Honors Project Option

Complete two semesters of a BIO or PSY honors project:

BIO U970	Junior/Senior Project 1	4 SH
with BIO U971	Junior/Senior Project 2	4 SH
or PSY U970	Junior/Senior Project 1	4 SH
with PSY U971	Junior/Senior Project 2	4 SH

Directed Study Option

Complete two semesters of directed study, which includes a final oral presentation or written report:

BIO U924	Directed Study	4 SH
PSY U924	Directed Study	4 SH

BEHAVIORAL NEUROSCIENCE MAJOR CREDIT REQUIREMENT

Complete 88 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BIOCHEMISTRY

www.biochemistry.neu.edu

Biochemistry includes nearly the entire spectrum of science—from physics and chemistry to biology and medicine. The biochemistry major, sponsored jointly by the departments of biology and chemistry, provides a strong foundation in mathematics and the physical sciences as well as thorough training in biochemistry, biology, and chemistry. In addition to formal classwork, opportunities are available for participation in faculty research programs on an individual basis or through the honors program. The large number of biotechnology companies and biomedical facilities in the Boston area provides a rich source of opportunities through Northeastern's program of cooperative education.

A Bachelor of Science degree in biochemistry allows students to enter the job market directly or go on to graduate, medical, veterinary, dental, law, or business school. Students may find positions in biotechnology companies, pharmaceutical companies, or government agencies, working in laboratory or clinical research, quality control, production, information systems, marketing, or technical sales. Students may also pursue graduate study in biochemistry, molecular biology, cell biology, biophysics, genetics, toxicology, biotechnology, clinical chemistry, animal science, nutrition, plant science, or other biomedical sciences.

Students who are interested in attending medical, dental, or veterinary school following graduation are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

To graduate with a major in biochemistry, a student must have a cumulative grade-point average (GPA) of 2.000 for all science and mathematics courses required for the major.

Students must maintain a minimal grade-point average of 2.000 to remain in this program. In addition, students must complete the arts and sciences core curriculum and experiential education requirement.

BS in Biochemistry

COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS

See page 46 for requirement list.

BIOCHEMISTRY BREADTH COURSES

Mathematics Courses

Complete the following two courses:

MTH U151	Calculus and Differential Equations for Biology 1	4 SH
MTH U152	Calculus and Differential Equations for Biology 2	4 SH

Physics Courses

Complete the following two courses and corresponding labs:

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
or PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
or PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH
or PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH
or PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

Computer Science Course

Complete one approved computer science course from the following list:

CET U201	Visual Basic Programming	4 SH
GE U111	Engineering Problem-Solving and Computation	4 SH

BIOCHEMISTRY MAJOR REQUIREMENTS

Principles of Biology

Complete the following two courses and corresponding labs:

BIO U101	Principles of Biology 1	4 SH
with BIO U102	Lab for BIO U101	1 SH
or BIO U111	General Biology 1	4 SH
with BIO U112	Lab for BIO U111	1 SH
BIO U103	Principles of Biology 2	4 SH
with BIO U104	Lab for BIO U103	1 SH
or BIO U113	General Biology 2	4 SH
with BIO U114	Lab for BIO U113	1 SH

Molecular Biology

Complete the following two courses and corresponding lab:

BIO U301	Genetics and Molecular Biology	4 SH
with BIO U302	Lab for BIO U301	1 SH
BIO U407	Molecular Cell Biology	4 SH

Chemistry Courses

Complete the following six courses and corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH
CHM U311	Organic Chemistry 1	4 SH
with CHM U312	Lab for CHM U311	1 SH
CHM U313	Organic Chemistry 2	4 SH
with CHM U314	Lab for CHM U313	1 SH
CHM U321	Analytical Chemistry	4 SH
with CHM U322	Lab for CHM U321	1 SH
CHM U401	Physical Chemistry 1	4 SH
with CHM U402	Lab for CHM U401	1 SH

Biochemistry Courses

Complete the following course and corresponding lab:

BIO U323	Biochemistry	4 SH
with BIO U324	Lab for BIO U323	1 SH

Capstone

Complete one of the following courses:

BIO U701	Biology Capstone	4 SH
CHM U770	Chemistry Capstone	4 SH

Biology and Chemistry Advanced Electives

Complete four advanced courses from biology and chemistry with a minimum of one from each department. In addition, at least one approved lab course must be taken, requiring a total of 17 semester hours:

