DEPARTMENT OF AGRICULTURE, LANDSCAPE & ENVIRONMENT

http://www.uvm.edu/cals/ale

The Agriculture, Landscape, and Environment (ALE) program integrates classroom and field experiences incorporating relevant environmental, social, and economic issues into the curriculum. ALE students have access to a diverse array of hand-on, high impact learning opportunities. Many of the department's courses include field components that will make Burlington and beyond part of the classroom. From stormwater mitigation, to soil testing on local farms, to creating farm business plans, students will be challenged and working within the local food system.

Students may choose between two majors offered in the department. Agroecology (AGR) is a degree that provides a foundation in the natural sciences with an emphasis on applying ecological principles to the production of horticulture or agronomic crops. Hands-on courses cover soils, plant pathology, entomology, and integrated farm management.

The Ecological Landscape Planning and Design (ELPD) program emphasizes the integration of ecological principles into design and planning while promoting a shift from engineered solutions to ecosystem-based approaches. It offers nature-based solutions to climate change challenges. This degree provides a foundation in the natural sciences and design skills with an emphasis on the application of ecological principles to the management of natural and human landscape.

The Agroecology and Ecological Landscape Planning and Design majors are strongly linked to UVM's highly recognized environmental program. The programs are 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.

Through research and teaching, the department engages with key environmental issues facing the use of resources. Faculty members study food security and sovereignty, sustainable food production, ecological landscape design, climate change in agricultural food systems, improvement of food crops, ecological pest management, soil health, and more. Faculty and courses span a wide range of disciplines, offering students a highly customizable course of study. ALE faculty represent the disciplines of agroecology, agronomy, entomology, horticulture, landscape design, plant pathology, and soil science.

Faculty help students develop individualized courses of study to match their interests and career goals. For more information, email: ale@uvm.edu or call (802)656-2630.

MAJORS

AGRICULTURE, LANDSCAPE & ENVIRONMENT MAJORS

Agroecology B.S.

Ecological Landscape Planning and Design B.S.

MINORS

AGRICULTURE, LANDSCAPE & ENVIRONMENT MINORS

Agroecology

Biodiversity and Global Change

Ecological Landscape Horticulture

Food Systems

Soil Science

GRADUATE

Agroecology CGS

Agroecology mCGS

Agroecology M.S.

Plant and Soil Science M.S.

Plant and Soil Science Ph.D.

See the online Graduate Catalogue for more information

Courses

ALE 1010. Home Vegetable Gardening. 3 Credits.
An introduction to the principles and practices of home vegetable gardening. Topics include garden design, soil preparation, crop selection, seed starting, planting techniques, irrigation, weeding, pest & disease management, and sustainable methods for producing and harvesting vegetables in home, community, and small-scale garden settings. This course is appropriate for students of all majors.

ALE 1100. Home & Garden Horticulture. 3 Credits.
Planning, selecting, and maintaining indoor plants, shrubs, trees, flowers, lawns, fruits, herbs and vegetables in and around the home. Plant propagation, as well as pests/diseases and their control, are also covered. This is a course with practical applications and is suitable for students in any major.

ALE 1150. Home & Garden Horticulture Lab. 1 Credit.
Provides students with basic horticultural skills to enable them to have a better understanding of the care and use of plants in and around the home including turf, ornamental flowers, trees and shrubs, vegetables, herbs and home garden fruit plants. Plant identification, propagation and pest/disease control are also covered. Pre/Co-requisite: ALE 1100.

ALE 1210. 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. Catamount Core: N1, SU.

ALE 1280. 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.

ALE 1360. Illustrating Botanicals. 3 Credits.
Training in the skills required to produce aesthetically pleasing visual representations of botanical subjects grounded in technically correct plant morphology and anatomy. Use of line, shading, and color explored in depth. Media include graphite, pen and ink, colored pencils and watercolor. Includes a final project. Prerequisite: Junior/Senior Standing. Catamount Core: AH1.

