

# Advising Information for Students Planning a Major in Biology (2007-08)

**A. The Core Curriculum:** A foundation in Biology is required of all majors and is provided by the following **four courses**:

**I. Four Courses:**

*Biology 151\**, Introductory Biology I: How Science Works (no prerequisite) (or AP Biology or International Baccalaureate credit)

*Biology 152\**, Introductory Biology II: How Life Works (no prerequisite) or an equivalent (e.g., see above or BIOL 153\*)

[OR \**Biology 153* (6 hrs), in summers only, can be taken in place of both BIOL 151 and 152 with permission of Department Chair]

*Biology 230*, Molecular and Cellular Biology (prerequisites: *BIOL 151, 152, or equivalent & CHEM 120*; OR *CHEM 220*)

*Biology 365*, Genetics (prerequisite: *BIOL 230*)

The three introductory courses must be taken before proceeding to most of the upper level courses listed below, although a few require only two. *Biology 365* can be taken any time after the introductory courses. Prerequisite courses are indicated in parentheses after the upper level courses.

**B. Upper Level Courses (Among Three Categories):** Five upper level courses build upon the core curriculum, providing both breadth and specialization. This combination is achieved through required categories that allow a wide choice of courses to accommodate the specific interests and goals of the student. (N.B., Some courses below are cross-listed with *Psyc\**, *Chem\*\**, or *Evst\*\*\**.)

**Category I. Organismal Biology – Two courses** (8 semester hours) required, one in each category, A and B. One course must be an animal biology course (e.g., *Biology 223, 320, 326, or 327*) **and** one must be a plant biology course (e.g., *Biology 213, 315/316, 331, or 332*).

Thus, students **CHOOSE one course from “Category A” AND one course from “Category B” using EITHER “Option 1” or “Option 2.”**

Option **A. Biodiversity and Phylogeny (choose one course):**

1 *Biology 213*, Systematics of Non-Vascular Plants (151, 152)

*Biology 315/316*, Systematics of Vascular Plants I/II (151, 152)

**AND**

**B. Structure and Function (choose one course):**

*Biology 326*, Animal Physiology (230)

*Biology 327\**, Neuroscience (152; 215\*; *Psyc* 101)

**OR**

Option **A. Biodiversity and Phylogeny (choose one course):**

2 *Biology 223*, Vertebrate Biology (151, 152)

*Biology 320*, Invertebrate Zoology (151, 152)

**AND**

**B. Structure and Function (choose one course):**

*Biology 331*, Plant Anatomy (151, 152; 230 recommended)

*Biology 332*, Plant Physiology (230; *CHEM* 220)

**Category II. Integration and Synthesis – One course** (3-4 semester hours) required from among:

*Biology 328\**, Animal Behavior (151, \*215, *Psyc*101)

*Biology 335*, Evolution (365 or permission)

*Biology 340*, Developmental Biology (230)

*Biology 341*, General Ecology (213, 223, 316, or 320; or perm.)

*Biology 342*, Marine Ecology (213, 223, 316, or 320 or perm.)

*Biology 366\*\**, Basic Biochemistry (230, *Chem* 320)

*Biology 415*, Advanced Molecular Biology (365 or 366)

*INTD 380*, Bioinformatics (365 or 366)

**Category III. Electives – Two courses** (6-8 semester hours) required. Courses may be selected from upper level courses above (I & II) or from:

*Biology 132 & 133*, Human Anat & Phys I & II (permission)

*Biology 215\**, Experimental Methods (*Psyc* 101, *Biol* 151)

*Biology 250\*\*\**, Introduction to Wildlife Management (151 or 152)

*Biology 280*, Seminar: Topics Vary (151, 152, or permission)

*Biology 300*, Field Biology (151, 152)

*Biology 310*, Fisheries Biology (151, 152)

*Biology 338*, Microbiology (230)

*Biology 344\*\*\**, Conservation Biology (151, 152)

*Biology 345\*\*\**, Forest Ecology Methods (151, 152; or permission)

*Biology 347\**, Primate Behavior and Ecology (152, 215\*, *Psyc* 101)

*Biology 368\*\*\**, Intermediate Biochemistry (366)

*Biology 378*, Immunology (230)

