First-Year Planning Guide
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WELCOME to the Biological Sciences major! As you prepare to enter your first year at Cornell, picking out a schedule for the upcoming year can feel a bit daunting. This guide has been developed to help you plan your first year schedule and answer some of your questions.
Requirements for the Biological Sciences Major

The following courses are required of all biology majors and must be **taken for a letter grade**. The Introductory Biology Cluster and BIOEE 1780/BIOSM 1780 should be completed by the end of sophomore year.

Introductory Biology Cluster (Take the lab and 1-2 lecture courses in your freshman year)

__ Investigative Lab: __Investigative Laboratory (BIOG 1500 or BIOSM 1500)

__Choose 2 of the 3 lecture courses:__

- Introductory Biology: Comparative Physiology (BIOG 1440) or Introductory Biology: Comparative Physiology, Individualized Instruction (BIOG 1445)

- Introductory Biology: Principles of Cell & Developmental Biology (BIOMG 1350)

- Introductory Biology: Ecology & the Environment (BIOEE 1610) OR Ecology and the Marine Environment (BIOSM 1610)

Core Biology Courses (evolution should be taken freshman or sophomore year)

__ Evolutionary Biology and Diversity: __BIOEE 1780 or BIOSM 1780

__Biochemistry (4 options):__

- BIOMG 3300; BIOMG 3310-3320; BIOMG 3330 (summer); or BIOMG 3350

__Genetics & Genomics:__

- BIOMG 2800 (Lecture) + BIOMG 2801 (Lab)

Biology Concentration Classes
13-21 credits, taken in sophomore, junior, and/or senior year.

Math and Physical Sciences

__Mathematics:__

- One semester of calculus (MATH 1106 or 1110) + 2nd Math (Statistics, CALC II or Finite Math)

__General Chemistry:__

- CHEM 2070-2080 or CHEM 2150

__Organic Chemistry (3 options):__

- CHEM 3530 (fall only) or CHEM 1570 (spring only) or CHEM 3570-3580 or CHEM 3590-3600

__Physics:__

- PHYS 1101-1102 or PHYS 2207-2208
How do I choose courses for my first semester?

Choose courses that interest you! Your schedule should always include at least one course that you are excited about. The Biological Sciences major offers great versatility since the introductory courses do not have to be taken in sequence; if you don’t get into your top choice in the fall, you can take the course in the spring semester. Below are some basic guidelines and possible schedules that include the main requirements for the biology major.

Guidelines for Planning a First Semester Schedule

- **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 a biology course doesn’t fit in your schedule for the fall – it’ll 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.
- Small peer-led study groups or active learning sessions are offered for BIOG 1440, BIOG 1445, and BIOMG 1350.

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.

1. **Introductory Biology Cluster**
   - Choose 2 of the 3 courses 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 requirement for application to medical school.
     - BIOMG 1350, Introductory Biology: Cell & Developmental Biology (3 credits)
     - BIOG 1440, Introductory Biology: Comparative Physiology (3 credits) OR BIOG 1445, Introductory Biology: Comparative Physiology, Individualized Instruction (4 credits).
     - BIOEE 1610 Introductory Biology: Ecology & the Environment (3 credits) OR BIOSM 1610.
- BIOG 1500 Investigative Biology Laboratory (2 credits; Required): Decide if you want to take BIOG 1500 in the fall or spring (if you are taking chemistry, decide if you are prepared to take 2 lab courses in your first semester).

2. BIOEE 1780 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 the 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 other upper level biology classes.

4. First-Year Writing Seminar
Complete the ballot for the First-Year Writing Seminar (FWS) using the following link: [http://www.arts.cornell.edu/knight_institute/index.htm](http://www.arts.cornell.edu/knight_institute/index.htm)

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 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), ILRST/STSCI 2100 (4 credits; fall, spring, summer), or BTRY 3010/NTRES 3130 (4 credits; fall; prerequisite of Calculus I)
- OR
  - Elective (such as sociology, psychology or history) or a foreign language. See page 19 for more options.

6. Physical Education (PE)

7. Check your schedule and make sure you have no more than 4-5 courses or 16 academic credits (not including PE)

8. Premed/vet/dent students should visit [http://www.career.cornell.edu/resources/additional-ccs-guides.cfm](http://www.career.cornell.edu/resources/additional-ccs-guides.cfm) for more information about completing course requirements for professional school.
Sample Schedules and Deferring Options

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

Typical Freshman Schedule

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<th>Fall</th>
<th>Spring</th>
<th>Notes:</th>
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<tbody>
<tr>
<td>1st Year</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
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<td>13-21 credits to fulfill Concentration</td>
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<tr>
<td></td>
<td>General Chemistry (4 cr.)</td>
<td>General Chemistry (4 cr.)</td>
<td>requirements can be taken in the sophomore,</td>
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<td>Math (3-4 cr.)*</td>
<td>Math (3-4 cr.)*</td>
<td>junior, and senior year</td>
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<td>FWS</td>
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<td>PE</td>
<td>PE</td>
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<tr>
<td>2nd Year</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>Organic Chemistry (3-5cr.)</td>
<td>Genetics lecture and lab can be taken in the</td>
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<td>Organic Chemistry (3-5 cr.)</td>
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<td>sophomore and junior year</td>
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<td>3rd Year</td>
<td>Biochemistry (3-4 cr.)</td>
<td>Biochemistry (2-4 cr.)</td>
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<td>Physics (4 cr.)</td>
<td>Physics (4 cr.)</td>
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<td>4th Year</td>
<td>Concentration</td>
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*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’ll be eligible for a spot earlier.

