

# **The Biology Majors' Guidebook**

**2020-2021**

**OBERLIN**

OF THE

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**COLLEGE & CONSERVATORY**

**Department of Biology  
Oberlin College**

# Checklist of Biology Major Requirements

## A. Three core courses:

- \_\_\_\_\_ BIOL 100 (includes lab)
- \_\_\_\_\_ BIOL 200 (includes lab)
- \_\_\_\_\_ BIOL 213
- \_\_\_\_\_ BIOL 214 (lab associated with BIOL 213)

## B. Two post-core Biology Department courses: Two 200-, 300- or 400-level full courses (exclusive of the core) offered by the Oberlin College Biology Department; at least one must have an associated lab component.

- \_\_\_\_\_ BIOL \_\_\_\_\_ (with lab)
- \_\_\_\_\_ BIOL \_\_\_\_\_

## C. Two additional post-core life sciences courses: The equivalent of two full courses – no more than two courses from outside the Oberlin Biology Department may be counted. BIOL 501 and 502 count as Category C courses.

- \_\_\_\_\_ a) 200-, 300-, or 400-level Category B BIOL courses \_\_\_\_\_
- \_\_\_\_\_ b) 200- or 300-level NSCI courses \_\_\_\_\_
- \_\_\_\_\_ c) ENVS 316 Ecosystems Ecology or 340 Systems Modeling: Systems Thinking
- \_\_\_\_\_ d) CHEM 374 Biochemistry
- \_\_\_\_\_ e) GEOL 370 Paleobiology Seminar or GEOL 325 Vertebrate Paleontology
- \_\_\_\_\_ f) BIOL 501 or 502, (the equivalent of one full-course may be applied to the major).
- \_\_\_\_\_ g) post-introductory transfer credits (the equivalent of 2 full-courses may be applied)

*Note:* Coursework from Categories B and C must collectively provide at least 2 lab experiences.

## D. Four courses in affiliated sciences:

- \_\_\_\_\_ CHEM 101 and 102 (or AP/IB equivalent; CHEM 103 may substitute for CHEM 101/102)
- \_\_\_\_\_ CHEM 205
- \_\_\_\_\_ One course from the following: MATH 132 or 133; STAT 113, 114, or 215; CHEM 254; PHYS 103 or 110; PSYC 200; CSCI 140 or 150.

## Other important considerations:

1. At least 3.5 full biology courses from categories A, B, and C, including two full courses (or the equivalent) of post-core coursework, must be taken at Oberlin.
2. Post-core coursework taken outside the Oberlin Biology Department and applied to the major may not exceed the equivalent of two full courses.
3. BIOL 501 and 502 count as Category C courses.
4. Private Readings, FYS, Colloquia, Practicums, or courses with course numbers below 100 do not count toward the major.
5. Students may not receive both academic credit and financial compensation for the same research work.
6. Students must earn minimum grades of C- (or CR or P) for all courses that apply toward the major.

# Table of Contents

<b>Checklist of Requirements for the Major in Biology .....</b>	<b>1</b>
<b>The Biology Major</b>	
Objectives .....	3
Requirements for the Major .....	3
Advanced Placement.....	3
Faculty Advisors .....	3
Courses for the Major .....	4
Private Reading .....	4
Non-Majors Courses .....	4
Other Options	
Winter Term Projects.....	4
Summer Courses.....	5
Research .....	5
Honors .....	5
Department Prizes and Scholarships .....	6
Extracurriculars.....	6
After the Major	
Graduate and Professional Schools.....	6
Employment After Graduation .....	7
<b>The Department of Biology</b>	
The Faculty .....	7
Support Staff .....	9
Student Employment.....	9
<b>Frequently Asked Questions.....</b>	<b>10</b>
<b>Example Pathways for Students Planning a Biology Major .....</b>	<b>11</b>
<b>Guidelines for Requesting Letters of Recommendation .....</b>	<b>14</b>

# The Biology Major

## Objectives

The biology major at Oberlin has three learning goals. 1) Graduates will have knowledge of key biological concepts and underlying fundamentals and should be able to apply these across all levels of organization. 2) Graduates will have critical thinking and functional skills needed to carry out the scientific process from inception through communication of results. 3) Graduates will have an understanding of the ways in which biology interrelates with other sciences, disciplines, and society.

Many biology majors proceed to study and work in the life sciences, including fundamental research and applied fields such as medicine and allied health careers, conservation biology, science writing, veterinary medicine, and teaching. By a proper selection of biology and other science courses in consultation with a departmental advisor, a student majoring in biology can prepare for graduate study in a wide range of areas such as animal behavior, biochemistry, biophysics, botany, cell biology, ecology, conservation biology, developmental biology, environmental sciences, evolutionary biology, forestry, genetics, genetic counseling, genomics, immunology, marine biology, molecular biology, morphology, microbiology, mycology, parasitology, physiology, plant biology, public health, systematics, systems biology, translational medicine, virology, and wildlife biology.

