

## DEPARTMENT OF PLANT AND SOIL SCIENCE

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

Majors in the Department of Plant and Soil Science include both Ecological Agriculture and Sustainable Landscape Horticulture that allow students to expand their knowledge of science and apply it to plant production, landscape design, and environmental issues related to plants, insects, soil, and water management. This program provides a unique, interdisciplinary opportunity to study plant/soil ecosystems that are managed for food, feed or fiber production, for landscape purposes, or for recycling/waste utilization, areas that are very important from societal and environmental perspectives. PSS faculty represent the disciplines of entomology, soil science, horticulture, landscape design, agronomy, plant pathology, and agroecology.

The Plant and Soil Science program integrates classroom and field experiences incorporating relevant environmental, social, and economic issues into the curriculum. The program is flexible, allowing students to pursue their interests in plant production, landscape design, and environmental issues related to plants, pathogens, pests, soils, and water management while preparing for career opportunities and graduate studies. Faculty help students develop individualized courses of study to match their interests and career goals. For more information, email: [pss@uvm.edu](mailto:pss@uvm.edu) or call (802) 656-2630.

### MAJORS

#### PLANT AND SOIL SCIENCE MAJORS

Agroecology B. S. (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantandsoilscience/agroecologybs/>)

Sustainable Landscape Horticulture B.S. (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantandsoilscience/sustainablelandscapebs/>)

### MINORS

#### PLANT AND SOIL SCIENCE MINORS

Agroecology (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantandsoilscience/agroecologyminor/>)

Food Systems (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/foodsystems/foodsystemsminor/>)

Soil Science (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantandsoilscience/soilscienceminor/>)

Sustainable Landscape Horticulture (<http://catalogue.uvm.edu/undergraduate/agricultureandlifesciences/plantandsoilscience/sustainablelandscapeminor/>)

### GRADUATE

Plant and Soil Science M.S.

Plant and Soil Science Ph.D.

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

### Courses

#### **PSS 010. Home & Garden Horticulture. 3 Credits.**

Planning, selecting, and maintaining shrubs, trees, flowers, lawns, fruits, and vegetables around the home. Suitable for students in any major.

#### **PSS 015. Home & Garden Horticulture Lab. 1 Credit.**

This lab provides practical, hands-on horticultural skills both in and around the home. Co-requisite: PSS 010.

#### **PSS 021. SU: Intro to Agroecology. 3 Credits.**

Analyzes factors driving current agricultural production systems, the problems associated with the industrial agriculture model, and the variety of approaches and practices for producing food in an ecologically sound and socially just manner.

#### **PSS 028. A Bug's Life. 3 Credits.**

An introduction to the world of insects and their impact on our everyday lives, from the food we eat to solving murder crimes.

#### **PSS 037. Living Landscapes. 3 Credits.**

Explores conservation and design strategies for restoring healthy ecosystems and building healthy livable communities. Through lectures, guest speakers, case studies, book discussions, field trips, and real-world class projects, students are given hands-on opportunities to learn about living landscapes in Vermont and beyond.

#### **PSS 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.

#### **PSS 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.

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

Courses or seminars on topics beyond the scope of existing department offerings.

#### **PSS 096. Special Topics. 1-18 Credits.**

Courses or seminars on topics beyond the scope of existing department offerings.

#### **PSS 106. Entomology & Pest Mgmt. 0 or 4 Credits.**

Covers basic entomology, insect diversity and identification, and the basic principles of pest management. Prerequisites: BIOL 001 and BIOL 002, or BCOR 011 and BCOR 012, or BCOR 021.

**PSS 112. Weed Ecology & Management. 0 or 3 Credits.**

Identification, ecology, and management of weeds and other invasive plants in agriculture, urban/suburban landscapes, and natural areas.

Prerequisites: PSS 010 or PSS 021, or PBIO 004, or Instructor permission.

**PSS 117. Plant Pathology. 4 Credits.**

Introduction to the causes of plant disease including the relationship of the plant, pathogen, and environment in disease development and disease management. Pre/co-requisites: PBIO 004, or BIOL 001 and BIOL 002, or BCOR 011 and BCOR 012 or Instructor permission.