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

Not all Biology Majors take Biology, Chemistry, Math, a First-Year Writing Seminar, and PE during the first year. For some, this is because they have AP credit for required courses, but for others it is because they would like to defer one of these classes until a later year. So, some of you, you might ask yourself… “Do I defer Biology, Chemistry, or Math?”

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

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<th>Fall</th>
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<td>1st Year</td>
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<td></td>
<td>General Chemistry (4 cr.)</td>
<td>General Chemistry (4 cr.)</td>
<td>requirements can be taken in the</td>
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<td>FWS</td>
<td>FWS</td>
<td>sophomore, junior and senior year</td>
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<td>Elective or language</td>
<td>Elective or language</td>
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<td>PE</td>
<td>PE</td>
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</tr>
<tr>
<td>2nd Year</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>Organic Chemistry (3-5 cr.)</td>
<td>Genetics lecture and lab can be</td>
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<td></td>
<td>Organic Chemistry (3-5 cr.)</td>
<td>Math* (3-4 cr.)</td>
<td>taken in the sophomore and junior year. It</td>
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<td>Math* (3-4 cr.)</td>
<td></td>
<td>is not recommended to take Genetics during</td>
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<tr>
<td>3rd Year</td>
<td>Biochemistry (3-4 cr.)</td>
<td>Biochemistry (2-4 cr.)</td>
<td>the senior year.</td>
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<td></td>
<td>Physics (4 cr.)</td>
<td>Physics (4 cr.)</td>
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<tr>
<td>4th Year</td>
<td>Concentration</td>
<td>Concentration</td>
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*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 tryout the biology major and want to make sure they like biology courses before taking chemistry, so they defer general chemistry until their sophomore year.

Schedule for Deferring General Chemistry to Sophomore Year

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<tr>
<td>1st Year</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>13-21 credits to fulfill Concentration requirements can be taken in the sophomore, junior and senior year</td>
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<td>Math (3-4 cr.)*</td>
<td>Math (3-4 cr.)*</td>
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<td>FWS</td>
<td>FWS</td>
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<td>Elective or language</td>
<td>Elective or language</td>
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<td>PE</td>
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<tr>
<td>2nd Year</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>General Chemistry (4 cr.)</td>
<td>Genetics lecture and lab can be taken in the sophomore and junior year</td>
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<td></td>
<td>General Chemistry (4 cr.)</td>
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<tr>
<td>3rd Year</td>
<td>Organic Chemistry (3-5 cr.)</td>
<td>Organic Chemistry (3-5 cr.)</td>
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<tr>
<td>4th Year</td>
<td>Biochemistry (3-4 cr.)</td>
<td>Biochemistry (2-4 cr.)</td>
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<tr>
<td></td>
<td>Physics (4 cr.)**</td>
<td>Physics (4 cr.)**</td>
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*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 a 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

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<th>Spring</th>
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<tr>
<td><strong>1st Year</strong></td>
<td>General Chemistry (4 cr.)</td>
<td>General Chemistry (4 cr.)</td>
<td>13-21 credits to fulfill Concentration requirements can be taken in the sophomore, junior and senior year</td>
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<tr>
<td></td>
<td>Math (3-4 cr.)*</td>
<td>Math (3-4 cr.)*</td>
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<td>FWS</td>
<td>FWS</td>
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<td></td>
<td>Elective or language</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
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<tr>
<td><strong>2nd Year</strong></td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>Bio Cluster/Evolution (3-6 cr.)</td>
<td>Genetics lecture and lab can be taken in the sophomore and junior year. It is not recommended to take Genetics during the senior year</td>
</tr>
<tr>
<td></td>
<td>Organic Chemistry (3-5 cr.)</td>
<td>Organic Chemistry (3-5 cr.)</td>
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<tr>
<td><strong>3rd Year</strong></td>
<td>Biochemistry (3-4 cr.)</td>
<td>Biochemistry (2-4 cr.)</td>
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<td></td>
<td>Physics (4 cr.)</td>
<td>Physics (4 cr.)</td>
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<td><strong>4th Year</strong></td>
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*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 ([http://biology.cornell.edu/academics/major](http://biology.cornell.edu/academics/major)) 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.

