

PLANT AND SOIL SCIENCE

OVERVIEW

The mission of the Department of Plant and Soil Science is to expand, integrate, and extend the knowledge of crops and environmental quality in plant/soil ecosystems affecting the people of Vermont, the region, and the world. The department will provide excellence in education, research, and extension that will enable people to produce healthy crops through environmentally, economically, and socially sound practices.

The department offers a Master of Science (M.S.) degree in all fields in plant science and soil science and a Doctor of Philosophy (Ph.D.) degree in either Soil Science or Entomology. A thesis, based on original research, is required for the M.S. degree, and completion of the requirements normally takes two and one-half years. A dissertation, based on original research, is required for the Ph.D degree, and completion of the requirements typically takes three years.

The department is comprised of faculty representing the disciplines of agronomy, entomology, horticulture, plant pathology, and soil science. Research faculty are involved in studying plant, soil or insect interactions within environments managed for food, fiber, waste utilization, or for landscape purposes. The objectives of these studies are: (1) to develop fundamental knowledge of environmental impacts and interactions and (2) to apply knowledge to better manage systems and promote environmental health. Specifically, departmental projects have included:

- Biological control of insect pests – entomopathogenic fungi
- Integrated pest management (IPM) in greenhouse and field situations
- Constructed wetland systems for water pollution control
- Design and analysis of experiments and surveys
- Field and forage crop management and utilization, forage quality, pasture and grazing management, and pest/weed management
- Analytical procedures for testing soils and environmental samples
- Effects of nitrogen (from acid rain) on forest soils and bog ecosystems
- Interaction between soil manganese oxides and heavy metals
- Nutrient dynamics and management in agricultural systems
- Nematodes and microarthropods as environmental indicators for terrestrial and wetland soils
- Development of sustainable apple production systems
- Evaluation and identification of woody and herbaceous landscape plants adapted to environmental conditions in Vermont/New England
- Diversified horticulture which involves the planning, production, handling, and marketing of horticultural crops with emphasis on multiple, diverse crops produced with environmentally and economically sound techniques.

DEGREES

- Plant and Soil Science M.S.
- Plant and Soil Science Ph.D.

FACULTY

Bosworth, Sidney Carl; Extension Associate Professor, Department of Plant and Soil Science; PHD, University of Kentucky

Bradshaw, Terence; Assistant Professor, Department of Plant & Soil Science; PHD, University of Vermont

Darby, Heather Marie; Extension Associate Professor, Extension - Programming and Faculty Support; PHD, Oregon State University

Fanslow, Yolanda H. Chen; Assistant Professor; Department of Plant and Soil Science; PHD, University of California Berkeley

Gorres, Josef H.; Associate Professor; Department of Plant and Soil Science; PHD, University of Manchester

Hazelrigg, Ann; Assistant Professor, Extension; PHD; University of Vermont

Hurley, Stephanie E; Assistant Professor; Department of Plant and Soil Science; DDES, Harvard University

Mendez, Victor E.; Associate Professor; Department of Plant and Soil Science; PHD, University of California Santa Cruz

Merrill, Scott; Research Assistant Professor, Department of Plant and Soil Science; PHD, Colorado State University

Neher Weicht, Deborah; Professor; Department of Plant and Soil Science; PHD, University of California Davis

Parker, Bruce Lawrence; Professor; Department of Plant and Soil Science; PHD, Cornell University

Parker, Jason; Research Assistant Professor; Department of Plant and Soil Science; PHD, The Ohio State University

Perry, Leonard Payne; Extension Professor; Department of Plant and Soil Science; PHD, Cornell University

Ross, Donald Savage; Research Professor; Department of Plant and Soil Science; PHD, University of Vermont

Skinner, Margaret; Research Professor; Department of Plant and Soil Science; PHD, University of Vermont

Starrett, Mark C.; Associate Professor; Department of Plant and Soil Science; PHD, North Carolina State University Raleigh

Courses

PSS 212. SU: Advanced Agroecology. 0 or 4 Credits.

This course presents an in-depth overview of research and applications in the field of agroecology, including current ecological and social dynamics in agricultural landscapes in Vermont and abroad. Pre/co-requisites: PSS 021 and one semester ecology at the 100-level or above or Instructor permission. Cross-listed with: ENVS 212.