## Requirements for the Major

A checklist of the courses required for the Biology major are located on the inside the front cover of this guidebook and in the Course Catalog. With planning, the eleven courses needed to fulfill the major may be easily completed in three years. This allows flexibility for students in their paths through the major, as described below.

Students who are eager to enroll in introductory biology and have a strong science background may choose to register for both BIOL 100 and CHEM 101 in the first semester. Some students choose to take CHEM 101 and a mathematics or statistics course in the first semester, delaying BIOL 100 to the second semester. (Note: The two semester introductory chemistry series may be started only in fall semester, whereas introductory biology may be taken in either semester. During 2020-21, CHEM 101 will be offered in both fall and spring, but most students will only attend one of those terms.) Alternatively, some students prefer to begin with a single lab science course such as BIOL 100. Examples of various pathways through the major and associated information is located on pages 11-13 of this handbook. Your academic advisor or other biology faculty are also excellent resources to help you plan your path through the major.

Students declaring the major in Biology must comply with the course requirements *in effect in the most recent edition of the College Catalog at the time the student declares the major.*

## Advanced Placement

Students earning a score of 4 or 5 on the Advanced Placement Biology exam (AP Bio) or a score of 6 or 7 on the International Baccalaureate Biology Higher Level exam will receive 1 full course of natural science credit, as BIOL 604, applied toward graduation requirements, but not toward the Biology major. AP or IB credit does not exempt Biology majors from taking BIOL 100: Organismal Biology.

## Faculty Advisors

Biology majors are required to have an advisor from among the continuing Biology faculty. However, you may opt for a biology advisor prior to declaring a major, and you may seek advice from professors who are not your official advisor. All professors maintain regular office hours and can be contacted by email. The departmental chair maintains regular office hours (posted outside of K123 and on the departmental website) and is available to discuss the major or other needs.

## Courses for the Major

The complete list of courses accepted for satisfaction of the major in biology is available in the current Oberlin College Course Catalog. Introduction to Global Health (BIOL 035), Environmental Biology (BIOL 103), first-year seminars, and other courses numbered below 100 *do not* count toward the major.

The three required core courses, Organismal Biology (BIOL 100), Genetics Evolution and Ecology (BIOL 200), and Molecular Biology, Cell Biology, and Biochemistry (BIOL 213/214) are offered every semester. During the 2020-21 year, graduating seniors will register for both BIOL 213 and BIOL 214. We have estimated that we can safely fit all graduating seniors that plan to take the course into 3 sections of BIOL 214, each with an enrollment cap of 6 students. Two lab sections will be offered in the fall, and one in the spring. No BIOL 214 labs will be offered in the summer.

Sophomores and juniors that enroll in BIOL 213 this year will not enroll in BIOL 214 during 2020-21, but must take BIOL 214 next year (2021-22). They will receive an asterisk as a final grade for BIOL 213, and that asterisk will be converted to a letter grade after they have completed BIOL 214 next year.

The following upper-level biology courses are typically offered every year or every other year, though with some gaps when a faculty member is on sabbatical (check the current year's Schedule of Classes to confirm whether a course is being offered in a given year):

BIOL 202 - Plant Ecology	BIOL 322 - Genetics of Populations
BIOL 221 - Plant Biology	BIOL 323/324 - Plant Systematics + Lab
BIOL 229 - Human Reproductive Health	BIOL 325- Marine Physiology
BIOL 234 – Human Anatomy + Lab	BIOL 336 - Genomics
BIOL 303 – Chemical Ecology	BIOL 403 – Seminar: The Cell and Molecular Biology of Pathogen-Host Interactions
BIOL 307 - Microbiology	BIOL 407 – Seminar: Origin(s) of Life
BIOL 308 – Disease Ecology	BIOL 408 – Seminar: Experimental Evolution
BIOL 309 - Ornithology	BIOL 411 - Seminar: Conservation Biology
BIOL 310 – Genetics	BIOL 416 - Seminar: Cellular Basis of Human Disease
BIOL 312 - Physiology	BIOL 423 – Seminar: Biogeography
BIOL 318 - Evolution	
BIOL 320 - Invertebrate Ecology & Evolution	

## Private Reading

Private Readings (BIOL 995) are arranged with individual faculty members. Many private-reading topics are similar to winter-term topics listed under the appropriate professors' names on page 5 of this guidebook. Private readings are intended to supplement completed coursework, and should NOT overlap with or replace existing courses except under special circumstances. Approval for Private Readings requires signatures of the faculty sponsor, your academic advisor, and the department chair. Private Reading credits do not count toward the major, but they may count toward graduation. See the current Course Catalog for more details regarding Private Reading.