For information regarding the Biology Major and its core requirements for completion, visit ([http://courses.cornell.edu/preview_program.php?catoid=22&poid=10801](http://courses.cornell.edu/preview_program.php?catoid=22&poid=10801)) on the web.
Some students take courses in the summer to lighten their load during the academic year. Remember, most intro bio courses are offered each summer.

Summer School as a Way of Balancing Your Schedule

**Advantages**
- Allows for completion of prerequisites for major or Concentration
- Allows pre-med biology majors to take MCAT exam in the spring of their junior year because required coursework can be completed by then
- Allows better balance of science and non-science courses in sophomore, junior, and senior years
- Makes possible the selection of more advanced biology electives in undergraduate schedule
- Makes possible the option of doing undergraduate research for credit before graduation

**Disadvantages**
- Increases cost of education
- Reduces options for earning money during the summer
- May lead to burn out due to lack of break between semesters
What Bio courses should I take in my first semester?

A first-semester schedule could include between 2 and 6 credits of intro biology. You need to decide how many credits are best for you, based on your interest and preparation. Bio courses that fulfill requirements for the major and are appropriate for a first semester schedule include: BIOG 1500 (2 cr.); BIOEE 1780 (4-5cr.); BIOMG 1350 (3 cr.); BLOG 1440 (3 cr.) OR BLOG 1445 (4 cr.); and BIOEE 1610 (3-4 cr.). Descriptions for these courses are listed below. Times, sections, and course ID numbers can be found online on the Course and Time Roster.

BIOG 1500, Investigative Lab (2 credits): Designed for biology majors to provide lab experience with emphasis on processes of scientific investigations and to promote collaboration, communication and literacy in science. Students gain expertise in methods including instrumentation used by biologists to construct new knowledge. Lab topics include physiology, genetics, evolution, ecology, biochemistry, and molecular biology.
- Course ID 3954; Lectures on Tuesdays, 9:05-9:55AM;
- Visit https://classes.cornell.edu/browse/roster/FA15/class/BIOG/1500 to find lab times

BIOMG 1350, Introductory Biology: Principles of Cell and Developmental Biology (3 credits): This course introduces molecular mechanisms by which cells behave, divide and grow as individuals, how they organize during embryonic development to form functional tissues and organs in multi-cellular organisms, and how their misbehavior contributes to disease. For more information on the course visit http://courses.cit.cornell.edu/biomg1350/
- Course ID 3956; Lectures on Mondays and Wednesdays, 12:20-1:10PM
- Visit https://classes.cornell.edu/browse/roster/FA15/class/BIOMG/1350 for mandatory section times

BLOG 1440, Introductory Biology: Introduction to Comparative Physiology (3 credits): An introductory physiology course intended for freshmen and sophomore biology majors. The course integrates physiology from the cell to the organism with comparisons among animals, plants and microbes. Emphasis is on understanding the basic physiological concepts, stressing structure-function relationships and underlying physio-chemical mechanisms.
- Course ID 3955; Lectures on Mondays and Wednesdays from 9:05-9:55AM
- Visit https://classes.cornell.edu/browse/roster/FA15/class/BLOG/1440 for mandatory section times
BIOG 1445, Introductory Biology: Comparative Physiology, Individualized Instruction (4 credits): Designed primarily for freshman and sophomore biology majors who desire an introduction to concepts of physiology. The course focuses on the understanding of how different biological organisms (animals, plants, microbes) perform common physiological functions. Because some study and testing involves the use of preserved specimens, students who object to dissections should pursue other course options. The course is based on individualized instruction and offers flexibility in scheduling. Completion of the course requires mastery of a set of core units. Testing is primarily by oral examination. Students who elect to take the course must be able to meet deadlines. Four formal laboratory sessions are offered with additional laboratory work incorporated into the core units.

There is forbidden overlap between BIOG 1445 and BIOG 1440.
- Course ID 4708; lecture Tuesdays, 9:05AM-9:55AM or Tuesdays 7:30-8:20PM. First organizational meeting Tuesday, August 25, 2015; 9:05 AM for section 001 and 7:30 PM for section 002. No admittance after the first week.

BIOEE 1610, Introductory Biology: Ecology and the Environment (3 or 4 credits): This course provides an introduction to ecology, covering interactions between organisms and the environment at scales of populations, communities, and ecosystems. Ecological principles are used to explore the theory and applications of major issues facing humanity in the 21st century, including population dynamics, disease ecology, biodiversity and invasive species, global change, and other topics of environmental sustainability.
- Course ID 1171; Lectures Tuesday and Thursday, 1:25-2:15PM
- Visit https://classes.cornell.edu/browse/roster/FA15/class/BIOEE/1610 for mandatory section times

BIOEE 1780, An Introduction to Evolutionary Biology and Diversity (4 or 5 credits): This course considers explanations for patterns of diversity and the apparent good fit of organisms to the environment. Topics include the diversity of life, the genetics and developmental basis of evolutionary change, processes at the population level, evolution by natural selection, modes of speciation, long-term trends in evolution, and origin of humans.
- Course ID 1181; Lectures on Monday, Wednesday and Friday, 3:35-4:25PM
- Visit https://classes.cornell.edu/browse/roster/FA15/class/BIOEE/1780 for mandatory section times
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


Dr. Jim Shapleigh

The bacterium *Escherichia coli* can either be a harmless commensal or a deadly pathogen. In this class we will explore the molecular mechanisms and evolutionary forces that bring about the remarkable strain diversity found in E. coli and related bacteria.