Cross-listed with: PBIO 117. Alternate years.

**PSS 120. Cold Climate Viticulture. 3 Credits.**

Students will learn principles and practices of commercial cold-climate grape production, including: site selection and preparation; cold hardiness development; varietal selection; vine training and trellising systems; nutrient, water and pest management; harvest and postharvest considerations, including basic winemaking principles.

Prerequisites: PSS 010 or PSS 021 or Instructor permission.

**PSS 121. Indoor Plants. 1 Credit.**

Indoor flowers, culture, related topics such as design. Prerequisite: PSS 010 or PSS 021, or one semester of Biology, or Instructor permission.

**PSS 123. Garden Flowers. 2 Credits.**

Outdoor flowers, culture, related topics. Prerequisite: PSS 010 or PSS 021, or one semester of Biology, or Instructor permission.

**PSS 124. Sust Veg Crops Production. 3 Credits.**

Introduces students to current practices in organic and conventional vegetable cropping systems and farm management. Prerequisite: PSS 010 or PSS 021 or Instructor permission.

**PSS 125. Woody Landscape Plants. 0 or 4 Credits.**

Identification, climatic requirements, cultural management, and use of ornamental plant materials in landscape planting. Prerequisite: PSS 010 or PSS 021, or one semester of Biology, or Instructor permission.

**PSS 127. Greenhouse Operations & Mgmt. 0 or 4 Credits.**

Principles and practices of commercial greenhouse management including construction, heating, cooling, container media, watering, fertilization, light and temperature, growth regulators, integrated pest management and disease control. Prerequisite: PSS 010, PSS 021, one semester Biology, or Instructor permission. Alternate years.

**PSS 133. Agroterrorism and Biopiracy. 3 Credits.**

Examines examples of agroterrorism and biological warfare on food production systems, outbreaks of pests introduced by trade routes and migrations, history of collecting and introducing new valuable crops, and the legal framework used to regulate collections and protect societies from the introduction of new pests. Prerequisite: PSS 010, PSS 021, MMG 002, ASCI 007, CDAE 032, BIOL 001, or BCOR 011.

**PSS 137. Landscape Design Fundamentals. 0 or 4 Credits.**

Studio course to learn techniques of landscape design and analysis, develop graphic communication skills for representing the landscape, and apply sustainable design principles to a site. Prerequisites: Junior standing; at least one course in drawing, design, or mapping, or Instructor permission. Cross-listed with: CDAE 137, ENVS 137, NR 137.

**PSS 138. Commercial Plant Propagation. 0 or 4 Credits.**

Principles and practices involved in propagating herbaceous and woody plants by seeds, division, layering, cuttings, budding, grafting, and aseptic culture. Prerequisite: PSS 010, PSS 021, one semester Biology, or Instructor permission.

**PSS 143. Forage and Pasture Mgmt. 4 Credits.**

Forage crops and grasslands play a central role in sustainable and diversified agriculture. Covers the scientific principles and practical applications of the production, management, and utilization of perennial and annual forage crops used by livestock and equine. Pre/co-requisites: BIOL 001 or BIOL 002 or BCOR 011 or BCOR 012 or PBIO 004 or PBIO 006 or Instructor permission. Cross-listed with: ASCI 143.

**PSS 145. Turfgrass Management. 3 Credits.**

Establishment, maintenance, and utilization of turf for aesthetic, athletic and utility functions. Pre/co-requisite: PSS 010, PSS 021, one semester of Biology, or Instructor permission. Alternate years.

**PSS 154. Composting Ecology & Mgmt. 3 Credits.**

Examines ecological, physical and chemical principles, the practical management of the composting process, and benefits of using compost in plant and soil ecosystems. Prerequisite: Three credits in basic biological or ecological science or Instructor permission.

**PSS 156. Permaculture. 0 or 3 Credits.**

Design of agriculturally productive environments that have the diversity, stability, and resilience of the natural biosphere to harmoniously integrate landscape and people. Prerequisite: PSS 021 or BIOL 002 or NR 103 or BCOR 012 or BCOR 102 or other basic ecology course or Instructor permission. Cross-listed with: ENVS 156.