ALE 1370. Intro to Ecological Planning. 3 Credits.
Explores conservation planning 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 ecological planning in Vermont and beyond. Catamount Core: N1, SU.

ALE 1990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ALE 1991. 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.

ALE 1993. 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.

ALE 1994. 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.

ALE 1995. 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.

ALE 2010. Introduction to Beekeeping. 3 Credits.
An introduction to the fundamentals of being responsible stewards of honey bee colonies and the skills to support good decision-making in today's changing world of beekeeping. Topics include basic bee biology, the factors driving global pollinator decline, current topics in pollinator research, purchasing equipment, and bees, integrated pest management, and successful strategies for overwintering. Prerequisites: BIOL 1400 and BIOL 1450, BCOR 1400 and BCOR 1450, BCOR 1425, or Instructor permission.

ALE 2020. Hands-on Beekeeping. 3 Credits.
Offers a combination of classroom lectures and hands-on field experience. Topics include bee biology, choosing and purchasing equipment and bees, integrated pest management, seasonal colony management, and queen grafting. Class will be held at the VT Bee Lab Apiary where students will interact with a research and education apiary consisting of over 30 hives. There will also be opportunities for field trips with beekeepers in our community. Prerequisites: BIOL 1400 and BIOL 1450, BCOR 1400 and BCOR 1450, BCOR 1425, or Instructor permission.

ALE 2030. Bees and Beekeeping. 3 Credits.
An introduction to the biology, ecology, and protection of both honey bees and native bees while building practical beekeeping skills. Students learn hive management, honey bee anatomy, pests and diseases, IPM strategies, and sustainable beekeeping practices. Students will also examine the varied life histories of wild bees, and the threats contributing to global pollinator declines. Students gain both practical beekeeping competence and a holistic understanding of the ecology and diversity of wild bees. Prerequisites: BIOL 1400 and BIOL 1450, or BCOR 1400 and BCOR 1450, or Instructor permission.

ALE 2060. Entomology & Pest Mgmt. 0 or 4 Credits.
Covers basic entomology, insect diversity and identification, and the basic principles of pest management. Prerequisite: BIOL 1400 and BIOL 1450, or BCOR 1400 and BCOR 1450, or BCOR 1425.

ALE 2120. 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. Prerequisite: ALE 1100, ALE 1210, PBIO 1040, or Instructor permission.

ALE 2170. 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. Prerequisite: PBIO 1040, or BIOL 1400 and BIOL 1450, or BCOR 1400 and BCOR 1450, or BCOR 1425, or Instructor permission. Cross-listed with: PBIO 2170.

ALE 2200. Cold Climate Viticulture. 3 Credits.
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. Prerequisite: ALE 1100, ALE 1210, or Instructor permission.

ALE 2210. Indoor Plants. 1 Credit.
Indoor flowers, culture, related topics such as design. Prerequisite: ALE 1100, ALE 1210, one semester of Biology, or Instructor permission.

ALE 2230. Garden Flowers. 3 Credits.
Outdoor flowers, culture, related topics. Prerequisite: ALE 1100, ALE 1210, one semester of Biology, or Instructor permission.

ALE 2240. Sust Veg Crops Production. 3 Credits.
Introduces students to current practices in organic and conventional vegetable cropping systems and farm management. Prerequisite: ALE 1100, ALE 1210, or Instructor permission.

ALE 2250. Woody Landscape Plants. 4 Credits.
Identification, climatic requirements, cultural management, and use of woody ornamental plants (trees, shrubs, groundcovers and vines/climbers) in managed landscape settings. Prerequisites: PBIO 1040 or ALE 1100, or ALE 1210, or ALE 1370 or BIOL 1400 or BIOL 1450 or BCOR 1400 or BCOR 1450 or FOR 1210 or Instructor permission.