## Non-Majors Biology Courses

The introductory course, BIOL 100 (Organismal Biology), has no prerequisite and is open to non-majors. In addition, several first-year seminars are taught with a biological emphasis or scientific theme. Introduction to Global Health (BIOL 035) and Environmental Biology (BIOL 103), are available to non-majors.

## Other Opportunities

*Winter-Term Projects.* Continuing biology faculty members sponsor winter-term projects representing various areas in biology. Group projects are announced well in advance of the coming Winter Term. Students intending to conduct individual winter-term projects are urged to confer as soon as possible with the appropriate faculty sponsor to ascertain the professor's availability.

- Taylor Allen: Projects relying upon genetic, molecular, and biophysical techniques to address cell physiological questions; readings on creativity or in Old Icelandic and Old English.
- Jane Bennett: Intensive science review, pre-medical internship.
- Katherine Cullen: Readings and review of molecular and cell biology, genetics, microbiology, and reproductive biology literature.
- Mary. Garvin: Projects in disease ecology, parasitology, entomology, ornithology, and epidemiology.
- Aaron Goldman: Projects involving protein and proteome evolution with a special focus on early cellular life and the emergence of ancient metabolic systems.
- Marta Laskowski: Projects and readings in plant growth and development.
- Roger Laushman: Projects involving conservation biology, forest ecology, and invasive species.
- Mike Moore: Projects involving plant molecular systematics and chloroplast genomics.
- Maureen Peters: Laboratory studies of biological rhythms, nutrition, and aging in the nematode, *Caenorhabditis elegans* using a variety of genetic, cellular and physiological techniques. Readings in clinical and molecular genetics, health careers, molecular biology, cancer biology, and the history of medicine, genetics, and eugenics.
- Angie. Roles: Projects and readings in molecular ecology, population and quantitative genetics, evolutionary biology and conservation/invasion biology.
- Laura Romberg: Projects involving the biochemistry of proteins involved in bacterial cell division; shadowing physical or occupational therapists at a hospital in Cleveland; independent projects on food science.
- Keith Tarvin: Projects and readings in evolutionary and behavioral ecology, ornithology; readings in multilevel selection, human behavioral ecology and other facets of evolutionary biology.

*Summer Courses.* Up to two courses offered during the summer at various institutions and biological field stations may be accepted toward general or major credit, but only by approval (pre-approval recommended) of the Department Chair (currently Keith Tarvin). The Department provides a limited number of competitive scholarships to support coursework at marine and inland biological field stations. Interested students are strongly advised to consult with their advisors and the Chair regarding participation in such off-campus programs. Further information on summer courses is posted on bulletin boards in the Department and at <http://www.obfs.org/>. Applications for Department Scholarships are due in March, and awards are made shortly thereafter, during the Department's Spring Celebration.

*Research.* While completing the coursework required for the major, many students become interested in specific research topics. Students who wish to conduct research under the direction of a faculty member may do so by enrolling in BIOL 501 (fall) or BIOL 502 (spring). Each student selects a research topic in consultation with a faculty sponsor. Consult faculty websites and the student research bulletin board to learn about research conducted in each lab.

Many students find research opportunities away from campus during summers and winter terms. For example, the Research Experience for Undergraduates (REU) programs funded by the National Science Foundation and similar internship programs provide opportunities for students to engage in mentored research and receive room and board plus a stipend and a variety of institutions and field stations. You can find information about these and other programs on the “[Career Online Resources](#)” and “[Internships and Career Opportunities](#)” on the Biology Department website.

Students may also conduct faculty-sponsored research with funding from various intramural and extramural sources. Interested students should consult with potential faculty sponsors as soon as possible, as grant proposal deadlines are announced only a few times a year. Additional resources regarding student research grants are available from the Office of Undergraduate Research and the Career Development Center.

*Honors.* Candidates for honors in biology are accepted by the Department faculty early in the fall semester of their senior year on the basis of general ability, capacity to profit from independent work, and high motivation. As seniors, honors students enroll in Biology 501 and 502, carry out a research project selected in consultation with a faculty sponsor, give two required talks on their projects, submit a written thesis, and take an oral examination given by their thesis committees. Third-year students interested in this program may initiate a discussion of

research possibilities with any member of the Biology faculty. The coordinator of the Honors Program in Biology for 2020/21 is Laura Romberg.

### Department Prizes and Scholarships

The Department awards prizes and scholarships annually to students in recognition of scholastic excellence and professional promise. Awardees are honored at the Biology Department's Spring Celebration, and prize-winners are recognized college-wide during both the Honors Assembly and the Commencement Exercises. The prizes are funded by generous gifts from alumni and friends and are awarded to students deemed most deserving by the faculty. Academic scholarships are supported by endowed funds that enable students to take courses at biological field stations during the summer. The scholarships are awarded competitively, and their availability is announced early in the spring semester.

