

BIOLOGY MAJOR (B.S.)

<https://colsa.unh.edu/biological-sciences/program/bs/biology-major>

Description

The biology major is designed to provide a strong, broad education in biological sciences to students interested in the life sciences. The biology major integrates theoretical and practical (hands-on laboratory and field work) courses in different aspects of the biology of animals, microbes, and plants. The curriculum is designed to reflect the diversity of biological systems in nature. It encompasses the study of structural and functional relationships of living organisms at the molecular, cellular, and organismal level, the interactions of living systems with the environment and with each other, and the evolutionary relationships of various forms of life. The goal is to create a facilitative environment for those with a scholarly interest in the biological sciences, and to extend their understanding, awareness, and appreciation of the diversity of the biological sciences.

The major is aimed at promoting excellence in biological science education by involving undergraduate students in strong interaction with faculty both in the classroom and in research laboratories, and encouraging the development of quality undergraduate programs in all aspects of biology.

The biology major prepares students for graduate work in the biological and medical fields, and for job opportunities in industry (biomedical, pharmaceutical, environmental, and biotechnological) and governmental research, and secondary school teaching. Completion of the four-year undergraduate program plus a fifth-year internship will be necessary for biology teaching certification. Students who plan to enter medical, dental, or related professional schools are advised to confer with their faculty adviser to build the requirements for these programs into their academic majors.

Courses in the biology major are selected from departments that constitute the biological sciences community at UNH. The flexibility of the curriculum allows student choice of a wide selection of courses in various departments. Students in the major take a biology core curriculum consisting of introductory and upper-level science courses. They must also take seven additional courses in the biological sciences; three of these must be selected from course lists in three broad categories.

While students are advised to declare the biology major as incoming first-year students to assure adequate program planning, transfer into the program at a later stage is also possible. Since several of the other biological sciences majors share the same biology core curriculum, it is quite easy to change to or from these other majors.

Requirements

Biology Core Curriculum

The biology courses in the core curriculum constitute an integrated sequence of courses imparting basic skills and concepts of biology to expose students to the breadth of knowledge inherent in the biological sciences. The biology core allows a student to obtain a broad background in biology, and in the related physical sciences and math.

Code	Title	Credits
Core Curriculum Courses		
BIOL 400	Professional Perspectives on Biology ¹	1
BIOL 412	Introductory Biology: Evolution, Biodiversity and Ecology	4
BIOL 411	Introductory Biology: Molecular and Cellular	4
BIOL 541	General Ecology	4
BMS 503 & BMS 504	General Microbiology and General Microbiology Laboratory	5
GEN 604	Principles of Genetics	4
CHEM 403 & CHEM 404	General Chemistry I and General Chemistry II	8
MATH 424B or MATH 425	Calculus for Life Sciences or Calculus I	4
BIOL 528	Applied Biostatistics I	4
PHYS 401 & PHYS 402	Introduction to Physics I and Introduction to Physics II	8
CHEM 545 & CHEM 546	Organic Chemistry and Organic Chemistry Laboratory ²	
BMCB 658 & BMCB 659	General Biochemistry and General Biochemistry Lab ²	
Total Credits		46

¹ BIOL 400 Professional Perspectives on Biology is required only for first-year biology majors.

² Students exploring pre-health professions should take a full year of Organic Chemistry (CHEM 651/653 and CHEM 652/654) in place of CHEM 545/CHEM 546 and BMCB 658/BMCB 659.

Biology Electives

In addition to the biology core curriculum, students must complete seven biology elective courses. One course must be taken from each of the three categories/disciplines; the other four electives can be chosen from the category lists or can be any other biological sciences course with approval of the student's adviser. At least two of these must be courses with labs. The last four courses must be 500-level or above. There must be one animal-identified course (A) and one plant-identified course (P). One capstone experience, supervised and approved within the major, is required of all seniors. The capstone requirement is completed in the senior year, and may be satisfied by a course (C), created work or product, or some form of experiential learning (e.g., honors thesis, mentored research project, and other special student activity). A complete list of approved courses in each category/discipline is available from the student's adviser, the Department of Biological Sciences office, and the biology website at colsa.unh.edu/dbs/biology. (<http://colsa.unh.edu/dbs/biology>) Corequisite lecture and lab courses count as one course.

Code	Title	Credits
Category 1: Form and Function (Morphology, Anatomy and Physiology)		
ANSC 511	Anatomy and Physiology (A)	4
ANSC 512	Anatomy and Physiology (A)	4
ANSC 701	Physiology of Reproduction (A)	4
BIOL 701	Plant Physiology (P)	5
BIOL 702	Techniques in Plant Physiology and Biochemistry (P, C)	4
BIOL 758	Plant Anatomy (P)	5