BIOEE 1250: Birds Can Tell Us Things and We Should Listen: An Introduction to Ornithology and Bird Study Techniques – 1 cr., S/U, meets Thursdays, 1:25-3:20PM, 9/3/15, 9/10/15, 9/17/15, 9/24/15, 10/1/15, 10/8/15, 10/15/15; Cornell Lab of Ornithology, Johnson Center for Birds and Biodiversity, 159 Sapsucker Woods Rd., Ithaca, NY 14850 (shuttle service to/from campus is available at no charge)

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!

Kelee Lynn Pacion, Mann Library and Dr. Mark Sarvary, Investigative Lab

Overview: If you ask a biology related question, where do you go to find the answer? Nearly 500 million people check Wikipedia every month to look for answers, explanations and definitions! The general population might use Wikipedia to make decisions regarding health, informing their personal beliefs, and potentially influence life choices. Did you even wonder whether that information is accurate? This course is co-taught by Kelee Lynn Pacion from Mann library and Mark A. Sarvary from Investigative Biology, to offer you a unique opportunity to enhance your scientific literacy and become an expert in a biology topic of your interest. You will write and edit biology related Wikipedia entries and use Wikipedia as a learning tool to develop stronger critical thinking and information literacy skills. According to Wikipedia, “wikipedians are people who write and edit the pages for Wikipedia.” Would you like to become a wikipedian? If your answer is yes, sign up for this course.


Dr. Susan Villarreal

This course brings together entomology and the media arts to investigate the facts and fallacies of insect use in science fiction and popular culture. From the creature features of the 1950’s to modern day insect monsters, society has been enamored and fearful of 6-legged creatures. Throughout the course students will learn how accurate insect behavior and biology is represented in science fiction movies and TV episodes, and in what conditions might the fallacies depicted become a reality. The course will highlight specific examples of insect biology as well as general themes of how insects are portrayed. We will also explore why insects are so commonly depicted in science fiction and how their portrayal reflects on us as a culture. Course activities include viewing and discussing select movies/television series, lectures and short readings on insect biology, hands on demonstrations of insect biology, and written reflections. The goal of the course is for students to learn some basics of insect biology and behavior, as well as critically reflect on insect portrayal in the media.

BIOEE 1250: Sharks, 1 cr., S/U, meets Tuesdays, 1:45-4 PM, 9/1/15, 9/8/15, 9/15/15, 9/22/15, 9/29/15, 10/6/15, Location: Liddell Laboratory (return transportation provided)

Dr. Willy Bemis

A six-session overview of the diversity, anatomy, ecology, and evolution of sharks and allies. Topics include: 1) the ten extant orders of sharks and their allies with an introduction to North American species; 2) dissection and study of skeletal materials in relation to functional morphology of swimming and feeding; 3) special sensory systems and behavior; 4) reproductive biology and physiology; 5) review of evolutionary relationships of extant taxa based on comparative anatomical and molecular phylogenetic approaches; 6) review tracking studies of the great white shark and other species. Course limited to six freshman or transfer students. Permission of instructor required. Dissection required. Prerequisite: High school biology. Course meets at Liddell Laboratory from 2:00PM to 4:30PM on Tuesday September 2, 9, 16, 23, 30 and October 7. Return transportation from Corson Hall to Liddell Laboratory will be provided.
**BLOG 1250: Cancer and Genomic Instability:** 1 credit, S/U, meets Wednesdays, 2:30-4:25PM  
9/2/15, 9/9/16, 9/16/15, 9/23/15, 9/30/15, 10/7/15, 10/14/15

Dr. Carol Manhart

The purpose of this course is to provide context and understanding of current studies and trends in advancing cancer research. Students will learn how academic cancer research impacts our understandings of diseases and their treatments. This course is designed for students hoping to pursue careers in biology (or for those curious about the practice and progress of modern cancer research) with an emphasis on scientific communication.

**Learning objectives:**
Upon completion of this course you should:
1.) understand genomic instability
2.) be able to explain how basic science is advancing cancer research
3.) be able to search for and discuss relevant literature on a specific topic
4.) be able to engage in discussions on the various topics covered in this course
5.) be able to communicate results of primary research to non-biologists

**BLOG 1250: Climate Change in the 21st Century: What we can learn from quantitative models;**  

Dr. Kirsten Deane-Co

Global climate change is one of the most fundamental environmental issues we face. This course focuses on how we make predictions for plant, animal, and ecosystems responses to changes in global temperature, hydrology, and atmospheric chemistry. We will explore classic and contemporary scientific literature on climate change predictions, engage in climate simulations, and you will be challenged to create your own model to describe how an organism or environmental process will respond to global change.

