

## PLANT BIOLOGY DEPARTMENT

<http://www.uvm.edu/cals/plantbiology> (<http://www.uvm.edu/cals/plantbiology/>)

CALS Plant Biology Major

The undergraduate Plant Biology program at the University of Vermont provides a broad introduction to the life sciences, from biochemistry and molecular biology to whole plant physiology and ecosystem ecology. Students receive individualized faculty attention via one-on-one advising to develop a personalized course of study. Popular study opportunities include a biennial trip to Costa Rica and an annual trip to the Galapagos. All students complete a senior capstone experience. Most students opt to conduct undergraduate research as part of a faculty-led research group, either in a plant science laboratory or at the internationally acclaimed Proctor Maple Research Center or at the Pringle Herbarium, the third largest plant collection in New England.

### MAJORS

#### PLANT BIOLOGY MAJOR

Plant Biology B.S. (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantbiology/plantbiologybs/>)

### MINORS

#### PLANT BIOLOGY MINOR

Plant Biology (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantbiology/plantbiologyminor/>)

### GRADUATE

Field Naturalist M.S.

Plant Biology M.S.

Plant Biology Ph.D.

See the online Graduate Catalogue (<http://catalogue.uvm.edu/graduate/>) for more information

### Courses

#### **PBIO 004. SU: Intro to Botany. 0 or 4 Credits.**

Structure, function, and reproduction of plants. Fundamental aspects of plant science with implications of botanical knowledge needed for applied plant sciences. Credit not given for both PBIO 004 and BIOL 001.

#### **PBIO 006. SU: The Green World. 3 Credits.**

Evaluation of the impact of plants on the aesthetic, cultural, social, medical, and religious lives of peoples of the world. Botany and Biological Science majors will not receive credit for PBIO 006 as part of program distribution requirements.

#### **PBIO 089. Ecuador: Natural History. 3 Credits.**

Provides a hands-on exploration of the unique biodiversity found in the tropical Andes and the Galapagos Islands, while studying ideas of how this great diversity came to be, and examining conservation efforts employed to protect it. Prerequisites: Instructor permission.

#### **PBIO 090. Internship. 1-3 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

#### **PBIO 092. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

#### **PBIO 095. Introductory Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

#### **PBIO 104. Plant Physiology. 0 or 4 Credits.**

Study of the plant as a whole, growth and development, water and mineral relations, environmental factors, and regulatory processes. Prerequisites: BCOR 011 and BCOR 012, or BIOL 001 and BIOL 002, or BCOR 021; and CHEM 031 and CHEM 032, or CHEM 023 and CHEM 026, or CHEM 031 and CHEM 026; or Instructor permission.

#### **PBIO 108. Morph & Evo of Vascular Plants. 0 or 4 Credits.**

Evolutionary relationships of vascular plants as inferred from plant structure, ecology, geography, and reproductive biology. Synthesis includes both fossil and extant groups. Prerequisites: PBIO 004, BIOL 002, BCOR 012, or BCOR 021, or Instructor permission.

#### **PBIO 109. Plant Systematics. 0 or 4 Credits.**

Collection and identification of ferns and flowering plants; survey of prominent Vermont plant families; plant nomenclature, classification, and phylogeny; species concepts and speciation; floral function. Prerequisites: PBIO 004 or BIOL 002 or BCOR 012 or BCOR 021 or Instructor permission.

#### **PBIO 117. Plant Pathology. 0 or 4 Credits.**

Introduction to the causes of agricultural and forest plant diseases including examination of the relationship of the plant, pathogen, and environment in disease development and disease management. Prerequisites: PBIO 004, or BIOL 001 and BIOL 002, or BCOR 011 and BCOR 012, or BCOR 021, or Instructor permission. Cross-listed with: PSS 117.

#### **PBIO 133. SU: How Plants Can Save World. 3 Credits.**

The overarching course question is the following: How can plants be used to design sustainable solutions to problems resulting from existing, unsustainable practices in agriculture, energy, and health? Prerequisites: BIOL 001 and BIOL 002, or BCOR 011 and BCOR 012, or PBIO 004, or PBIO 006.

**PBIO 151. Plant Anatomy. 3 Credits.**

Introduction to the structural and developmental anatomy of roots, stems, and leaves, including basic tissue types, vascular anatomy, woody plant anatomy, and reproductive anatomy. Prerequisites: BIOL 001 or BCOR 011 or BCOR 021.