### Extracurriculars

The Biology Majors Committee is a student-run organization of current biology majors. The Committee sends representatives to the regular meetings of the Department faculty and, in general, serves as an important avenue for faculty-student contact outside of courses. Ruth McDowell and Angie Roles are the faculty liaisons for the Majors Committee.

### After The Major

What career paths do our majors pursue after graduating? A survey of two recent graduating classes showed that about 38% of our students pursue health careers, including advanced training in medicine, nursing, pharmacy, public health; approximately 20% seek research careers through graduate training in science and engineering programs; 9% are working as laboratory technicians; and about 7% pursue careers in K-12 education. Others report work in a variety of fields including nonprofit charities, conservation, writing and editing, the arts, and business.

How does a biology major prepare for life after Oberlin? The general pattern has been to match disciplinary interests and examine available options and opportunities. Listed below are the most common routes:

*Graduate and Professional Schools.* Many majors find themselves interested in pursuing further training in biology or a related field. For these students, graduate/professional school is the next destination. Consult one or more members of the faculty and request advice on areas of study appropriate for your intended career. Many of the faculty members are knowledgeable about the institutions and fields of study that may be of interest to you. In addition, many faculty members are acquainted with the experiences of recent Oberlin graduates who may have been, or are, at the institutions you are considering.

Other sources of information are available as well. The current edition of Peterson's Annual Guide to Graduate Study is available at the Career Development Center on campus, as well as from the Science Library. A list of university curricula in oceanography and related fields is also available from the latter office. Numerous catalogs and bulletins from various educational institutions are available outside K123, and announcements from these institutions are posted on specific bulletin boards scattered throughout the Department. These publications and postings contain information concerning programs of study, admission requirements, application procedures, faculty, facilities, financial aid, and living conditions, not only for graduate study but also for summer fellowships, laboratory internships, and field work.

National and international scholarships and fellowship programs for graduate study in the sciences should be investigated by biology majors intending to pursue graduate studies. The Career Development Center is the best source of information regarding these opportunities.

Students seeking admission to medical, dental, and other health-professions schools should be aware of the specific preparatory examinations and admissions requirements for each degree and institution. Consult with Professor Peters, Premedical Program Director, if you wish to explore a health careers profession. She offers

specific advice and all forms of assistance at every step of the application process. To request an advising appointment with Maureen Peters, you may email her at [mpeters@oberlin.edu](mailto:mpeters@oberlin.edu).

*Employment after Graduation.* The Career Development Center offers guidance, support, training, and interview opportunities for majors seeking employment immediately after graduation. Early in their college career, students should explore the numerous resources available at the Career Development Center. These resources include workshops on resume preparation, interviewing skills, and networking. Recruiters from private companies and professional schools frequently contact the Career Development Center to schedule their campus visits.

*Other Sources of Information about Job Opportunities.* The “[Internships and Career Opportunities](#)” link on the Biology Department website provides links to a variety of websites that list job and internship opportunities. Job announcements sent to the members of the Biology faculty are posted at this site and on bulletin boards near faculty offices. Many students take the first step in seeking employment by sending their resumes directly to companies or institutions of interest to them. [Peterson's Annual Guide](#) to Careers and Employment for engineers, computer scientists, and scientists is a valuable reference and is available at the Career Development Center. The Office of Alumni Affairs maintains a list of alumni who have expressed interest in discussing careers and employment opportunities. Other sources of information are the off-campus supervisors with whom many students work on winter-term or summer projects. Finally, it helps to let some faculty members know of your job interests. The faculty often become aware of employment or fellowship opportunities informally and can call attention to suitable ones that may come along.

## **The Faculty**

Faculty members teach both the lecture and laboratory portions of their courses, which are described in the current College Catalog. In addition to conducting research, each faculty member sponsors student research projects, winter term projects, and private readings.

**Taylor Allen**, Associate Professor of Biology. BSE, University of Pennsylvania; PhD., University of Washington. Professor Allen teaches courses on physiology, biophysics, and creativity. He also teaches the core course on organismal biology (Biol 100). One facet of his research investigates teaching practices that promote productive thinking; another investigates how muscle works in health and disease.

**Jane E. Bennett**, Laboratory Instructor and Lecturer in Biology. BA, St Mary's University; MS, Wright State University. Ms. Bennett teaches laboratory classes in the introductory courses. She trains and coordinates the consultants and teaching assistants for these courses.

**Yolanda P. Cruz**, Robert S. Danforth Professor of Biology. BSA, MS, University of the Philippines; PhD, University of California (Berkeley). Professor Cruz's research interests include: embryonic development and embryo-maternal signaling in mammals, comparative embryology and evolution in animals, and epigenetics. She is on sabbatical during fall 2020 and will retire in December.

