout the first few weeks of each semester during the add/drop period. This enables you to "shop around".

Prepare for Pre-enrollment: July 10-18, 2017

Use the information on the Class Roster at <https://classes.cornell.edu/browse/roster/FA17> to select interesting courses. You can map out your schedule using the Scheduler feature. During pre-enrollment (July 10-18, 2017), follow the directions at the Student Center (<https://studentcenter.cornell.edu>) to pre-enroll in your fall 2017 classes.

Advisor Assignments

Freshmen majoring in the Biological Sciences will be receiving an email from the Office of Undergraduate Biology that identifies the names of both their faculty and student advisor. **Student Advisors (SAs) will be contacting their advisees** at the beginning of July and will be able to answer many pertinent questions. Students are also encouraged to call the Office of Undergraduate Biology at 607-255-5233 if they need further assistance.

Biology advisors look forward to meeting freshmen during Orientation at the advising meeting on Monday, August 21st at 9:30 AM in Call Auditorium, Kennedy Hall (please get there early to find your seat!). Your Student Advisor will contact you in early August with your seating assignment.