*Biology 380*, Seminar: Topics Vary (151, 152; or permission)

**C: Apprenticeship Experience (APEX):** The apprenticeship experience, or APEX, is designed as the culmination of a student's program in biology. The APEX allows each student to apply his or her expertise in a variety of contexts. This concrete experience can be achieved through an independent or collaborative research project on campus, a research techniques course and project, an internship off campus, or student teaching of biology in middle or secondary school. All students prepare and submit a scientific paper to the faculty supervisor and present a public lecture based upon the apprenticeship experience. Majors are required to meet with their Biology faculty advisor no later than the advising period in the fall semester of the junior year to discuss options for the apprenticeship experience.

**Options for the Apprenticeship Experience** – 3 or 4 semester hours (one course equivalent) required from among the following:

*Biology 481*, Independent Research (permission);

*Biology 482*, Techniques in Biological Research (permission) or *Chemistry 483*, Techniques in Biochemistry (permission);

*Biology 498*, Internship (permission);

*Education 423*, Student Teaching in Biology (see Education Department requirements).

**D. Required Correlative Courses:** Modern biologists need background in other disciplines to enhance their insight into biological phenomena and to understand the role of the life sciences in society. The following correlative courses are required:

*Chemistry 120*, Structure and Bonding; *121*, Introduction to Chemical Analysis; and *220*, Introduction to Organic Chemistry (*Chem 120, 121*)

*Physics 113*, Principles of Physics I (algebra based); or *213*, Fundamentals of Physics I (calculus based; *Math* 198)

*Mathematics 108*, Statistics (math placement exam); or *Math 198*, Calculus I (math placement exam).

Students interested in professional programs beyond an undergraduate degree most likely will need further courses in these correlative disciplines (see the comments under the “Pre-Professional Course Work” section below and advising handouts for these particular paths).

In addition to the required correlative courses above, one course addressing the ethical, historical, or social aspects of science, chosen in consultation with the student's advisor in the Biology department, is strongly recommended. Examples include:

*Interdisciplinary 301, 302, 306, 307, 309, 311, 317, 318, 321, 344, 360, 361, 362, 370, 374, 375*; *Philosophy 265 or 270*.

**Pre-Professional Course Work:** Please note that further courses in chemistry, mathematics, and physics are required for admission to most professional schools (e.g., medicine, veterinary medicine, dental programs, physical therapy) and some graduate programs. Biology students planning to attend professional or graduate schools should investigate the specific requirements for these programs, including the possible need of a reading knowledge of a foreign language or facility in a computer programming language. Your Biology advisor will help you with this planning.

**A Minor in Biology** requires a minimum of 6 courses including Biology 151, 152 (or 153), and 230, and 3 additional courses that are approved by the student's Biology faculty advisor. A student wishing to minor in Biology must have a Biology faculty member as an advisor in addition to an advisor in the student's major department.

**General Frequency of Course Offerings** (This schedule is subject to change, especially 2008/09 onward. SAP = Study Abroad Program):

Every year:	<b>Fall:</b> 132, 151, 215, 230, 327, 366	<b>Spr:</b> 133, 152, 215, 223, 326, 338, 365
Alternate years: 2007/08 ---	<b>Fall:</b> 250, 320, 335,340, 345, 378	<b>Spr:</b> 101/300 (SAP: Peru), 315/316, 331, 380 (SAP: Biomes)
2008/09 ---	<b>Fall:</b> 213, 332(?or spring), 341, 342	<b>Spr:</b> 332(?if not fall), 368, 483, INTD 318 (SAP: Galapagos Islands)
2009/10 ---	<b>Fall:</b> 250, 320, 335,340, 345, 378	<b>Spr:</b> 315/316, 331
2010/11 ---	<b>Fall:</b> 213, 234, 332 (?or spring) 341, 342	<b>Spr:</b> 315/316, 332(?if not fall), 368, 483

Courses not listed here are offered on a 3-year rotation, as part of the International Study Abroad Program, as summer field courses, or are courses for non-majors, in which case the frequency of offering varies. You must check published course schedules for all course offerings for each semester.