ALE 2260. Herbaceous Landscape Plants. 3 Credits.
A comprehensive introduction to the identification, characteristics, and uses of the most common herbaceous plants in New England landscapes. Consideration is given to methods of propagation, adaptability/resiliency, habitat value, and ornamental value. Explores the fundamentals of botany, horticulture, design, culture, and pests and diseases as they relate to herbaceous plants in the garden. Covers a range of herbaceous plant types, including annuals, biennials, perennials, bulbs, and grasses. Prerequisites: ALE 1100, ALE 1210, one semester of Biology, or Instructor permission.

ALE 2270. 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: ALE 1100, ALE 1210, one semester of Biology, or Instructor permission.

ALE 2280. Intro to Hemp Production. 3 Credits.
An introduction to the botany, agronomy, and end-use potential of industrial hemp; an authoritative introduction for those interested in knowing more about this renewable material that is an excellent source of food, fiber, building products, and therapeutic resins. Prerequisite: ALE 1100, ALE 1210, or Instructor permission.

ALE 2370. Landscape Design Fundamentals. 3 Credits.
Introduces students to the history and principles of landscape design. Examines various aspects of built environments with consideration of natural and cultural phenomena, with topics to include: spatial scale, equity, land use, design precedent, soils, plants, water, recreation, transportation, and more. Prerequisite: ALE 1370, ALE 1100, ALE 1210, ENVS 1510, ENVS 1520, NR 1010, NR 1020, or CDAE 1010; minimum Sophomore standing; or Instructor permission. Cross-listed with: CDAE 2370, ENVS 2650.

ALE 2371. Landscape Design Studio. 3 Credits.
Introduces students to the practice and profession of landscape design through studio-based learning. Through a series of design exercises, field experiences, and a real-world final project, students engage the landscape design process from site inventory and analysis to conceptual design, schematic planning, and supporting drawings. Students learn drafting and illustration techniques for design communication, with an emphasis on hand-drawn methods. Prerequisites: Minimum Sophomore standing; ALE 2370, ALE 2560, ARTS 1010, CDAE 1160, or Instructor permission. Co-requisite: ALE 2370. Catamount Core: AH1.

ALE 2380. 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 tissue culture and micropropagation. Prerequisite: PBIO 1040 or ALE 1100, ALE 1210 or ALE 1370 or BIOL 1400 or BIOL 1450 or BCOR 1400 or BCOR 1450 or Instructor permission.

ALE 2430. Forage and Pasture Mgmnt. 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-requisite: BIOL 1400, BIOL 1450, BCOR 1400, BCOR 1450, PBIO 1040, PBIO 1060, or Instructor permission. Cross-listed with: ASCI 2240.

ALE 2540. 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. Cross-listed with: ENVS 2985.

ALE 2560. 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. Prerequisites: ALE 1100, ALE 1210, BIOL 1450, NR 2030, BCOR 1450, BCOR 2100, or a basic ecology course. Cross-listed with: ENVS 2654. Catamount Core: N1, SU.

ALE 2610. Fundamentals 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. Prerequisites: ALE 1100, ALE 1210, ALE 1370, ENSC 1010, or CE 1000. Catamount Core: SU.

ALE 2620. 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: ALE 2610 or Instructor permission. Cross-listed with: ENVS 2656.

ALE 2810. Prof Dev: Ag, Landscape, & Env. 1 Credit.
Students will develop and articulate a professional philosophy and improve skills in career development including writing, resume preparation, effective interviewing and negotiation. Prerequisite: Ecological Agriculture, Sustainable Landscape Horticulture, or Agroecology & Landscape Design Major; minimum Sophomore standing; or Instructor permission.

ALE 2990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ALE 2991. 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.

ALE 2993. 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.

ALE 2994. 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.

ALE 2995. 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.