**Katherine E. Cullen**, Laboratory Instructor and Lecturer in Biology. BS, Michigan State University, E. Lansing; PhD, Vanderbilt University. Professor Cullen teaches laboratory courses in molecular biology, cell biology, biochemistry, genetics, ecology, and evolution.

**Mary C. Garvin**, Professor of Biology. BA, Hiram College; MS, Louisiana State University; PhD., University of Florida. Interests include: entomology; ornithology; chemical ecology; uptake of environmental contaminants by trees; and disease ecology. Teaching includes: core course on genetics, ecology and evolution (Biol 200); upper-level courses and labs on invertebrate biology (Biol 320); and disease ecology (Biol 308); and a first-year seminar.

**Mary Gemmel**, Visiting Professor of Biology. BS, Ohio State University; PhD, Ohio University. Teaching includes: core course on organismal biology (Biol 100), introduction to global health (Biol 035), human anatomy (Biol 234), and human reproductive health (Biol 229).

**Aaron Goldman**, Associate Professor of Biology. BA, Swarthmore College; PhD, University of Washington. Professor Goldman's research interests include the evolution of ancient protein families and the early evolutionary history of cellular life. He teaches courses on genomics (Biol 336) and on molecular biology, cell biology, and biochemistry (Biol 213).

**Marta Laskowski**, Professor of Biology. BS, Indiana University; PhD, Stanford University. Professor Laskowski's research interests include plant physiology, plant developmental biology, and transgenic technologies. Her teaching includes the core course on organismal biology (Biol 100); an upper-level course and lab on plant development and function (Biol 304, 305); and a first-year seminar

**Roger H. Laushman**, Associate Professor of Biology and Acting Chair. BS, University of Kansas; MS Iowa State University; PhD, University of Georgia. Interests include: botany; population ecology and genetics; conservation biology, and invasive species biology. Teaching includes: upper-level courses and labs on plant ecology (Biol 202); seminars in evolution and conservation biology (alternating between first-year and senior seminars); and a non- majors' course on environmental biology (Biol 103). He is also a member of the Environmental Studies Program Committee.

**Ruth E. McDowell**, Visiting Assistant Professor of Biology. BS, Duke University; PhD, University of Alabama at Birmingham. Professor McDowell's research investigates the role of cell metabolism and reactive oxygen species production in ecology, evolution, and human disease. She teaches a core course on molecular biology, cell biology, and biochemistry (Biol 213) and upper-level courses on Marine Physiology (Biol 325) and Chemical Ecology (Biol 303), and a first-year seminar.

**Michael J. Moore**, Professor of Biology. BS, College of William and Mary; MS, University of Illinois, Urbana-Champaign; PhD, University of Texas. Professor Moore's research interests include: systematics and phylogeography of plants; assembly and evolution of North American floras; origin and evolution of edaphic endemism; core course on organismal biology (Biol 100); upper-level course and lab on plant systematics (Biol 227 and 228); and seminar (alternating between first-year and senior seminars).

**Maureen Peters**, Professor of Biology. BA, Washington University; PhD, Harvard University. Professor Peters is currently the Premedical Health Advisor. Her Interests include: classical and molecular genetics; cellular and molecular biology. She teaches a first year seminar and genetics.

**Angela J. Roles**, Associate Professor of Biology. BA, Wake Forest University; PhD, Michigan State University. Professor Roles' research interests include the effects and context dependence of spontaneous mutations on plant fitness and the evolutionary ecology of local and invasive crayfishes. Her teaching includes: core course on genetics, ecology, and evolution (Biol 200); upper-level course and lab on genetics of populations (Biol 322); and seminar (alternating between first-year and senior seminars).

**Laura Romberg**, Associate Professor of Biology. BA, Princeton University; PhD, University of California (San Francisco). Professor Romberg's research interest is the biochemistry of bacterial cell division. She teaches courses in molecular biology, cell biology, and biochemistry (Biol 213), microbiology (BIOL 307), a senior seminar on the cell biology of host-pathogen interactions, and a first-year seminar on nutrition.

**Keith A. Tarvin**, Professor of Biology. BA, Hendrix College; MS, University of Arkansas; PhD, University of South Florida. Professor Tarvin's research addresses the ecology and evolution of social interactions, signaling and communication, and life history strategies. Teaching includes: core course on organismal biology (Biol 100); upper-level offerings on ornithology (Biol 309), evolution (Biol 318), and behavioral ecology (Biol 315); and seminars on social evolution (alternating between first-year and senior seminars).