BMS 507	Human Anatomy and Physiology I (A)	4	ZOOL 710	Ichthyology (A)	4
BMS 508	Human Anatomy and Physiology II (A)	4	ZOOL 733	Behavioral Ecology (A, C)	4
BMS 702	Endocrinology	4	ZOOL 745	Biology and Diversity of Insects (A, C)	4
NR 625	Physiological Ecology	4	MEFB 510	Field Ornithology (SML, A)	4
BMS 718	Mammalian Physiology (A)	4	MEFB 630	Biodiversity and Biology of Marine Invertebrates (SML, A)	4
ZOOL 518	Vertebrate Morphology (A)	5	MEFB 674	Ecology and Marine Environment (SML)	4
ZOOL 625	Principles of Animal Physiology (A, ZOOL 626 Lab optional)	3	MEFB 714	Field Animal Behavior (SML, A, C)	4
ZOOL 773	Physiology of Fish (A)	4	BIOSM 1780	Evolution and Marine Diversity (SML)	4
ZOOL 777	Neuroethology	3	Other Elective Options		
MEFB 754	Anatomy and Function of Marine Vertebrates (SML, A)	4	BIOL 700	Current and Controversial Issues in Biology	4
BioSM 1650	Whales, Seals and Sharks (SML, A)	3	BMS 602	Pathogenic Microbiology	5
Category 2: Genetics/Development (including molecular biology and bioinformatics)			& BMS 603	and Pathogenic Microbiology Laboratory	
ANSC 612	Genetics of Domestic Animals (A)	4	BMS 655	Human and Animal Parasites (A)	3
BMCB 605	Eukaryotic Cell and Developmental Biology	4	BMS 703	Infectious Disease and Health	4
GEN 704	Genetics of Prokaryotic Microbes	5	BMS 706	Virology	5
GEN 705	Population and Quantitative Genetics	4	& BMS 708	and Virology Laboratory	
GEN 706	Human Genetics (A)	4	BMS 711	Toxicology	4
GEN 711	Genomics and Bioinformatics	4	HMP 501	Epidemiology and Community Medicine	4
GEN 771	Molecular Genetics	4	NSB 727	Animal Communication (A)	4
GEN 772	Evolutionary Genetics of Plants (P, C)	4	NSB 728	Research Methods in Animal Behavior (A)	4
GEN 774	Techniques in Plant Genetic Engineering and Biotechnology (P, C)	4	PSYC 531	Psychobiology	4
ZOOL 529	Developmental Biology (A)	4	SAFS 651	Plant Pathology (P)	4
ZOOL 736	Genes and Behavior (A, C)	4	ZOOL 610	Principles of Aquaculture	4
Category 3: Evolution, Ecology and Biodiversity (including population biology)			ZOOL 726	Conservation Behavior	4
BIOL 510	Mushrooms, Molds, and Mildews: Introduction to the Fungal Kingdom	4	ZOOL 750	Biological Oceanography	4
BIOL 704	Plant-Microbe Interactions	3	Note: It is strongly recommended that students participate in an exchange semester at another university, or in a field-oriented program or internship. There are many exchange opportunities available in which a full semester of credits toward the major may be earned. It is further recommended that students explore possibilities of one or more semesters of independent investigation (research projects). For details, students should contact their adviser. Financial support is available for most of these programs. In addition, students can explore the courses at the Shoals Marine Laboratory (SML), which provides an excellent setting for several "field-oriented" courses during the summer. Often there is financial support available for the SML programs. (See the SML website at https://marine.unh.edu/SML or the Cornell website at http://www.shoalsmarinelaboratory.org for details.)		
BIOL 720	Plant-Animal Interactions	4	One 600, 695, 795, or 796 experience totaling three or more credits or any two 795-796 experiences of two credits each can fulfill one course requirement in any category with adviser approval. A Petition for Academic Variance approved by the chair of the Department of Biological Sciences is required to count 795-796 experiences for more than one major-required course. Students should check the biology website colsa.unh.edu/dbs/biology (http://colsa.unh.edu/dbs/biology) and the UNH online catalog for updates and current course offerings.		
BIOL 752	Mycology	4	Academic Requirements		
BIOL 566	Systematic Botany (P)	4	To receive the B.S. degree in biology, students must complete 128 credit hours with at least a 2.0 cumulative grade-point average. Courses must include all UNH Discovery Program requirements, biology core curriculum requirements, seven additional courses from the biological sciences, and a capstone experience or course. The capstone explores areas of interest based on the integration of prior learning. Departments are responsible for certifying that graduating seniors have met the capstone		
GEN 715	Molecular Evolution	4			
MEFB 525	Introduction to Aquatic Botany (P)	4			
MEFB 527	Aquatic Animal Diversity (A)	4			
MEFB 717	Lake Ecology	4			
MEFB 722	Marine Phycology (P, C)	4			
MEFB 725	Marine Ecology (C)	4			
MEFB 747	Aquatic Plants in Restoration/Management (P)	4			
NR 506	Forest Entomology (A)	4			
NR 642	Introduction to Biogeography	4			
NR 660	Ecology and Biogeography of New Zealand	5			
NR 663	Applied Directed Research in New Zealand (C)	4			
NR 712	Mammalogy (A)	4			
NR 713	Quantitative Ecology	4			
NR 765	Community Ecology	4			
ZOOL 542	Ornithology (A)	4			
ZOOL 613	Animal Behavior (A)	5			
ZOOL 628	Marine Invertebrate Evolution and Ecology (A)	5			
ZOOL 690	Evolution (C)	4			

requirement for their majors. A minimum grade of C- is required in all biological science courses that are counted toward the requirements for a degree in biology. Students who expect to compete successfully for post-baccalaureate programs should attain a cumulative GPA of 3.0 or higher by the end of the sophomore year and maintain it at that level.