**PBIO 177. Biology of Fungi. 4 Credits.**

Collect, identify and study major fungal groups, especially basidiomycetes (mushrooms, rusts and smuts), ascomycetes (cup fungi, yeasts and mildews), and affiliated taxa. Extensive field and lab work, with thematic lectures. Prerequisite: PBIO 004 or BIOL 002 or BCOR 12 or BCOR 021 or Instructor permission.

**PBIO 189. Ecuador: Natural History. 3 Credits.**

Provides a hands-on exploration of the unique biodiversity found in the tropical Andes and the Galapagos Islands, while studying ideas of how this great diversity came to be, and examining conservation efforts employed to protect it. Prerequisites: BCOR 011 and BCOR 012 or BIOL 001 and 002; Instructor permission.

**PBIO 190. Internship. 1-18 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**PBIO 191. Teaching Assistantship. 1-3 Credits.**

Undergraduate student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

**PBIO 192. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**PBIO 195. Intermediate Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**PBIO 198. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion. Prerequisites: Department permission.

**PBIO 209. Biology of Ferns. 3 Credits.**

Evolutionary biology; a survey of New England ferns and discussion of their phylogenetic relationships; current research emphasizing morphological, biogeographical, genetic, and phytochemical aspects of speciation. Prerequisite: PBIO 108 or PBIO 109 (BCOR 101 recommended).

**PBIO 223. Fundamentals of Field Science. 3 Credits.**

Pattern and process in natural systems. Weekly discussion of unifying questions in science. Field labs teach sampling and analysis of vegetation, soils, and animals. Prerequisite: Graduate standing or several university courses in earth sciences, life sciences, and chemistry.

**PBIO 232. Plant Systematics in Costa Rica. 2 Credits.**

Intensive field trip to Costa Rica with the goal of comparing the diversity of flowering plants and ferns in four distinct tropical American forests. Emphasis on field recognition of flowering-plant families, with an appreciation of the relationship between the Costa Rican people and their landscape. Prerequisites: PBIO 109; Instructor permission.

**PBIO 241. Tropical Plant Systematics. 3 Credits.**

Principles and methods of angiosperm phylogeny. Recent systematic and evolutionary research on flowering plants; survey of tropical flowering plant families. Student presentations on recent research. Prerequisite: PBIO 109.

**PBIO 261. Plant Growth & Development. 3 Credits.**

Concepts in plant structure and development. Biophysics of plant structure and pattern-formation. Introduction to methods of plant microscopy and microtechnique. Prerequisites: PBIO 104, PBIO 108, introductory Physics, or Instructor permission.

**PBIO 275. Global Change Ecology. 3 Credits.**

Survey of global climate change including its causes, mechanisms, and ecological and societal impacts. Prerequisite: BCOR 102 or Instructor permission.

**PBIO 281. Botany Seminar. 0 Credits.**

Presentations of personal research by faculty, graduate students, and outside guest speakers. Attendance required of plant biology Graduate students and Seniors in botanical research programs. Without credit.

**PBIO 282. Botany Seminar. 0 Credits.**

Presentations of personal research by faculty, graduate students, and outside guest speakers. Attendance required of plant biology Graduate students and Seniors in botanical research programs. Without credit.

**PBIO 288. The Evolution of Development. 3 Credits.**

Highlights how the integration of key concepts from developmental biology has contributed to our understanding of the proximate causes of plant and animal diversification. Prerequisite: BCOR 102 or equivalent, BCOR 101 or equivalent.

**PBIO 290. Internship. 1-18 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**PBIO 291. Teaching Assistantship. 1-3 Credits.**

Undergraduate student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

**PBIO 292. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**PBIO 294. QR:Ecological Modeling. 3 Credits.**

Provides an introduction to process-based modeling of ecological systems. Explores system dynamics and agent-based approaches to modeling ecological systems and processes. Includes a focus on the system dynamics modeling software Stella and the agent-based language Netlogo. Prerequisite: BCOR 102 or Instructor permission.

**PBIO 295. Advanced Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**PBIO 298. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion. Prerequisite: Department permission.

**PBIO 299. Plant Biology Capstone. 1 Credit.**

Culmination of the Plant Biology major; draws together the disciplines of plant biology presented in previous coursework and other student experiences into a single over-arching perception of plant biology and its role in the world; prepares Plant Biology majors for post-graduate success. Prerequisites: Plant Biology major; Senior standing or Junior standing if graduating in December.