**Planning Your Coursework for a Biology Major:** Various combinations of beginning science courses are possible for students who plan to major in Biology or for those who choose to follow a pre-professional health sciences program (e.g., pre-med, pre-vet, pre-dentistry, pre-physical therapy). Regardless of your ultimate goal at this point, what is most important now is to get started early with the courses that are prerequisites both for upper level biology courses and for application to professional and graduate schools. If you have any questions, we recommend that you speak with a Biology Department professor during the Open House session of First-Year Institute or at any time you want assistance.

For students with good preparation in high school chemistry we recommend that you complete three or four of the following courses by the end of your first year: Chem 120, Chem 121 (you can place into this course the first semester with a high score on the AP Chemistry exam), Biol 151, Biol 152, and Math 198. We recommend that you take no more than two science lab courses in one 12-week session. By the end of your second full year of study we also recommend that you take an additional four lab science courses or math courses including those that you did not complete in the first year from the list above and other courses selected from: Chem 220, Chem 320, Biol 230, and BIOL 365. By completing seven or eight of these courses in the first two years, you will have many more options for biology courses, and other science courses, in your last two years.

For students with weak or no preparation in high school chemistry we recommend that you complete two or three of the following courses by the end of your first year: Chem 115, Chem 120, Chem 121, Biol 151, Biol 152. We recommend that you take only one lab science course during the Fall 12 week session. By the end of your second full year of study we also recommend that you take an additional 3 or 4 lab science or math courses including those that you did not complete from the first year and other lab science or math courses including Biol 230, Math 108. By completing six courses in your first two years, you will be on track for completing a Biology major in four years, provided you do well in the courses you attempt.

**College Requirements:** In addition to a major, all students must satisfy the following **twelve college requirements** before graduation:

**Two first-year courses:** First-Year Colloquium and First-Year Seminar (FRCL & FSEM) in the fall and spring 12-week sessions, respectively;

**Two Interdisciplinary courses** (INTD), one or both of which are team taught, usually taken during the sophomore, junior or senior years;

**Eight General Requirements:** Creative Methods (CM), Interpretive Methods (IM), Modeling Methods (MM), Experimental Science (SM), Social and Cultural Analysis (CA), Understanding Diversity at Home (UD), Exploring the World (EW), and Ethical and Social Responsibility (ES). Some of these general course requirements will be part of the biology major (e.g., experimental science (SM), modeling methods (MM) categories).

<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>
<b>Fall 12-Week Session</b>	<b>Fall 12-Week Session</b>	<b>Fall 12-Week Session</b>	<b>Fall 12-Week Session</b>
<b>FRCL</b> _____ BIOL 151 (SM) and/or CHEM 120	BIOL 230 or 151 CHEM 220,120, or 121 _____	BIOL 230 or _____ CHEM 220 or _____ PHYS 113 or 213 or _____	_____ _____ _____
	<i>Discuss internship w/ Advisor</i>	<i>Declare Biol. major; Discuss APEX w/ Biology Advisor</i>	<i>Begin Grad Sch Applications APEX Presentations</i>
<b>Fall 3-Week Session</b>	<b>Fall 3-Week Session</b>	<b>Fall 3-Week Session</b>	<b>Fall 3-Week Session</b>
_____	_____	_____	_____
<b>Spring 12-Week Session</b>	<b>Spring 12-Week Session</b>	<b>Spring 12-Week Session</b>	<b>Spring 12-Week Session</b>
<b>FSEM</b> _____ BIOL 152 and/or CHEM 121 or 120	BIOL 365 or 152 CHEM 121 or _____ _____	BIOL 365 or _____ _____ _____	_____ _____ _____
	<i>Select Your Biology Advisor</i>	<i>Apply for Internships, etc. Finalize APEX with Advisor</i>	<i>APEX Presentations</i>
<b>Spring 3-Week Session</b>	<b>Spring 3-Week Session</b>	<b>Spring 3-Week Session</b>	<b>Spring 3-Week Session</b>
_____	_____	_____	_____
<b>Summer</b>	<b>Summer</b>	<b>Summer</b>	<b>Summer</b>
<i>Internship &amp;/or Research?</i>	<i>Internship &amp;/or Research?</i>	<i>Apprenticeship Experience via Internship &amp;/or Research</i>	