

## SUSTAINABILITY, ECOLOGY AND POLICY PROGRAM

<https://www.uvm.edu/rsenr/sustainability-ecology-policy>

The Sustainability, Ecology and Policy Curriculum combines course work from disciplines inside and outside The Rubenstein School to produce an individualized major focused on an ecological theme or the human-environment relationship. Students concentrate in Applied Ecology, Environmental Policy, Planning and Law, or Integrated Natural Resources. They take foundational courses in natural or social sciences and then tap into upper-level and field-based courses to focus in areas such as aquatic ecology; terrestrial ecology; environmental policy, economics and law; community-based resource planning; environmental education; sustainability and resource management; and energy and environmental systems. Most students incorporate internship, research, and/or study abroad experiences into their academic program. Graduates are competitive for positions in the environmental field in a range of settings. They also are prepared to pursue graduate studies in environment and natural resources including advanced study in the natural sciences, in law, urban, regional and community planning, public administration, and sustainability sciences.

### MAJORS

#### SUSTAINABILITY, ECOLOGY AND POLICY MAJOR

Sustainability, Ecology and Policy B.S.

### GRADUATE

Natural Resources M.S.

Natural Resources Ph.D.

See the online Graduate Catalogue for more information.

### Courses

#### NR 1010. Natural Hist & Human Ecology 1. 0 or 4 Credits.

Integrates the science of ecology and the science of humans and society to understand the relationship between the natural landscape's effects on society and social organization, and society's effects on the natural landscape. Catamount Core: N2.

#### NR 1020. Natural Hist & Human Ecology 2. 0 or 4 Credits.

Integrates the science of ecological sciences and the science of humans and society to understand the relationship between the natural landscape's effects on society and social organization, and society's effects on the natural landscape. Pre/Co-requisite: NR 1010. Catamount Core: S1.

#### NR 1050. Critical Reflection & Dialogue. 1 Credit.

An opportunity for First-Year students to develop skills of critical reflection and dialogue through the examination of several environmental issues, and to build strong working relationships with peers and faculty. Includes nuanced, personal conversations in small and large groups, and will consider disparate viewpoints and experiences. Pre/Co-requisites: RSENR First-Year student standing.

#### NR 1060. Race & Culture in NR. 0 or 3 Credits.

Introduces First-year students to issues of race and culture and their relevance to society, natural resources, and the environment. Prerequisite: NR 1050. Catamount Core: D1.

#### NR 1090. VT: Natural & Cultural Hst. 0 or 4 Credits.

Introduction to the Vermont landscape that combines elements of natural history, field ecology, and environmental history. Students visit locations around the Champlain Valley as they build observational skills, study natural systems, and examine past and present human relationships with nature. Pre/Co-requisite: RSENR transfer students only. Catamount Core: N2, SU.

#### NR 1210. Speaking and Listening. 2 Credits.

Course aids students in learning to speak, listen and critique public speaking. Different delivery styles focus on relevant environmental and natural resource topics.

#### NR 1610. Foundations of PBE. 4 Credits.

Introduces the principles and practices of place-based education. Students learn to design place-based curriculum and educative materials from an interdisciplinary analysis of specific places. Cross-listed with: EDTE 1610. Catamount Core: SU.

#### NR 1990. Special Topics. 1-18 Credits.

Introductory topics in environmental and natural resource issues beyond the scope of exiting courses.

#### NR 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.

#### NR 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.

#### NR 1996. Aiken Scholars Seminar. 1 Credit.

Seminar discussions on current environment issues. Guest speakers and field trips. Prerequisite: Open only to First-Year Aiken Scholars.

#### NR 2020. Water as a Natural Resource. 3 Credits.

Uses of water resources and impacts on aquatic systems and human society. Prerequisites: Minimum Sophomore standing. Catamount Core: SU.

**NR 2030. Ecology, Ecosystems & Environ. 3 Credits.**

Major ecological concepts and their application. Analysis of form, structure, and function of organisms, populations, communities, ecosystems, and landscapes. Prerequisites: Agroecology, Environmental Science, Environmental Studies, Forestry, Natural Resources, Parks, Recreation & Tourism, or Wildlife & Fisheries Biology major; minimum Sophomore standing. Catamount Core: N1.

