The Department of Biology is the general biology research and teaching department at the University of Vermont. The department is committed to the active pursuit of scientific knowledge through integrative, cutting-edge research in neuroscience, cell biology, ecology, and evolution. Biology majors at UVM may concentrate on cell and molecular biology, neurobiology, environmental biology, forensic biology and pre-professional medical or veterinary biology, or they may remain generalists. In all programs the focus is on learning through small, experience-based classes, hands-on research and close faculty interaction. UVM Biology professors are respected, internationally known scientists and recipients of generous grants each year from organizations including the National Institutes of Health, the Environmental Protection Agency, and the National Science Foundation. Student research is encouraged and supported by stipends, departmental and university grant programs, and awards.

The Bachelor of Arts in Biology provides a general biology program that can be structured to meet student interests in a variety of concentrations including pre-professional (human or veterinary medical, dental, or allied health fields), cell and molecular biology, environmental biology (ecology, evolution, animal behavior), genetics, forensic biology, or neurobiology. Students should consult frequently with departmental faculty advisors to choose a structured set of elective biology courses.

**MAJORS**

**BIOLOGY MAJORS**

Biology B.A.

Biological Science B.S.

Zoology B.A.

Zoology B.S.

**MINORS**

**BIOLOGY MINORS**

Biology

Zoology

**GRADUATE**

Biology AMP

Biology M.S.

Biology M.S.T.

Biology Ph.D.

See the online Graduate Catalogue for more information

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**Biology Courses**

**BIOL 001. Principles of Biology. 0 or 4 Credits.**

Principles of cellular biochemistry; cell biology; genetics and evolution. Topics: biochemistry; metabolism, cell structure/function; respiration; photosynthesis; molecular, Mendelian and population genetics; genetics of evolution. Credit not given for both BIOL 001 and BCOR 011.

**BIOL 002. Principles of Biology. 0 or 4 Credits.**

Principles of organismal biology; nature of scientific inquiry, plant form and function, pollination ecology, animal phylogeny illustrated by comparative anatomy and physiology; animal behavior. Credit not given for both BIOL 002 and BCOR 012.

**BIOL 003. Human Biology. 3 Credits.**

For nonscience majors. Selected biological topics relevant to humans, such as cancer, human genetics, environmental toxicants; biological concepts necessary for understanding these problems.

**BIOL 004. The Human Body. 0 or 3 Credits.**

For nonscience majors. Introduction to basic human anatomy and organ system physiology emphasizing normal homeostatic mechanisms and the changes that accompany common disorders and diseases.

**BIOL 006. Evolutionary Biology. 3 Credits.**

For nonscience majors. The process of biological evolution; evidence for evolution; mechanisms of evolutionary change; origin of adaptations; evolution of behavior; social and reproductive behavior.

**BIOL 009. Science As a Way of Knowing. 3 Credits.**

History of scientific method and its application to generation of knowledge. How science seeks to understand the origin and diversity of life. Lab research project.

**BIOL 013. Human Biology Laboratory. 1 Credit.**

For nonscience majors. Optional virtual laboratory available for BIOL 003. Selected biological concepts and topics relevant to humans, such as cancer, human genetics, environmental toxicants.

**BIOL 014. The Human Body Laboratory. 1 Credit.**

For nonscience majors. Optional virtual laboratory for BIOL 004. Introduction to basic human anatomy and organ system physiology emphasizing normal and diseased homeostatic mechanisms.

**BIOL 086. Intro to Forensic Biology. 3 Credits.**

An introductory-level course covering crime scene investigation, methods of evidence collection, identifying a body, cause of death and producing DNA profiles.

**BIOL 095. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**BIOL 096. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.
BIOL 106. Cell Structure and Function. 0 or 4 Credits.
Molecules, structures, and physiology of cell membranes; energy
transformations; nuclear and cytoplasmic events; extracellular matrix;
cell signaling; and cell types and fates. Prerequisites: BIOL 001 and
BIOL 002 or BCOR 011 and BCOR 012; CHEM 141, CHEM 142
recommended.

BIOL 168. Mathematics of Biology. 3 Credits.
Discrete biological processes: nonlinear differential equations.
Continuous processes: ordinary differential equations, phase plane
methods, quantitative solutions. Applications: population dynamics,
epidemiology, Michaelis-Menten kinetics, autocatalysis, muscle
contraction. Includes a lab. May not be taken concurrently with or
after MATH 268. Pre/co-requisites: MATH 022 or MATH 023,
MATH 124. Cross-listed with: MATH 168.

BIOL 191. Research Apprenticeship. 0-3 Credits.
Participation in a faculty research project. Students must follow all
departmental guidelines. May be repeated for credit.