ALE 3030. Planting Design Studio. 3 Credits.
Offers practical tools and theoretical frameworks for developing planting design methodologies, emphasizing the cultural and environmental aspects of plant communities. Through lectures, field trips, and assignments, students will explore and apply principles of planting design, focusing on spatial structure, plant performance, ecological value, cultural significance, ornamental qualities, and technical considerations for installation and maintenance. Prerequisites: ALE 2370, ALE 2371, ALE 2230, and ALE 2250; minimum Junior standing; or Instructor permission.

ALE 3080. 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 2020, ALE 3120, or equivalent. Cross-listed with: CDAE 3080. Catamount Core: S1, WIL2.

ALE 3090. 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: ALE 1210 and one 2000-level ALE course, equivalent experience, or Instructor permission.

ALE 3100. 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: ALE 1210 and one 2000-level ALE course, equivalent experience, or Instructor permission.

ALE 3120. 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: ALE 1210 or one semester ecology at the 2000-level or above or Instructor permission. Catamount Core: SU.

ALE 3210. 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: ALE 1100, ALE 1210, BIOL 1400, BIOL 1450, BCOR 1400, or BCOR 1450; ALE 2610.

ALE 3250. 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 1400, BIOL 1450 or BCOR 1400, BCOR 1450; NR 2030, BCOR 2100, ALE 2060, or equivalent; or Instructor permission. Catamount Core: QD, WIL2.

ALE 3320. 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. Prerequisite: Course in entomology, ecology, or relevant experience. Catamount Core: QD, WIL2.

ALE 3380. 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; ALE 2370, ALE 2371; or Instructor permission.

ALE 3400. Landscape Construction & Tech. 3 Credits.
Focuses on constructing and detailing the primary landforms and hardscape components utilized in the landscape design industry. These components include landforms, grading, drainage systems, patios, paths, ramps, bike paths, staircases, retention walls, permeable parking lots, and green infrastructure such as wetlands, bioswales, green roofs, rain barrels, and living walls. Students will use standard tools and REVIT for different fields and computer lab exercises. Prerequisites: ALE 2371 or CDAE 1010; minimum Sophomore standing; or Instructor permission. Pre/Co-requisites: ALE 2371, CDAE 1010.

ALE 3450. Urban Landscape Design Studio. 3 Credits.
A comprehensive understanding of landscape design strategies in the built environment. Students will work on one project that could enable communities and cities to thrive, exploring the driving forces of change in the landscape and developing strategic masterplans for addressing socioecological challenges. Explores the intersection of urbanism and landscape design, such as climate crisis, local economies, biodiversity preservation, environmental justice, and social equity. Prerequisites: ALE 2371 or CDAE 1010; minimum Sophomore standing; or Instructor permission. Pre/Co-requisites: ALE 2371 or CDAE 1010; Sophomore standing.

ALE 3500. Landscape Planning Global. 3 Credits.
Provides a comprehensive understanding of land use planning in a changing world. Students will be working on two projects that could enable communities and regions to thrive, exploring the driving forces of change in the landscape and developing strategic plans for addressing international challenges. Explores the intersection of landscape planning and international challenges, such as climate crisis, global economies, and biodiversity preservation. Prerequisites: ALE 2371 or NR 2430; minimum Sophomore standing; or Instructor permission. Pre/Co-requisites: ALE 2371, NR 2430. Catamount Core: GC1.

ALE 3610. Soil Morph and Land Use. 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: ALE 2610 or Instructor permission.

ALE 3640. 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: ALE 2610, two semesters Chemistry or Instructor permission.

ALE 3680. 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 2100 or NR 2030; ALE 2610. Cross-listed with: NR 4680. Catamount Core: N2, QD.

ALE 3690. 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: ALE 2610 or Instructor permission.

ALE 3990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ALE 3991. 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.

ALE 3993. 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.

ALE 3994. 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.

ALE 3995. 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.

ALE 4990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

ALE 4991. 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.

ALE 4993. 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.

ALE 4994. 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.

ALE 4995. 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.