**NR 2040. Social Proc & the Environment. 3 Credits.**

Social science theories and their application to environmental issues. Analysis of issues using theories of government, economics, and social movements. Emphasis on integrating frameworks to analyze environmental issues. Prerequisite: NR 1020 or NR 1090. Catamount Core: S1.

**NR 2070. Human Health & the Environmt. 3 Credits.**

Offers an introduction to environmental health. Topics include: methods (toxicology, epidemiology), environmental health hazards (physical, biological, chemical) and supports (nature contact), risk analysis, communication and management, health and climate change, food production and access, energy production, and water. Prerequisite: Sophomore standing. Cross-listed with: HLTH 2070. Catamount Core: SU.

**NR 2110. Kincentric Ecology. 3 Credits.**

'Kincentric ecology', as defined by Enrique Salmon, is when humans view themselves as part of an extended ecological family that shares ancestry and origins with other species. Explores how we relate to other species through engagement with a number of different fields, including ecology, evolution, ecofeminism, multispecies ethnography, and Indigenous Place-Thought. Prerequisite: ENV5 1500, ENV5 1510, NR 1010, or NR 1090. Catamount Core: AH2.

**NR 2210. Ecosystems' Nonmaterial Values. 3 Credits.**

Explores the nonmaterial ways ecosystems benefit people (that is, spiritually, psychologically), and how those benefits might be incorporated into decision-making. In addressing these Cultural Ecosystem Services, its approach is both appreciative and critical. Ethical implications figure prominently. Prerequisite: ENV5 1500, ENV5 1510, NR 1010, or NR 1090.

**NR 2400. Applied Environ Statistics. 0 or 4 Credits.**

Introduction to the biostatistical analyses for natural resource applications. Covers disciplinary software and analyses to prepare students to independently design, analyze, interpret and communicate environmental data. Includes parametric and non-parametric methods focused on real-world environmental data-sets. Prerequisite: Minimum Sophomore standing. Catamount Core: QD.

**NR 2410. Intro to Ecological Economics. 3 Credits.**

Introduction to the study of economics as dependent on social and environmental systems and to transdisciplinary problem-solving using ecological economics. Prerequisite: Minimum Sophomore standing.

**NR 2430. Intro to Geog Info Systems. 0 or 3 Credits.**

Understanding and application of computer-based, geographically-referenced information systems. Prerequisite: Minimum Sophomore standing.

**NR 2460. Remote Sensing. 3 Credits.**

Examinations of the earth's surface from aerial photographs and satellite imagery. Emphasis is on image interpretation, classification, change detection, multivariate analysis (e.g. principal components analysis). Prerequisite: Sophomore standing. Cross-listed with: GEOG 2520.

**NR 2530. Intro to Environmental Policy. 3 Credits.**

Introduction to policy aspects of environment and natural resources including policy processes, public governance, and citizen participation with applications to environmental issues. Prerequisite: NR 2040 or POLS 1300.

**NR 2650. Enviro Literature, Arts, Media. 3 Credits.**

Introduction to the environmental humanities exploring the role of the literary, visual, musical, performative, and media arts in shaping cultural attitudes and responses to nature and contemporary environmental problems. Prerequisite: ENV5 1500, ENV5 1510, NR 1010, or NR 1090. Catamount Core: AH2.

**NR 2730. Landscape Natural History. 3 Credits.**

Field-based; examines patterns and processes on local landscapes from an interdisciplinary perspective, with an emphasis on geology, soil science, plant ecology, and ecosystem geography. Prerequisite: ENV5 1500, NR 1010, or NR 1090.

**NR 2740. CR: Sustainability Theory&Prac. 4 Credits.**

In theory and practice, sustainability can be expressed differently depending on ideological, political, academic or normative commitments. Alongside local partners in Costa Rica, students will study and apply frameworks from traditional communities, and the biophysical and social sciences to understand how sustainability is interpreted and being operationalized in Central America and beyond. Prerequisite: Minimum Sophomore standing. Co-requisite: Enrollment in the Costa Rica Semester Abroad Program. Catamount Core: SU.