BIOL 192. Research Apprenticeship. 0-3 Credits.
Participation in a faculty research project. Students must follow all
departmental guidelines. May be repeated for credit.

BIOL 193. Internship in Biology. 3 Credits.
Professional experience, containing a substantial academic
component, with an off-campus organization or campus unit other
than Biology Department. Students must follow all departmental
guidelines. Prerequisite: Department permission.

BIOL 194. Internship in Biology. 3 Credits.
Professional experience, containing a substantial academic
component, with an off-campus organization or campus unit other
than Biology Department. Students must follow all departmental
guidelines. Prerequisite: Department permission.

BIOL 195. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOL 196. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOL 197. Undergraduate Research. 3 or 6 Credits.
Individual research under faculty guidance. Enroll following
departmental guidelines. Pre/co-requisites: Junior/Senior standing;
Department permission.

BIOL 198. Undergraduate Research. 3 or 6 Credits.
Individual research under faculty guidance. Enroll following
departmental guidelines. Pre/co-requisites: Junior/Senior standing;
Department permission.

BIOL 202. Quantitative Biology. 3 Credits.
Topics in quantitative methods in biological research, including
statistics and computer-based analysis. Prerequisites: One of
BCOR 101, BCOR 102, BCOR 103; MATH 019, MATH 020.

BIOL 203. Population Ecology. 3 Credits.
Analysis of growth, regulation, and interrelations of biological
populations in theoretical, laboratory, and natural systems.
Prerequisite: BCOR 102.

BIOL 204. Adv Genetics Laboratory. 4 Credits.
Laboratory experiments to provide experience with modern genetic
techniques. Bench work and data analysis emphasized. Prerequisite:
BCOR 101.

BIOL 205. Adv Genetics Laboratory. 4 Credits.
Laboratory experiments to provide experience with modern genetic
techniques. Bench work and data analysis emphasized. Prerequisite:
BCOR 101.

BIOL 208. Morphology&Evolution Insects. 0 or 4 Credits.
Systematics, morphology, and anatomy of insect taxa, with
comparisons to related arthropods. Prerequisite: BCOR 102.

BIOL 209. Field Zoology. 0 or 4 Credits.
Collection, identification, and ecology of arthropods. Substantial field
collecting. Prerequisite: BCOR 102.

BIOL 212. Comparative Histology. 0 or 4 Credits.
Anatomy of tissues, chiefly vertebrate. Tissue similarities and
specializations of organs among the various groups of animals in
relation to function. Prerequisite: BCOR 103.

BIOL 217. Mammalogy. 0 or 4 Credits.
Classification, identification, morphology, evolution, and distribution
of mammals. Prerequisite: BCOR 102.

BIOL 219. Compar/Func Vertebrate Anatomy. 4 Credits.
Structure, function, and phylogeny, with evolutionary and functional
trends of all chordate groups. Prerequisite: Two courses from
BCOR 101, BCOR 102, BCOR 103.

BIOL 223. Developmental Biology. 3 Credits.
An analysis of the cellular, subcellular, molecular, and genetic
mechanisms that operate during oogenesis and embryogenesis in
invertebrate and vertebrate organisms. Prerequisites: BCOR 101,
BCOR 103.

BIOL 225. Physiological Ecology. 3 Credits.
Processes by which animals cope with moderate, changing, and
extreme environments. Prerequisites: BCOR 102, BIOL 255.

BIOL 238. Winter Ecology. 3 Credits.
Natural history and winter adaptation of plants and animals of
western Maine. Field work during winter break; oral and written
report completed during spring semester. Prerequisite: Instructor
permission.

BIOL 246. Ecological Parasitology. 1 or 3 Credit.
Parasite-host interactions examined with evolutionary perspective.
Topics include the origin of parasites, evolution of virulence, and
ecological consequences of parasitism. Laboratory includes original
experiments. Prerequisite: BCOR 102.

BIOL 254. Population Genetics. 0-4 Credits.
Methods of detecting and investigating genetic variation, as well as its
causes and consequences. Applications from medicine, forensics, and
environmental biology are emphasized. Pre/co-requisite: BCOR 101.
BIOL 255. Comparative Physiology. 0 or 4 Credits.
Physiology at the organ, systems, and organismal levels. Capstone course to consolidate biological concepts. Pre/co-requisites: BCOR 101, BCOR 102, BCOR 103.

BIOL 261. Neurobiology. 3 Credits.
Focus on molecular and cellular aspects of the nervous system. Electrical signaling, synaptic transmission, signal transduction, neural development, plasticity and disease. Prerequisite: BCOR 103 or NSCI 110. Cross-listed with: ANNB 261.