PSS 232. Biological Control. 3 Credits.

Describes theory and application of biological control of insects, disease, and weeds. Discuss ecological factors that contribute to the success of classical, augmentative, and conservation approaches to biological control. Approved for Graduate credit. Prerequisite: Course in entomology, ecology, or relevant experience.

PSS 238. Ecological Landscape Design. 4 Credits.

Studio course synthesizing work from fields of landscape ecology and landscape design, exploring ecological design alternatives at multiple scales, and developing multifunctional landscape solutions. Prerequisites: Junior standing; PSS 137 or one course in ecology plus one course in design or drawing. Cross-listed with: CDAE 238, ENVS 238, NR 238.

PSS 261. Soil Morph Class & Land Use. 0 or 3 Credits.

Field techniques that describe soil properties, formation, and classification. The principles and processes of soil genesis, land use classification systems, and land use challenges. Prerequisite: PSS 161 or Instructor permission. Alternate years.

PSS 264. Chemistry of Soil & Water. 0 or 4 Credits.

An environmentally oriented study of the colloidal chemistry of soil and its interfaces with roots, water, and air. Prerequisites: PSS 161, two semesters Chemistry or Instructor permission. Alternate years.

PSS 266. Soil Water Movement. 3 Credits.

Mathematical modeling and physical principles of the soil-water-plant interaction and its relationship to environmental and agricultural issues. Prerequisites: PSS 161, one semester of Physics or Instructor permission. Alternate years.

PSS 268. Soil Ecology. 0 or 4 Credits.

Underlying concepts and theory of modern soil ecology will be reviewed including spatial and temporal distributions, sampling methods, biogeochemical cycles, and ecological functions of soil. Prerequisites: BCOR 102 or NR 103, and PSS 161. Cross-listed with: NR 268.

PSS 269. Soil/Water Pollution/Bioremed. 3 Credits.

Examines key issues in pollution of soil and water. Topics include type of pollutants, their reactions in soil and water, pollution prevention and bioremediation. Prerequisites: PSS 161 or Instructor permission. Alternate years.

PSS 295. Advanced Special Topics. 1-18 Credits.

Lectures, laboratories, readings, field projects, surveys, or research designed to provide specialized experience in horticulture, agronomy, soils, entomology, and integrated pest management. Prerequisite: Instructor permission.

PSS 296. Advanced Special Topics. 1-18 Credits.

Lectures, laboratories, readings, field projects, surveys, or research designed to provide specialized experience in horticulture, agronomy, soils, entomology, and integrated pest management. Prerequisite: Instructor permission.

PSS 298. Advanced Independent Study. 1-6 Credits.

Individual projects under direction of a faculty member. Project may involve original research, readings, internship, or assisting in teaching. Prerequisite: Instructor permission. More than a total of six credits per semester requires Chair permission.

PSS 301. Professional Skills Colloquium. 1 Credit.

Presentation and peer review of oral and written communication. Professional development skills including technical writing, literature review, mentorship, scientific integrity, grant proposals, and job market.

PSS 302. Soil Science Colloquium. 1 Credit.

Graduate student and faculty discussion of current research topics in soil science.

PSS 381. Graduate Special Topics. 1-3 Credits.

Advanced readings and discussion of horticulture, crops, or soils research literature.

PSS 391. Master's Thesis Research. 1-18 Credits.**PSS 393. Seminar Series. 1 Credit.**

Presentations of personal research by faculty, Graduate students and outside guest speakers. Attendance and oral presentations are required of Graduate students in Plant and Soil Science. Repeatable 2 times for M.S. students and 4 times for Ph.D. students.

PSS 394. Seminar Series. 1 Credit.

Presentations of personal research by faculty, Graduate students, and outside guest speakers. Attendance and oral presentations are required of Graduate students in Plant and Soil Science. Repeatable 2 times for M.S. students and 4 times for Ph.D. students.

PSS 395. Special Topics. 1-18 Credits.

See Schedule of Courses for specific titles.

PSS 491. Doctoral Dissertation Research. 1-18 Credits.