**NR 2750. Rural Lives in Global World. 3 Credits.**

Uses political economic development theory to explore the livelihoods of rural Costa Ricans on the Osa Peninsula, and the tension between external demands made by a global economy vs. their local capacity for self-determination and control of employment opportunities, cultural identity, and quality of life. Co-requisite: Enrollment in the Costa Rica Semester Abroad Program.

**NR 2760. Tropical Ecology in CR. 4 Credits.**

A field-based, travel study course where students will learn the major ecological patterns in tropical (and other) ecosystems and on the factors that generate, maintain, and threaten biodiversity. Students will also gain experience in critical thinking, research design, framing hypotheses, data collection techniques, basic statistics, science communication and collaborative research. Prerequisite: Minimum Sophomore standing. Catamount Core: N2.

**NR 2810. Environmental Justice. 3 Credits.**

Examines the historical trajectory of environmental justice; key lessons from EJ movements; the links between environmental justice, sustainability, decolonial movements, and just transitions; as well as how racism, classism, prejudice, and power are intimately intertwined with epistemic practices in science, technology, and environmental governance. Prerequisite: ENVS 1500 or ENVS 1510 or NR 1020. Catamount Core: D1.

**NR 2880. Sustainability Science. 3 Credits.**

The study of sustainability integrating natural and social science perspectives. Topics include theories of ecological adaptation and resilience, sustainability assessment methods, life cycle analysis, relational values, community science, emerging technologies and their applications to achieving a sustainability transformation. Prerequisites: ENVS 1500, ENVS 1510, NR 1010, NR 1020, or Instructor permission; minimum Sophomore standing. Catamount Core: SU.

**NR 2990. Special Topics. 1-18 Credits.**

Special topics in natural resources beyond the scope of existing formal courses.

**NR 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.

**NR 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.

**NR 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.

**NR 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.

**NR 2996. Honors Seminar. 1 Credit.**

A discussion and readings seminar that features guest speakers, and is part of the SNR Spring Seminar Series. Focus of the seminars change annually. Can be repeated. Prerequisite: Sophomore standing; open only to SNR Honors Students.

**NR 3010. Research Methods. 3 Credits.**

Provides a big-picture understanding of what research is, how to do it, and conceptually learn some methodological approaches to research in the environmental realm and helps effectively structure and write a literature review and thesis proposal. Prerequisite: Minimum Junior standing. Catamount Core: WIL2.

**NR 3050. Ecosys Mgt: Intg Sci, Soc & Pol. 3 Credits.**

Integration of natural and social science to formulate solutions and policies to address some of our biggest environmental challenges. Consideration of ecological, social, and economic approaches, as well as human needs and values for environmental decision-making. Prerequisites: NR 2030; NR 2040. Catamount Core: S1, SU.

**NR 3200. Landscape Ecology. 3 Credits.**

The course examines the critical role of landscape pattern in determining ecological process and dynamics, as well as human-ecological interactions. Includes field labs. Prerequisites: NR 2030 or BCOR 2100; Senior/Graduate standing.

**NR 3280. Ecosystems Ecology. 3 Credits.**

Examination of the structure and function of terrestrial ecosystems focusing on carbon and nutrient cycles. Laboratory sessions involve spatial modeling and data analysis. Prerequisites: NR 2030, BCOR 2100, PSS 2610, or Graduate student standing. Cross-listed with: FOR 4280.

**NR 3360. Women, Health and Environment. 3 Credits.**

Uses interdisciplinary approaches to analyze specific connections between human-environment interactions from the gender perspective, especially women's and children's health. Examines the tensions between science, politics, gender and nature. Explores historical and contemporary understandings of gender in science and society at large. Prerequisite: Minimum Junior standing.

**NR 3370. Human Ecology & Health-Arctic. 3 Credits.**

An unstable Arctic poses threats, not only to the future of the Arctic but to the world itself. Provides an interdisciplinary overview of histories and approaches to human-environment interactions in the circumpolar Arctic, with a focus on the contexts of sustainability and justice. Prerequisite: Minimum Junior standing.

**NR 3430. Adv Geospatial Techniques. 1-3 Credits.**

Advanced course encompassing a wide range of topics in GIS, remote sensing, GPS, modeling, and visualization designed to provide technical expertise in geospatial techniques. Topics vary by offering; periodic offering at intervals that may exceed four years. Prerequisite: NR 2430, GEOG 2510, NR 6430, NR 2460, or GEOG 2520.