**PSS 158. Internship:Eco Ag/Landscape Hrt. 1-3 Credits.**

Academically oriented hands-on experience in agriculture and horticulture under the joint supervision of instructor and host. Pre/co-requisite: Must be a Junior/Senior in the Ecological Agriculture Major or the Sustainable Landscape Horticulture Major or Instructor permission.

**PSS 161. SU: Fundmntls of Soil Science. 0 or 4 Credits.**

Biological, chemical, and physical properties of the dynamic soil system as related to plant growth and environmental problems. Prerequisite: Inorganic chemistry or permission.

**PSS 162. Soil Fertility & Conservation. 3 Credits.**

An ecological approach to soil management including nutrient supply and uptake, rhizosphere-microbial interactions, soil conservation, and nutrient management strategies. Prerequisite: PSS 161 or Instructor permission.

**PSS 172. Crop Breeding. 0 or 4 Credits.**

Service learning course; acquaints students with the primary objectives and tools of plant breeding theory, practice, and history through engagement in breeding activities with community partners. Builds understand of how crops are improved to meet farmer demands. Prerequisite: PSS 021 or PSS 010 or PBIO 006 or BIOL 001 or BCOR 011.

**PSS 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.

**PSS 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.

**PSS 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.

**PSS 195. Special Topics. 1-18 Credits.**

Courses or seminars on topics beyond the scope of existing department offerings. Prerequisite: Instructor permission.

**PSS 196. Special Topics. 1-18 Credits.**

Courses or seminars on topics beyond the scope of existing department offerings. Prerequisite: Instructor permission.

**PSS 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. Prerequisite: Permission. More than a total of six credits per semester requires the permission of the Department Chair.

**PSS 208. Diversified Farm Planning. 3 Credits.**

Students study diverse farming systems to gain financial, management, and technical knowledge to plan a new or evaluate and existing farm enterprise. Prerequisites: PSS 021 and one 100-level PSS course, equivalent experience, or Instructor permission.

**PSS 209. Diversified Farm Operations. 6 Credits.**

An experiential course in sustainable, diversified vegetable production that includes soil fertility, weed, insect and disease control, crop planning and farm management skills. Prerequisites: PSS 021 and one 100-level PSS course, equivalent experience, or Instructor permission.

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

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. Prerequisites: PSS 021 or one semester ecology at the 100-level or above or Instructor permission. Cross-listed with: ENVS 212.

**PSS 218. Agricultural Policy and Ethics. 3 Credits.**

An examination of American agriculture and policies from various perspectives - historical, political, ecological, technological, social, economic, and ethical. Emphasis on contemporary issues, policy options, and future development. Prerequisites: CDAE 102 or PSS 212 or equivalent. Cross-listed with: CDAE 208.

**PSS 221. Sustainable Orchard Management. 3 Credits.**

Principles and practices of commercial tree fruit production, including site considerations; cultivars; training; nutrient, water and pest management; harvest and postharvest considerations. Special emphasis on environmental and economic sustainability of the orchard system. Pre/Co-requisites: PSS 10 or PSS 21 or BIOL 001 or 002 or BCOR 011 or BCOR 012; and PSS 161.

**PSS 225. Eco Frontiers in Agroecology. 3 Credits.**

Examines recent peer-reviewed research that has the potential to transform the productivity or sustainability of agroecosystems. Students will be guided in developing, communicating, and justifying new questions that may potentially transform agroecology. Prerequisites: BIOL 001/BIOL 002 or BCOR 011/BCOR 012; and NR 103 or BCOR 102 or PSS 106 or equivalent; or Instructor permission.

**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.

**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 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 281. Prof Dev:Eco Ag/Sust Lndsc Hrt. 1 Credit.**

Students will develop and articulate a professional philosophy and improve skills in career development including writing, resume preparation, effective interviewing and negotiation. Prerequisites: Sophomore/Junior standing; Ecological Agriculture Major or the Sustainable Landscape Horticulture Major or Instructor permission.

**PSS 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.

**PSS 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.

**PSS 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.

**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. 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: Instructor permission. More than a total of six credits per semester requires Chair permission.