### **Support Staff**

Dorothy Auble, Resources Coordinator  
Twila S. Colley, Administrative Assistant  
Margaret L. Holcomb, Laboratory Technician

Judy Laushman, Greenhouse Manager  
Lori Lindsey, Animal Caretaker  
Forrest Rose, Facilities Manager

### **Student Employment**

The Department employs students in various capacities during both the school year and the summer; some of the positions require financial-aid eligibility. Many laboratory courses often require student assistants; in addition, the introductory courses require tutors and consultants. Biology majors who are interested in these positions should check with the professors in charge of the courses and, additionally, Ms. Bennett for Biology 100. Several part-time student worker positions are available during both semesters and the summer; interested students should check with Ms. Holcomb.

Students may also be employed as part-time research assistants under the auspices of various research or teaching grants awarded to individual professors. Some of these positions are for the school year and/or the summer. Students seeking this type of employment should consult with individual professors.

## Frequently Asked Questions

### **1. I am considering a double major, or maybe even a double degree. How I should plan to survive this?**

A double major means two majors in the College of Arts and Sciences, such as History and Biology majors or other combinations. A double major can be accomplished within the four years of your projected stay at Oberlin, especially if you identify your areas of interest and sign up with an advisor in each discipline as soon as possible. Common double-majors with Biology are Neuroscience, Environmental Studies, and Chemistry, but humanities and social science majors can work also. Timely planning and good advice are crucial to completing both majors.

The double degree program requires admission to both the College and the Conservatory and is a five year program earning a BA from the College of Arts and Sciences and the Bachelor of Music from the Conservatory of Music. You will have two advisors, one from your College major and another from your Conservatory discipline. Strong organization skills and efficient planning are keys to success!

### **2. I want to be able to study abroad and get academic credit for it while I am in college. Is this possible at Oberlin?**

Yes, and in several ways at that. There are study-away programs run by Oberlin, e.g. the Oberlin in London program. There are many 'abroad' programs with which Oberlin has consortial arrangements, as well as others from which Oberlin College accepts for transfer of academic credit. Consult the current course catalog for information, inquire from your advisor about the appropriateness of such a program, visit the Study Away Office or web site, and ask to speak to the appropriate adviser in the Dean of Studies Office.

### **3. Is there something I could do during Winter Term that would be relevant to my planned major in biology?**

Yes! Consider an individual or group project that will allow you to train in laboratory or field research, to do volunteer work at a hospital or health center, or to apprentice at a zoo or museum. Also worth considering are reading projects, MCAT reviews, seminar-type discussions, and similar activities both on and off campus (especially with alumni), provided a suitable sponsor can be found. Explore other possibilities by discussing Winter Term experiences with your advisor and with junior or senior majors.

### **4. Any meaningful summer work off-campus I could look into?**

Depends on what you mean by 'meaningful.' You could work for money, for experience, and/or for academic credit by taking courses at another institution (although you should first determine whether you may transfer such credits to Oberlin). You could seek a summer internship at a marine lab somewhere, work as a summer lab technician or hospital assistant or health-center volunteer, do field work (e.g. for the Nature Conservancy or the U.S. Forest Service), or conduct research on campus...possibilities abound. Think of what would be interesting to and appropriate for you, and check with your advisor and older peers for suggestions.

### **5. Should I try to do honors?**

Honors requires a considerable commitment of time and energy for both semesters of the senior year, as well as a minimum grade-point average of 3.1 (in Biology courses and overall). Also consider the reality of devoting much of your senior year to the research work involved in completing an honors thesis. This is highly desirable for some students with career plans that involve post-baccalaureate study, but perhaps less so for students whose academic interests are very broad and who would prefer to complete another major, or another degree, or take courses in art, history, dance, geology, etc., while completing the biology major.

Timing is also a factor; by the end of your junior year, you should have identified a research advisor who agrees to sponsor your project during your senior year. Completing Honors in Biology is NOT required for admission to a graduate program after Oberlin. You should consult with your advisor about honors as soon as possible, even if it is only a remote possibility in your plans.

**6. How is Biology coursework related to the majors in Neuro, Biochem, or Environmental Studies?**

These majors require similar introductory or cognate courses. For example, BIOL 100 is also required for the Neuroscience major. Many electives count for two or more of the above majors. In addition, some faculty members have appointments in more than one department or major and are therefore important resources for advice regarding the overlap or interface of these related disciplines.

**7. How do I arrange to consult with a biology faculty member about my courses, academic interests, and studying strategies? I am not sure how this is done and am intimidated/shy/nervous about doing it.**

Biology faculty will be happy to talk with you about your interests. Ask your current advisor (if not in the Biology faculty) about a professor she or he would recommend. Call or e-mail a Biology faculty member recommended by majors whom you know and trust. Arrange to meet with the Biology Chairperson. Take a Biology course. Come to a seminar. Ask your Resident Coordinator. Or, e-mail or approach a Biology faculty member and ask to sign up for an appointment during their office hours. A good introduction could be, "I think I want to be a biologist but am not sure. Could you help me decide?"

