Biology Major

Biology touches every aspect of our lives—from the food we eat and our health, to the plants and animals who share our planet. Biology majors gain a broad understanding of the fundamental nature and characteristics of living things and the way they interact. The study of biology covers the full range of life sciences, from cancer genes to acid rain, from lichens to marine mammals.

1. Required Courses From Other Programs

   Note: Grades in the following courses must be at least C-.

   Chem 1021-1022—Chemical Principles I-II
   Chem 2301-2302—Organic Chemistry I-II
   Chem 2311—Organic Chemistry Lab
   Math 1271-1272 or 1281-1282—Calculus I-II
   Phys 1201-1202—General Physics I-II
   or  Phys 1301-1302—Introductory Physics I-II

2. General and Organismal Biology—Choose sequence A or B:

   **Sequence A. (preferred sequence):**
   Biol 1001—Introductory Biology I: Evolutionary and Ecological Perspectives
   Biol 1002—Introductory Biology II: Molecular, Cellular, and Developmental Perspectives

   Choose one organismal biology course or course pair from the following list:

   **Animal:** Biol 2012 (General Zoology)
   or  Biol 3211 & 2005 (Animal Physiology & Animal Diversity Lab)
   **Plant:** Biol 2022 (General Botany)
   or  Biol 3002 & 3005 (Plant Biology: Function with Lab)
   or  Biol 3007 (Plant Biology: Diversity & Adaptation)
   **Microbiology:** Biol/MicB/VPB 2032 (General Microbiology with Lab)
   or  Biol/MicB 3301 (Biology of Microorganisms)

   **Sequence B.**
   Biol 1009—General Biology

   Choose two organismal biology courses or course pairs from two different sub-groups from the following list:

   **Animal:** Biol 2012 (General Zoology)
   or  Biol 3211 & 2005 (Animal Physiology & Animal Diversity Lab)
   **Plant:** Biol 2022 (General Botany)
   or  Biol 3002 & 3005 (Plant Biology: Function with Lab)
   or  Biol 3007 (Plant Biology: Diversity & Adaptation)
   **Microbiology:** Biol/MicB/VPB 2032 (General Microbiology with Lab)
   or  Biol/MicB 3301 (Biology of Microorganisms)

3. Biology Core—Complete each of the following:

   Biol/BioC 3021—Biochemistry
   Biol 4003—Genetics
   Biol 4004—Cell Biology

   Choose one course from: Biol 3407—Ecology, Biol 3409—Evolution, or Biol 3411—Animal Behavior

4. Electives in the Major:

   Complete eleven additional upper division credits* in mathematics, physical, biological science and/or computer science. Must include two additional laboratory or fieldwork courses or course pairs and a major project. (Phsl 3051 may not be used to fulfill this requirement.)

   **Major Project**
   Students must complete a 3-6 credit independent research project, which can be applied to the eleven elective credit requirement. Select from BioC, EEB, GCD, MicB, NSci, or PBio using one of the following course numbers:
   4993—Directed Study
   4973W—Writing intensive directed study
   4994—Directed Research†
   4974W—Writing Intensive Directed Research†

   † Only directed research credits may be applied to the 2 lab/field class requirements. Students may satisfy both of the lab/field course requirements through directed research only if 3 credits of 4994 or 4974W are completed in 2 different labs.

*Upper division electives (3xxx, 4xxx, or 5xxx courses having Biol 1002 or 1009 as a prerequisite) may be selected from any CBS department, as well as appropriate mathematics, physical science, and computer science courses. Biol 3211, Biol 3002 & 3005, Biol 3007, or Biol/MicB 3301 may be used if not used to satisfy the organismal biology requirement.
Approved lab/field elective courses:

Biol/NSci 3105 (4105) and 3115 (4115)—Neurobiology Laboratory I-II
BioC 4025—Laboratory in Biochemistry
BioC 4125—Laboratory in Molecular Biology and Biotechnology
BioC 4974W—Directed Research: Writing Intensive
BioC4994—Directed Research
EEB 4014W—Ecology of Vegetation
EEB 4016W—Ecological Biogeography
EEB 4129—Mammalogy
EEB 4134—Introduction to Ornithology
EEB 4136—Iichthyology
EEB 4605—Limnology Laboratory
EEB 4974W—Directed Research: Writing Intensive
EEB 4994—Directed Research
GCD 4015—Genetics Laboratory
GCD 4025—Cell Biology Laboratory
GCD 4111—Histology
GCD 4974W—Directed Research: Writing Intensive
GCD 4994—Directed Research
MicB 4215—Advanced Laboratory: Microbial Physiology and Diversity
MicB 4235—Advanced Laboratory: Virology, Immunology, and Microbial Genetics
MicB 4974W—Directed Research: Writing Intensive
MicB 4994—Directed Research
NSci 4974W—Directed Research: Writing Intensive
NSci 4994—Directed Research
PBio 4404—Developmental Plant Anatomy
PBio 4511—Flowering Plant Systematics
PBio 5416—Plant Morphology, Development, and Evolution
PBio 4974W—Directed Research: Writing Intensive
PBio 4994—Directed Research

All 38xx and 48xx CBS courses offered at the Lake Itasca Forestry and Biological Station are acceptable (if not used to satisfy other requirements in the major).