*See Courses of Study or Office of Undergraduate Biology website ([http://biology.cornell.edu/bio-1250-biology-seminar](http://biology.cornell.edu/bio-1250-biology-seminar)) for additional seminars to be added later.*
What about chemistry? Are there special courses I need for the major?

Cornell offers 2 intro. chemistry courses for bio majors. While most students take CHEM 2070, students with AP credit and a strong interest in chemistry might consider CHEM 2150.

Introductory Chemistry
Biology majors need a lecture with lab, recommended for freshman schedule

CHEM 2070 (fall; 4 credits) /2080 (spring; 4 credits) (Lecture and Laboratory): Typically, biology majors take CHEM 2070/2080 (fall/spring); it is the standard introductory sequence. In this class, fundamental chemical principles are covered with considerable attention given to the quantitative aspects and to the techniques important for further work in chemistry. The laboratory is included within the course, as well as a small discussion section. Students must sign up for a lecture, as well as lab and section. See Course & Time Roster for Section and Laboratory times.

CHEM 2070 is offered:
- Tuesday and Thursday 10:10 – 11:00 AM (Course ID # 5881)
- Tuesday and Thursday 12:20 – 1:10 PM (Course ID # 5882)
- Visit https://classes.cornell.edu/browse/roster/FA15/class/CHEM/2070 to find a section and lab time that fits your schedule

CHEM 2150 (fall; 4 credits, includes Lecture and Laboratory): This course is offered for students with a very strong preparation and very strong interest in chemistry. Students with an AP 5 and a very strong interest in chemistry may take CHEM 2150 (fall), Honors General and Inorganic Chemistry. This is a challenging course. You will not forfeit any AP credit in chemistry by taking CHEM 2150. The course is an intensive systematic study of the laws and concepts of chemistry, with considerable emphasis on quantitative aspects. CHEM 2150 covers electronic structure of atoms, chemical bonding, thermodynamics, kinetics, and equilibrium. 2150 also now serves as an accelerated entry into organic chemistry in the Spring semester for students with a strong background in chemistry. Laboratory work covers qualitative and quantitative analysis, thermodynamics, kinetics transition metal chemistry, and spectroscopic techniques. It should be noted that the biology major requires only the completion of 2150. Cornell University advises medical schools that AP credit, together with completion of Chem 2150, is equivalent of 8 credits of introductory chemistry.

CHEM 2150 is offered:
- Monday, Wednesday, and Friday: 11:15 – 12:05 PM (Course ID # 5895)
- Visit https://classes.cornell.edu/browse/roster/FA15/class/CHEM/2150 for mandatory lab times
How can I use my AP Chemistry Credit?
Students with an AP 5 in Chemistry may earn 4 credits for CHEM 2070. To retain this credit, students can either enroll in CHEM 2080 in the spring, or take CHEM 2150 in the fall. (You will not forfeit any AP credit in chemistry by taking CHEM 2150.)

*Some of this chemistry information was provided by: http://www.chem.cornell.edu/undergrad/index.asp.

Summary of Options:

1. CHEM 2070 & 2080 8 credit hours
2. CHEM 2150 4 credit hours
3. AP 5 & 2080 8 credit hours
4. AP 5 & 2150 8 credit hours
What are the course options for math?

The math selections shown are those that many bio majors take. Once again read the course descriptions and see which course feels right for you.

Mathematics

Biology majors are required to take one semester of calculus plus a second semester math course (statistics is recommended).

MATH 1105 (Fall; 3 credits) /1106 (Spring; 3 credits) (lecture): MATH 1105/1106 is a course sequence used by many biology majors to satisfy the math requirement. MATH 1105 (fall) is a Finite Math course for the Life and Social Sciences – not a pre-calculus course. It is an introduction to linear algebra, probability, and Markov chains, which develop the parts of the theory most relevant for applications. Specific topics include equations of lines, the method of least squares, solutions of linear systems, matrices; basic concepts of probability, permutations, combinations, binomial distribution, mean and variance, and the normal approximation to the binomial. MATH 1106 (spring) is Calculus for the Life and Social Sciences. It serves as an introduction to differential and integral calculus, partial derivatives, and elementary differential equations. These are straight mathematics courses, taught with the philosophy that it is usually better pedagogically to explain the material before attempting to apply it to the sciences. Although the two-semester sequence provides an excellent and useful mathematical experience for many students in biology, it should be emphasized that MATH 1105 is not a pre-requisite for MATH 1106.