**8. Does the major in biology meet pre-med or pre-vet academic requirements?**

In part, yes. Medical, dental, veterinary, and allied-health-sciences schools in general require one year of college-level biology with lab, two years of chemistry with lab, one year of physics with lab, one year of math, and one year of English. The major in biology will more than adequately meet the biology requirement, and most of the chemistry requirement. We highly recommend that our majors take calculus, statistics, physics, and perhaps biochemistry, depending on their interests. Many pre-med students complete these courses. The English requirement is typically not a problem, as these courses count toward the Humanities requirement, and there are many excellent options available during a student's academic career. Some of our students who do not complete the pre-med preparation at Oberlin take the courses elsewhere during the summer or soon after graduation from Oberlin. The College's Premedical Program Director, [Maureen Peters](#), is an excellent person to consult if your career interests involve the health professions.

## EXAMPLE PATHWAYS FOR STUDENTS PLANNING A BIOLOGY MAJOR

The biology major is flexible and can be adjusted to fit individual needs. The greatest flexibility in course options is possible when students take the year-long introductory chemistry sequence in the first year because the Biology major requires 3 Chemistry courses which must be taken in order and must begin in a fall semester (CHEM 101 is normally only offered in the fall; during 2020-21, CHEM 101 will be offered in both fall and spring, but most students will only attend one of those terms). The primary benefit is having more flexibility in scheduling 300-level courses in Biology that require Chemistry, and more semesters available to study abroad. You may wish to consult your academic advisor or a Biology department faculty member for assistance in planning your path through the major.

Below, we give a brief overview of three sample pathways through the Biology major described in this document.

### **Example Pathway 1: Chemistry before Biology**

For students who are certain of their interest in majoring in biology, one recommended approach is to begin with only introductory chemistry (CHEM 101 or CHEM 103) in the first semester, leaving introductory biology (BIOL 100) for the second semester. Many students experience a more successful college transition by beginning with only a single lab science course in the first semester.

### **Example Pathway 2: Biology before Chemistry**

Students who wish to explore biology as a potential major and prefer not to take two science courses during their first semester may enroll in BIOL 100 first semester, BIOL 200 second semester, then begin the introductory chemistry series in the following fall. Students certain of their interest in majoring in biology may also take this approach.

### **Example Pathway 3: Biology and Chemistry**

Students who are eager to enroll in introductory biology and have a strong science background may choose to register for both BIOL 100 and CHEM 101 in the first semester.

Notes:

- BIOL 103 does NOT count toward the Biology major. Students completing BIOL 103 must still begin the major with BIOL 100.
- Students interested in medical or other professional schools should consult a Health Career Advisor during the first year (Premedical Health Advisor, <mailto:mpeters@oberlin.edu>). Additional information for students considering medical school is available at <https://www.oberlin.edu/career/go/graduate-professional-school/medical-school>
- Some courses outside the Biology Department count toward the major in Biology. Consult the "Checklist of Biology Major Requirements" at the beginning of this document, or the current College Catalog.
- Remember to check that you will have the necessary prerequisites for the courses you plan to take.
- Biology Department website has more information: <https://www.oberlin.edu/arts-and-sciences/departments/biology>
- A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.

### **Example Pathway 1: Chemistry (and Math) before Biology**

Many students begin with only a single lab science course in the first semester. Beginning with only introductory chemistry (CHEM 101 or CHEM 103) in the first semester, and leaving introductory biology (BIOL 100) for the second semester offers several advantages. Introductory chemistry is required for the major in biology, and given that biology makes use of insights and tools from chemistry, as well as mathematics and statistics, starting with CHEM 101 (or CHEM 103), lays the foundation for a deep, conceptual understanding of biology.

Year	Fall Courses	Spring Courses
1	CHEM 101 +lab <i>MATH 133 or CSCI 140/150*</i> (2 Elective courses)	CHEM 102 +lab BIOL 100 +lab (2 Elective courses)
2	CHEM 205 +lab BIOL 200 or 213 +lab (2 Elective courses)	BIOL 200 or 213 +lab (3 Elective courses)

*\*MATH 133 or CSCI 140/150 may be delayed until a later semester for students not wishing to start with 2 NS courses in the first semester.*

Additional required major coursework includes:

- 1 cognate quantitative course (if MATH 133 or CSCI 140/150 not taken)
- 4 2XX, 3XX, or 4XX life science courses, of which at least two must have a BIOL prefix, and at least two of which must have a lab. See the Biology Majors' Guidebook or the Course Catalog for details. Considerations:

1. Note that CHEM 205 can be taken concurrent with either BIOL 200 or BIOL 213. The material covered in CHEM 205 overlaps somewhat with BIOL 213, but there is little overlap with BIOL 200. Either BIOL 200 or BIOL 213 could be delayed, though this will reduce the number of fall semesters available to take fall-only 300-level courses for which the delayed course (200 or 213) is a prerequisite.