BIOL 262. Neurobiology Techniques. 4 Credits.
Extensive study of laboratory methods used in modern research on the function of the nervous system. Techniques from electrophysiology, cell biology, biochemistry and genetics. Pre/co-requisites: BCOR 103, BIOL 261.

BIOL 263. Genetics Cell Cycle Regulation. 3 Credits.
Molecular events during the cell cycle; mutants defective in cell cycling; comparison of normal and transformed (cancer) cell cycling. Prerequisite: BCOR 101 or Instructor permission.

BIOL 264. Community Ecology. 3 Credits.
Theoretical and empirical analyses of community structure. Topics include population growth, metapopulation dynamics, competition, predation, species diversity, niches, disturbance succession, island biogeography, and conservation biology. Prerequisite: BCOR 102; at least Junior standing.

BIOL 265. Developmental Molecular Genetics. 3 Credits.
Current topics in developmental genetics explored through lectures and discussions of current literature; emphasis on molecular approaches. Prerequisite: BCOR 101.

BIOL 266. Neurodevelopment. 3 Credits.
Current topics in developmental neurobiology through lectures and discussions of primary literature. The course is designed for advanced undergraduate life science majors and graduate students in the biological sciences. Pre/co-requisites: BCOR 101 and BCOR 103.

BIOL 267. Molecular Endocrinology. 4 Credits.
Study of hormone action at the cellular and molecular level. Prerequisite: BCOR 101.

BIOL 268. Medical Entomology. 3-4 Credits.
Examines the arthropod vectors of temperate and tropical diseases that affect human health, using an ecological and a systematics approach. Prerequisites: BCOR 102 or Instructor permission.

BIOL 269. Plant-Animal Interactions. 3 Credits.
Ecological and evolutionary interactions among plants and animals. Topics include herbivory, pollination, seed predation, biocontrol, and effects of global climate change. Prerequisite: BIOL 001 and BIOL 002 or BCOR 011 and BCOR 012; BCOR 102 recommended.

BIOL 270. Speciation and Phylogeny. 3 Credits.
Contribution of modern research in such fields as genetics, systematics, distribution, and serology to problems of evolutionary change. Prerequisite: BCOR 101, BCOR 102 recommended.

BIOL 271. Evolution. 3 Credits.
Basic concepts in evolution will be covered, including the causes of evolutionary change, speciation, phylogenetics, and the history of life. Pre/co-requisites: BCOR 102 or permission of the Instructor.

BIOL 275. Human Genetics. 3 Credits.
Application of genetic techniques to the study of human biology. Topics include pedigree analysis, linkage analysis, and complex genetic disorders of medical importance. Prerequisite: BCOR 101.

BIOL 276. Behavioral Ecology. 3 Credits.
Adaptive significance of behavior in natural environments. Evolutionary theory applied to behavior and tested with field data. Prerequisite: BCOR 102 or Instructor permission.

BIOL 277. Sociobiology. 3 Credits.
The evolutionary biology of social behavior in animals. Topics include the evolution of sociality, social interactions, and the functional organization of social groups. Prerequisite: BCOR 102.

BIOL 280. Molecular Ecology. 0 or 4 Credits.
Molecular genetic tools and analytical methods used to investigate ecological processes in natural populations of plants and animals. Prerequisite: BCOR 102.

BIOL 286. Forensic DNA Analysis. 3 Credits.
Theory and techniques of modern genetics used to produce and analyze a DNA profile in forensic science. Emphasis on degraded or contaminated DNA samples. Prerequisite: BCOR 101.

BIOL 288. Seminar in Forensic Biology. 1 Credit.
Capstone course in seminar format for undergraduates concentrating in Forensic Biology in the Biology major; discussions, readings, guest speakers. Pre/co-requisite: CHEM 141, CHEM 142, and BCOR 101.

BIOL 295. Advanced Special Topics. 0-18 Credits.
See Schedule of Courses for specific titles.

BIOL 296. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOL 297. Advanced Undergraduate Rsrch. 3 or 6 Credits.
Research under faculty guidance. Enroll following departmental guidelines. May not be used toward advanced course requirements for BA students in Biology or Zoology. Pre/co-requisites: Junior/Senior Standing; Department permission.

BIOL 298. Advanced Undergraduate Rsrch. 3 or 6 Credits.
Research under faculty guidance. Enroll following departmental guidelines. May not be used toward advanced course requirements for BA students in Biology or Zoology. Pre/co-requisites: Junior/Senior Standing; Department permission.