Courses not required for the major, but highly recommended:

**Biol 1020**—Biology Colloquium—Introduction to the diverse field of biology through seminars, lab tours, trips to Itasca Biological Station, and interaction with other biology students and faculty. (Course may be repeated once)


**Biol 2201**—Introduction to Computing in Biology—(prereq Biol 1009 or 1002, biology major) Hands-on use of computers to show how computers manipulate data, prepare graphs/graphics, acquire/analyze scientific data, perform literature searches, prepare scientific presentations, communicate via network.

Declaring the major:

To declare the major, call the biology department in 223 Snyder Hall, 612-624-9717, to schedule an appointment with a biology adviser.

Resources

Be sure to check out the Biology newsletter at: [http://www.cbs.umn.edu/bionews/](http://www.cbs.umn.edu/bionews/)

The CBS Career Center is open to CLA Biology majors. Stop by 229 Snyder Hall for information about jobs and internships for biology majors.
**Possible Areas of Employment**

- **Basic Research**—microbiologist, animal behaviorist, biotechnologist
- **Environmental Science**—resources manager, recreation planner, political lobbyist
- **Health Care**—nurse, occupational or physical therapist, physician, pharmacist
- **Business**—technical writer, recruiter, salesperson, consultant
- **Education**—teacher, academic adviser, curriculum or program developer

**Career and Community Learning Center**

The Career and Community Learning Center (CCLC), located in 135 Johnston, supports CLA students making career decisions.

**Hours**

The office’s Resource Library in 135 Johnston is open from 8:00am-4:30pm Monday-Friday, and no appointment is necessary for students who wish to look at the resources listed in this handout. The office’s phone number is (612) 624-7577.

For students with additional questions after their initial visit, appointments are available with professional staff members to discuss career planning. The staff in the Resource Library will help you schedule an appointment.

**Workshops and Classes**

CCLC offers career workshops and credit-bearing courses covering resume writing, job and internship searches, interviewing, and other subjects. A current schedule is available online at [www.cclc.umn.edu](http://www.cclc.umn.edu).

**Volunteer Resources**

Many science students are interested in gaining volunteer experience. CCLC can help with this too! We actually have two offices. The career office is in 135 Johnston, but a second office is located in 345 Fraser.

In 345 Fraser, advisers are available to meet with students who wish to arrange volunteer opportunities or who wish to enroll in classes that involve service-learning. For more information, see [www.cclc.umn.edu](http://www.cclc.umn.edu) or call (612) 624-2044.

**Graduate and Professional School Information**

CCLC’s Resource Library includes information on graduate and professional schools. Students visiting the office can learn more about potential programs and application procedures.

In addition, CCLC staff members are available to review drafts of personal statements for students applying to graduate programs. While we can’t substitute for the Writing Center or others who are experts in grammar and other intricacies of writing essays, we are happy to offer feedback. See a CCLC peer adviser in 135 Johnston to schedule an appointment.

Finally, CCLC coordinates an annual Graduate and Professional School Day, attended by representatives from programs across the United States.
Resources Available at the Career and Community Learning Center, 135 Johnston Hall

Allied Health Professions by The Arco Editorial Board
Careers in Health Care by Barbara Swanson
Careers in High Tech by Nick Basta
Careers in Medicine by Terence J. Sacks
Careers in Nursing by Terence J. Sacks
Careers in Science by Thomas A Easton
Careers in the Environment by Fasulo and Walker
Career Opportunities in Health Care by Shelly Field
Great Jobs for Biology Majors by Blythe Camenson
Opportunities in Biological Sciences Careers by C. Winters
Opportunities in Biotechnology Careers by Sheldon Brown
Opportunities in Research and Development Careers by Jan Goldberg
Real People Working in Health Care by Blythe Camenson
Real People Working in Science by Jan Goldberg

Web Sites of Interest:

University of Minnesota College of Biological Sciences http://biosci.cbs.umn.edu/
American Association for the Advancement of Science www.aaas.org
American Institute of Biological Sciences www.aibs.org
American Society for Microbiology
BiologyJobs.com BiologyJobs.com
Bio Online Career Center http://career.bio.com/
Careers in Biochemistry and Microbiology (Federation of American Societies for Experimental Biology) www.faseb.org/careers/pubs/unlock.htm
Careers in Biotechnology www.bio.org/career/career1.html