### **Example Pathway 2: Biology before Chemistry**

Students who wish to explore biology as a potential major and prefer not to take two science courses during their first semester may enroll in BIOL 100 first semester, BIOL 200 second semester, then begin the introductory chemistry series in the following fall. Students certain of their interest in majoring in biology may also take this approach. Beginning with biology and delaying chemistry will allow students earlier entry into upper-level elective biology courses that do not have chemistry prerequisites.

Year	Fall Courses	Spring Courses
1	BIOL 100 +lab (3 Elective courses)	BIOL 200 +lab (3 Elective courses)
2	CHEM 101 +lab (3 Elective courses)	CHEM 102 +lab (3 Elective courses)
3	BIOL 213 +lab (3 Elective courses)	CHEM 205 +lab (3 Elective courses)

Additional required major coursework includes:

- 1 cognate quantitative course,
- 4 2XX, 3XX, or 4XX life science courses, at least two of which have the BIOL prefix, and at least two of which must have a lab. See the Biology Majors' Guidebook or the Course Catalog for details. Considerations:

1. Note that CHEM 205 can be taken concurrent with BIOL 213. Some students may find this beneficial (some overlapping material) while others may wish to avoid this (both are challenging courses).

2. Delaying CHEM 101 and 102 to the second year delays taking the required core course BIOL 213. This will leave only one fall semester to take fall-only 300-level courses that require BIOL 213 as a prerequisite. You should consult the Course Catalog for the prerequisites and semesters offered for the upper-level courses you are interested in taking.
3. Delaying the year-long introductory chemistry sequence to the second year also reduces the number of semesters during which study abroad is feasible.
4. A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.

### **Example Pathway 3: Biology and Chemistry**

Students who are eager to enroll in introductory biology and have a strong science background may choose to register for both BIOL 100 and CHEM 101 in the first semester. Alternatively, some students choose to take CHEM 101 and a mathematics or computer science course in the first semester, delaying BIOL 100 to the second semester. Note that introductory chemistry may be started only in fall semester, whereas introductory biology may be taken in either semester.

<b>Year</b>	<b>Fall Courses</b>	<b>Spring Courses</b>
1	CHEM 101 +lab BIOL 100 +lab (2 Elective courses)	CHEM 102 +lab BIOL 200 +lab (2 Elective courses)
2	BIOL 213 +lab (3 Elective courses)	CHEM 205 +lab (3 Elective courses)

Additional required major coursework includes:

- 1 cognate quantitative course,
- 4 2XX, 3XX, or 4XX life science courses, at least two of which have the BIOL prefix and at least two of which must have a lab. See the Biology Majors' Guidebook or the Course Catalog for details. Considerations:
  1. Note that CHEM 205 can be taken concurrent with BIOL 213. Some students may find this beneficial (some overlapping material) while others may wish to avoid this (both are challenging courses).
  2. A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.

## Guidelines for Requesting Letters of Recommendation

1. **Choose your recommenders well.** Letters of recommendation are intended to provide information not discernible from a transcript or a resume. Such information includes class performance, technical expertise, laboratory experience, overall academic qualifications, motivation, personality characteristics, manual dexterity, work ethic, and so on. It would be wise, then, to seek letters from persons who can describe you in these regards because they have been your teachers in small class settings, or are your academic advisors, or laboratory supervisors.
2. **Be considerate.** Give your recommender *at least two weeks* notice.
3. **Come prepared.** Provide your recommender the following materials or information:
  - a. a list of individuals or institutions to whom letters should be sent
  - b. clearly indicated deadlines for each letter
  - c. recommendation forms, if required  
N.B.: Fill out applicant sections on these forms before giving them to the recommender. Do not overlook spaces for your signature. Most recommendation forms require that you sign a waiver that guarantees confidentiality of the recommendation. In general, it is good to waive your right to see a recommendation letter written on your behalf because the recipient of the letter will have greater confidence that the letter was written candidly.
  - d. current resume or curriculum vitae
  - e. current external or internal transcript
  - f. copy of relevant application essay and/or letter of application
  - g. if available, your scores on the GRE, MCAT, etc.
  - h. any additional information (job description, work experience, extra-curricular activities) that may be relevant to the position you are seeking
4. **Follow up.** If you wish to be notified when the letter you have requested has been sent, you should tell your recommender and perhaps ask that they notify you by email. Recommenders are generally eager to find out whether or not their recommendation has helped you, so it is a nice touch to let them know what happened.