MATH 1105 is offered:
- Monday, Wednesday, Friday 1:25-2:15PM (Course ID # 5979)

Students needing a standard pre-calculus course (i.e., one which aims at strengthening the student’s skills in college algebra and trigonometry so that he or she will be in a better position to study calculus) should consider MATH 1101. For a description of these courses, please look online at: http://www.math.cornell.edu/m/Courses/Catalog/lowerlevel

MATH 1110 (First-semester Calculus; 4 credits) /1120 (Second-semester Calculus; 4 credits):
MATH 1110/1120 is a standard two-semester calculus course, with applications given to various fields. Many biology majors take Math 1110. Students who think they may take more than one year of mathematics should definitely start with MATH 1110/1120 or one of its variants. MATH 1110 is offered in the fall and spring. Course topics include functions and graphs, limits and continuity, differentiation and integration of algebraic, trigonometric, inverse trig, logarithmic, and exponential functions; applications of differentiation, including graphing, max-min problems, tangent line approximation, implicit differentiation, and applications to the sciences; the mean value theorem; and derivatives, definite and indefinite integrals, the fundamental theorem of calculus, substitution in integration, and the area under a curve. MATH 1120 is also offered in both the fall and spring semester. The focus of this course is on integration: applications, including volumes, approximate integration with error estimates, improper integrals, and differential equations (separation of variables, initial conditions, systems, some applications). Also covered are infinite sequences and series: definition and tests for convergence, power series, Taylor series with remainder, and parametric equations.
• MATH 1110 is offered at multiple times on different days. Please visit https://classes.cornell.edu/browse/roster/FA15/class/MATH/1110 for times.

• MATH 1120 is offered at multiple times on different days. Please visit https://classes.cornell.edu/browse/roster/FA15/class/MATH/1120 for times.

STSCI 2150 – Introductory Statistics for Biology (Fall and Spring; 4 credits; no Prerequisites; Forbidden Overlap with AP statistics)
This course provides an introduction to data analysis and statistical inference illustrated with biological applications. The computer labs will teach graphical analysis and statistical computation using R, a statistical program. Topics include graphical display, populations and sampling, probability distributions, expectation and variance, estimation, testing, correlation, regression, contingency tables, and the design of experiments. Emphasis is on concepts and the careful modeling of biological data, so that statistical methods are applied properly, pitfalls are avoided, and sound conclusions are reached.

STSCI 2150 Lecture is offered
• Monday, Wednesday and Friday, 2:30-3:20 PM (Course ID# 13129)
• For section/lab times visit: https://classes.cornell.edu/browse/roster/FA15/class/STSCI/2150

What about AP Math Credit?

The following chart from First Steps in Mathematics 2015, http://www.math.cornell.edu/Courses/FSM/index.html, provides basic guidelines on how to use: AP credit, the General Certificate of Education Advanced (“A”) Level Exam (GCE), or the International Baccalaureate Higher Level Exam (IB) credit and appropriate placement. (The GCE exam may not be used to place out of Calculus II unless it is taken in Singapore.)

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<td>A, B, C</td>
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<td>MATH 1120, 1220, 1910, or 2310</td>
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<td>4, 5</td>
<td>Singapore A, B, C</td>
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<td>Calculus I (MATH 1106, 1110) and Calculus II (MATH 1120, 1220, 1910)</td>
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<td>MATH 1920, 2210, 2230, 2130, or 2310</td>
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<td>MATH 1910</td>
<td>4</td>
<td>MATH 1920</td>
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</table>
### Summary of Options:

1. MATH 1110-1120, (MATH 1110, 1910), or equivalent  
   8 credit hours
2. MATH 1105-1106  
   6 credit hours
3. MATH 1110/finite math course  
   7 credit hours
4. MATH 1110/statistics course  
   8 credit hours
5. AP credit for MATH 1110* & second semester calculus  
   8 credit hours
6. AP credit for MATH 1110* & finite math  
   7 credit hours
7. AP credit for MATH 1110* & statistics  
   8 credit hours
8. 4 or 5 on BC exam score (exemption from calculus sequences)  
   8 credit hours

*AP credit for MATH 1110 can come from a 3, 4, or 5 on the AB exam or a 3 on the BC exam.

For more information on other math courses, such as finite math courses and statistics courses that are offered this fall semester, please see the courses of study online at:  
What is a First-Year Writing Seminar?

First-Year Writing Seminars (FWS) help develop coherent, concise, and effective writing. These communication skills are valued by future employers and graduate or professional schools.

First-Year Writing Seminars
Your college requires that each student take a minimum of six credits of written expression

First-Year Writing Seminars (FWS) are 3 credits, and vary in content and theme. FWS selections can be viewed at fws.arts.cornell.edu/ballot, beginning Monday July 2nd. Here you will find information about how to enroll in a writing seminar, and the writing seminars that are offered this fall. You will use this website, between July 8th and July 19th, to electronically submit your choices on a ballot. This should occur after your schedule is finalized (after you know when your classes, laboratories, and sections are meeting). This is usually the last class in which students enroll, and unlike other courses, does not depend on when you submit the ballot (as long as you submit by 11:59 pm on July 19th). CALS students may fulfill their writing requirement by completing a few FWS or other classes listed on the CALS website (http://cals.cornell.edu/academics/registrar/degree-requirements/distribution/).