**NR 3880. Ecol Design & Living Technol. 0 or 3 Credits.**

The course explores the potential for ecological design to shape a sustainable future. It analyzes living technologies for food production, waste management and environmental restoration. Prerequisite: Junior standing.

**NR 3930. Environmental Law. 3 Credits.**

An introduction to the dynamic and interdisciplinary field of environmental law in the United States. Examines the history of federal and state involvement in environmental decision-making and the most critical environmental problems we face today, including issues related to air and water pollution, biodiversity protection, and climate change. Prerequisites: NR 2530; minimum Junior standing.

**NR 3940. Energy and Climate Law. 3 Credits.**

Focus at the intersection of energy law, environmental law, and climate law, including the regulations that empower government agencies to enforce the laws, and the policies that implement this enforcement. Partnership with Vermont Law School's Institute for Energy and the Environment provides an experiential learning opportunity for students. Prerequisite: Minimum Junior standing.

**NR 3950. Environmental Education. 3 Credits.**

Philosophy, concepts, and strategies of environmental education, emphasizing integration of environmental concerns into formal and non-formal educational programs for youth and adults. Prerequisite: Junior standing.

**NR 3990. Special Topics. 1-18 Credits.**

Advanced special topics in natural resource planning beyond the scope of existing formal courses.

**NR 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.

**NR 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.

**NR 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.

**NR 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.

**NR 3996. Honors. 1-6 Credits.**

Honors project dealing with aquatic resources, terrestrial ecology, or integrated natural resources.

**NR 4060. Env Prob Sol & Impact Assessmt. 0 or 4 Credits.**

Group dynamics, impact assessment, risk assessment, and decision making. Emphasis on the process of solving complex environmental problems, interdisciplinary team work, and the National Environmental Policy Act. Prerequisites: NR 3050. Catamount Core: GC2.

**NR 4080. Birding to Change the World. 4 Credits.**

Place-based course and service learning lab that pairs UVM students as enviro-mentors with children in Burlington schools in an after-school birding and nature study club. Application and background check are required of enrolled students. Prerequisites: Minimum Junior standing; Instructor permission. Catamount Core: GC2.

**NR 4350. Legal Aspects Envir Planning. 3 Credits.**

Comparison of environmental planning law at local, state, and national levels. Case studies in environmental and natural resource planning and land use controls. Prerequisite: Senior standing.

**NR 4430. GIS Practicum. 3 Credits.**

An applied course in geospatial technology with a focus on ESRI's ArcGIS software suite. Prerequisite: NR 2430 or NR 6430.

**NR 4500. Limnology. 0 or 4 Credits.**

Ecology of lakes and reservoirs, including their origin, physics, chemistry and biology, and the effects of anthropogenic perturbations. Field and laboratory experience. Prerequisites: BIOL 1400 and BIOL 1450 or BCOR 1400 and BCOR 1450, and CHEM 1100 and CHEM 1150 or CHEM 1400 and CHEM 1450, and NR 2030 or BCOR 2100.

**NR 4640. C Ross Env Pb Srv Practicum. 4-5 Credits.**

Creating proposals for modification and implementation of natural resource and environmental policy in Vermont with emphasis on critical thinking, problem solving and leadership. Prerequisites: NR 2040 or POLS 1300.

**NR 4680. 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, Prerequisites: BCOR 2100 or NR 2030, and PSS 2610. Cross-listed with: PSS 3680.

**NR 4800. Stream Ecology. 0 or 4 Credits.**

Ecology of streams including hydrodynamics, morphology, sediment transport, chemistry, biology and human impacts. Field and laboratory experience. Prerequisites: BIOL 1400 and BIOL 1450 or BCOR 1400 and BCOR 1450, and CHEM 1100 and CHEM 1150 or CHEM 1400 and CHEM 1450, and NR 2030 or BCOR 2100.

**NR 4880. Advanced Ecological Design. 3 Credits.**

A problem-based, cross-disciplinary design course in which existing conditions are integrated with the redesign of place and system in alignment with ecological design principles. Prerequisite: NR 3880.

**NR 4990. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.