BIOLOGY

BIO U311 to BIO U699

CHEMISTRY

CHM U310 to CHM U699

LABS

BIO U579	Biochemistry Methods Laboratory	5 SH
CHM U332	Lab for CHM U331	1 SH
with CHM U331	Bioanalytical Chemistry	4 SH
CHM U522	Instrumental Methods of Analysis Lab	4 SH
with CHM U521	Instrumental Methods of Analysis	1 SH
CHM U532	Chemical Synthesis Characterization Lab	4 SH
with CHM U531	Chemical Synthesis Characterization	1 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

BIOCHEMISTRY MAJOR CREDIT AND GPA REQUIREMENTS

Complete 96 semester hours in the major with a cumulative GPA of 2.000.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

136 total semester hours required
Minimum 2.000 GPA required

BIOLOGY

www.biology.neu.edu

Susan Powers-Lee, PhD
Professor and Chair

MATTHEWS DISTINGUISHED UNIVERSITY PROFESSORS

Phyllis R. Strauss, PhD
Carol M. Warner, PhD

PROFESSORS

Ahmed T. Abdelal, PhD
Frederick C. Davis, PhD
H. William Detrich, PhD
Edward L. Jarroll, PhD
Gwilym S. Jones, PhD
Kim Lewis, PhD
James M. Manning, PhD
Richard L. Marsh, PhD
Charles A. M. Meszoely, PhD

COLLEGE OF ARTS AND SCIENCES DISTINGUISHED ASSOCIATE PROFESSOR

Wendy A. Smith, PhD

ASSOCIATE PROFESSORS

Joseph L. Ayers, PhD
Kostia Bergman, PhD
Donald P. Cheney, PhD
Charles H. Ellis Jr., PhD
Donald M. O'Malley, PhD
Jacqueline M. Piret, PhD
Daniel C. Scheirer, PhD

ASSISTANT PROFESSORS

Slava S. Epstein, PhD
Valentin A. Ilyin, PhD
Rebeca B. Rosengaus, PhD
Geoffrey C. Trussell, PhD

By majoring in biology, students develop a basic understanding of the organization and the processes of life, from molecules and cells through organs and organ systems to populations, species, ecosystems, and evolution. The major offers the mathematical, chemical, and physical background necessary for understanding biology and the practical scientific skills associated with each of these areas. It allows students to begin to specialize in a subdiscipline of biology such as animal physiology, cell biology, ecology, marine biology, microbiology, molecular biology, plant biology, zoology, and so forth. Numerous opportunities for relevant positions are available through Northeastern's program of cooperative education. A marine biology concentration, designed to provide biology majors with a strong foundation in marine biology and related disciplines, is now offered through the Northeastern University Marine Science Center in Nahant.

The undergraduate biology major prepares students for careers in the life sciences, including medical, dental, and other health-related fields. Students may find employment in federal, state, industrial, hospital, or university laboratories or in industries involved in the manufacture and distribution of pharmaceuticals, biological products, food, or scientific equipment. Biologists also work in fisheries, forestry services, county and state agencies, museums, aquariums, research vessels, and marine stations. Graduate study culminating in a master's or doctoral degree can lead to careers in upper-level teaching or research in any of the life sciences.

Premedical, predental, and other preprofessional students are urged to consult with the preprofessional advisory committee early in their careers at Northeastern.

To graduate with a major in biology, a student must have a cumulative GPA of 2.000 for all science and mathematics courses required for the major.

BS in Biology

COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS

See page 46 for requirement list.

BREADTH COURSES FOR BIOLOGY

Mathematics

Complete the following two courses:

MTH U151	Calculus and Differential Equations for Biology 1	4 SH
MTH U152	Calculus and Differential Equations for Biology 2	4 SH

Chemistry

Complete the following four courses and corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH
CHM U311	Organic Chemistry 1	4 SH
with CHM U312	Lab for CHM U311	1 SH
CHM U313	Organic Chemistry 2	4 SH
with CHM U314	Lab for CHM U313	1 SH

Physics

Complete two courses from the following list and corresponding labs (PHY U145 and PHY U147 are recommended):

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
or PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
or PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH
or PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH
or PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

Intermediate or Advanced Science

Complete one intermediate or advanced science course from the following list:

BIO U311 to BIO U699

CHM U321	Analytical Chemistry	4 SH
with CHM U322	Lab for CHM U321	1 SH

CHM U331 to CHM U699

GEO U300 to GEO U699

MTH U280 to MTH U699

PHY U303 to PHY U699

PSY U202	Biological Basis of Mental Illness	4 SH
PSY U458	Psychobiology	4 SH
PSY U510	Psychopharmacology	4 SH

BIOLOGY MAJOR REQUIREMENTS

Required Biology

Complete the following three courses and corresponding labs:

BIO U101	Principles of Biology 1	4 SH
with BIO U102	Lab for BIO U101	1 SH
or BIO U111	General Biology 1	4 SH
with BIO U112	Lab for BIO U111	1 SH
BIO U103	Principles of Biology 2	4 SH
with BIO U104	Lab for BIO U103	1 SH
or BIO U113	General Biology 2	4 SH
with BIO U114	Lab for BIO U113	1 SH
BIO U301	Genetics and Molecular Biology	4 SH
with BIO U302	Lab for BIO U301	1 SH

Experiential Education Introduction

Complete the following course:

BIO U106	Introduction to Experiential Education	1 SH

BIOLOGY MAJOR ELECTIVES

Cellular and Molecular Biology

Complete one course and corresponding lab from the following list:

BIO U319	Regulatory Cell Biology	4 SH
with BIO U320	Lab for BIO U319	1 SH
BIO U321	Microbiology	4 SH
with BIO U322	Lab for BIO U321	1 SH
BIO U323	Biochemistry	4 SH
with BIO U324	Lab for BIO U323	1 SH

Organismal and Population Biology

Complete one course and corresponding lab from the following list:

BIO U311	Ecology	4 SH
with BIO U312	Lab for BIO U311	1 SH
BIO U313	Plant Biology	4 SH
with BIO U314	Lab for BIO U313	1 SH
BIO U315	Invertebrate Zoology	4 SH
with BIO U316	Lab for BIO U315	1 SH
BIO U317	Vertebrate Zoology	4 SH
with BIO U318	Lab for BIO U317	1 SH

Intermediate and Advanced Biology

Complete three biology courses (at least 13 semester hours) at the BIO U311 level or above.

Biology Capstone

Complete the following course:

BIO U701	Biology Capstone	4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

BIOLOGY MAJOR CREDIT REQUIREMENT

Complete 83 semester hours in the major with a cumulative GPA of 2.000.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

136 total semester hours required
Minimum 2.000 GPA required

Minor in Biology

This minor is not available for students who major in Biochemistry, Behavioral Neuroscience, or any dual major that involves biology.

REQUIRED COURSES

Complete five biology courses. Three of the courses must be intermediate to advanced (in the BIO U300 to BIO U699 range).

REQUIRED LABS

Three of the five courses must contain a lab co-requisite.

BREADTH COURSE

Complete one CHM, GEO, or PHY course that serves as a prerequisite.

GPA REQUIREMENT

2.000 GPA required in the minor

Minor in Marine Biology

REQUIRED COURSES

Complete the following two courses:

BIO U101	Principles of Biology 1	4 SH
BIO U103	Principles of Biology 2	4 SH

ELECTIVE COURSES

Complete three courses from the following list:

BIO U151	Introduction to Marine Biology	4 SH
BIO U315	Invertebrate Zoology	4 SH
BIO U501	Marine Botany	4 SH
with BIO U502	Lab for BIO U501	1 SH
BIO U503	Marine Invertebrate Zoology	4 SH
with BIO U504	Lab for BIO U503	1 SH
BIO U505	Biology of Corals and Coral Reefs	3 SH
BIO U507	Biology and Ecology of Fishes	3 SH
BIO U509	Marine Birds and Mammals	2 SH
with BIO U510	Lab for BIO U509	1 SH
BIO U511	Adaptations of Aquatic Organisms	3 SH
BIO U513	Tropical Terrestrial Ecology	1 SH
BIO U515	Benthic Marine Ecology	3 SH
BIO U517	Oceanography	2 SH
with BIO U518	Lab for BIO U517	1 SH
BIO U519	Ocean and Coastal Processes	3 SH
BIO U521	Experimental Design Marine Ecology	4 SH
with BIO U522	Lab for BIO U521	1 SH
BIO U523	Molecular Marine Biology	3 SH
BIO U525	Marine Microbial Ecology	2 SH
with BIO U526	Lab for BIO U525	1 SH

GPA REQUIREMENT

2.000 GPA required in the minor