What if I have AP Credit in English?

- **College of Agriculture and Life Science**: students who score a 4 or 5 on either of the AP English examinations (English Language and Composition, or English Literature and Composition) are awarded three credits for each exam taken and can thus place out of up to two FWS for 3 credits each.
- **College of Arts and Sciences**: students need a score of 5 on either AP English examination to be awarded a maximum of three credits total, and can thus place out of one FWS.
Is there room for an elective in my freshman schedule?

If you do 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, but instead are encouraged so that a student will have the preparation to be successful in the class. There are exceptions to these 1000, 2000, 3000, 4000 ‘rules’, however. In selecting an elective, you should always choose a back-up alternate course in case you are blocked out of your first choice. Below we have listed electives biology majors find fun and worthwhile. All these courses are acceptable for a freshman to take, and some may fulfill your college’s distribution requirements.

**AIS 1100 Introduction to American Indian Studies (3 credits) (Lecture TR 1:25-2:40 PM & section)**
This course provides an interdisciplinary introduction to the diverse cultures, histories and contemporary situations of the Indigenous peoples of North America. Students will also be introduced to important themes in the post-1492 engagement between Indigenous and settler populations in North America and will consider the various and complex ways in which that history affected - and continues to affect - American Indian peoples and societies. Course materials draw on the humanities, social sciences, and expressive arts. Course ID: 1013

**ASTRO 1101/1103 From New Worlds to Black Holes (3/4 credits) (Lecture MWF 11:15 –12:05 PM & section)**
This course introduces students to the physical laws of the cosmos and discusses the nature of time, the birth, evolution, and death of stars, the formation of the chemical elements, and the nature of white dwarfs, neutron stars, and black holes are discussed. An introduction to the theories of special relativity and general relativity is given. The course covers the search for other worlds outside the solar system and the possible existence of life and intelligence elsewhere in the universe. Course ID: 6422

**CLASS 2604 Greek Mythology (3 credits) (TR 2:55-4:10 PM)**
A survey of the Greek myths, with emphasis on the content and significance of the myths in Mediterranean society, including the place of myth in Greek life and consciousness; the factors and influences involved in the creation of myths; and the use of myths for our understanding of Greek literature, religion, and moral and political concepts. Course ID: 6095

**DSOC 1101 Introduction to Sociology (3 credits) (TR 10:10-11:00 AM & section)**
Introduction to theory and research in sociology. Demonstrates how the insights, theories, and methods of sociological analysis can be brought to bear on major issues of social life. A primary goal is to convey a sense of the manner in which sociologists formulate theories and how the collection and analysis of data are used to evaluate those theories. Provides hands-on experience in analyzing sociological issues. Students undertake guided research exercises that involve using computers to analyze actual data. No prior background is presumed; necessary skills are covered in class and section meetings. Course ID: 1227

**EAS 1101 Earth Science in the 21st Century (3 credits) (TR 1:25-2:40 PM)**
Provides a basic understanding of earth processes, emphasizing those critical to humans in the 21st century and beyond. Designed for non-science majors. Topics include energy, water resources, natural hazards (earthquakes, tsunamis, volcanoes, landslides, floods, delta subsidence), coastal processes, river systems, climate change, and mountain building among others. Current events relating to the earth are highlighted and difficult choices facing society discussed. The course develops an appreciation for the Earth, its history and how it works. Course ID: 11440

**ECON 1110 Introductory Microeconomics (3 credits) (MW 9:05-9:55 AM & section OR TR 9:05-9:55 AM & section)**
Explanation and evaluation of how the price system operates in determining what goods are produced, how goods are produced, who receives income, and how the price system is modified and influenced by private organizations and government policy. Course ID: 5745/5761
ECON 1120 Introductory Macroeconomics (3 credits) (TR 10:10-11:00 AM & section)
Analysis of aggregate economic activity in relation to the level, stability, and growth of national income is covered. Topics discussed may include the determination and effects of unemployment, inflation, balance of payments, deficits, and economic development, and how these may be influenced by monetary, fiscal, and other policies. Course ID: 5776

FDSC 1101 Science and Technology of Foods (1 credit) (T 1:25-2:15 PM)
This course explores the application of science and technology to foods. Lectures will elucidate the role of engineering, biotechnology, chemistry, biochemistry, nutrition, toxicology, and microbiology in supplying the world with safe and nutritious food. An overview of food science as a discipline and career choice is given. A laboratory exercise in food development is undertaken. Course ID: 1360

LING 1101 Introduction to Linguistics (4 credits) (MWF 11:15-12:05 PM & section)
This course is an overview of the science of language, especially its theoretical underpinnings, methods, and major findings. Areas covered include: the relation between sound and meaning in human languages, social variation in language, language change over time, universals of language, and the mental representation of linguistic knowledge. Students are introduced to a wide variety of language phenomena, drawn not only from languages resembling English, but also from many that appear to be quite unlike English, such as those native to the Americas, Africa, Asia, Australia, and the South Pacific. Course ID: 6126

DSOC 2200/LSP 2200 Sociology of Health and Ethnic Minorities (3 credits) (TR 10:10-11:25 AM)
Discusses the health status of minorities in the United States. Specifically, we explore intra-group diversity such as migration, economic status, and the influence of culture and the environment on health status and access to health care. Although special attention is given to Latino populations, discussion encompasses other minorities who face similar problems. Course ID: 1252/6469

PSYCH 1101 Introduction to Psychology (3 credits) (MWF 10:10-11:00 AM)
The study of human behavior. Topics include brain functioning and mind control, psychophysiology of sleep and dreaming, psychological testing, perception, learning, cognition, memory, language, motivation, personality, abnormal behavior, psychotherapy, social psychology, and other aspects of applied psychology. Emphasis is on developing skills to critically evaluate claims made about human behavior. Course ID: 5965

SOC 1101 Introduction to Sociology (3 credits) (MW 11:15-12:05 PM & section)
The purpose of this course is to introduce students to the distinctive features of the sociological perspective, as opposed to psychological, historical, or economic approaches. We do so by first discussing the sociological perspective in the context of small groups and face-to-face interaction. Course ID: 6243
What if I’m Pre-med?

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

In addition to courses in the biology major, premed students should take 2 writing classes plus courses in the behavioral and social sciences.

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

What is the Physical Education requirement?

Physical Education Classes

_The University requires that each student take two Physical Education Courses and pass a swim test (75 yard swim)_

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/fall-2015

You can register for many PE classes online during pre-enrollment time.
Academic Supports

Many academic supports 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 (visit www.biology.cornell.edu and follow the link to Student Advisors)
- Utilizing resources in the Learning Strategies Center (LSC) (http://lsc.sas.cornell.edu/), including supplement courses.

Write down your course selections for Fall 2015

Use this worksheet to keep track of the classes that you would like to sign up for. Remember that some classes require enrollment in labs and sections. Please bring this worksheet with you to campus as well, so that you can finalize your schedule with your student and faculty advisors! As always, if you have any questions, feel free to call us here at the bio office (607-255-5233), or check our website at www.biology.cornell.edu. We’d be delighted to help you!

See pages 4-9 of this packet for courses commonly taken by freshmen. For First-Year Writing Seminars, see http://www.arts.cornell.edu/knight_institute/fws/fws.htm, for PE classes see http://www.pe.cornell.edu/physed/ and for electives see pages 19-20 or the Cornell Roster at: http://registrar.sas.cornell.edu/courses/roster/FA15/

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Students should follow directions and register for courses through the Student Center ([http://studentcenter.cornell.edu](http://studentcenter.cornell.edu)).

As you begin to plan your first year and courses, play around with options to increase choices and flexibility for scheduling when the school year begins. There are many courses to choose from and many ways to fit them into your schedule. Use this manual as your guide to structuring your first year at college. With ample planning, course loads and requirements are not as daunting as they seem!

**Are there Special Opportunities to study Biology at Cornell?**

- **Shoals Marine Lab** on Appledore Island, Isles of Shoals, Maine is dedicated to undergraduate education and research in marine science, and offers undergraduate students a unique opportunity to study marine science in the field. [http://www.sml.cornell.edu/]

- **The Lab of Ornithology** is a nonprofit membership institution whose mission is to interpret and conserve the earth’s biological diversity through research, education, and citizen science focused on birds. [http://www.birds.cornell.edu/](http://www.birds.cornell.edu/)
My schedule includes:

✓ At least one course that I find extremely interesting
✓ One introductory biology class (either BIOMG 1350 or BLOG 1440/BLOG 1445 or BLOG 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

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 year before beginning research. When you feel ready to work in a lab, you may browse the listing of research opportunities at the Office of Undergraduate Biology (216 Stimson Hall) or look online at http://biology.cornell.edu/oub-research. Note: Some investigators will accept only upperclassmen (Juniors or Seniors) in their labs.

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 AP Courses. Will that put me at a disadvantage?

A: No, there is no evidence that students with AP 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. Don’t hesitate to ask for help when you need it, there are many resources available
to you as a student. The professors are happy to interact with students on a more personal level, and TAs often have weekly office hours. Also, supplemental courses are offered to complement large lecture courses. They meet once a week to give students a chance to review recent material. If that doesn’t appeal to you, you can always seek out a Student Advisor tutor or form a study group with classmates.

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

A: Yes, but you have to be proactive. Most 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”.

Yikes, are we done? I think that is all I have to share with you about planning a balanced schedule. Remember, if you are majoring in the Biological Sciences you will be hearing from your Student Advisor at the beginning of July and he or she can help answer many of your questions. I also encourage you to call the Office of Undergraduate Biology at 607-255-5233 if you need further assistance.

Biology advisors will look forward to meeting you during Orientation at the advising meeting on Monday, August 24th 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.

Enjoy your summer!!