The Natural Resources 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 Resource Ecology, Resource Planning, 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 and in law, urban, regional and community planning, and public administration.

**MAJORS**

**NATURAL RESOURCES MAJOR**

Natural Resources B.S.

**GRADUATE**

Natural Resources M.S.

Natural Resources Ph.D.

See the online Graduate Catalogue for more information.

**Courses**

**NR 001. Natural Hist & Field Ecology. 0 or 4 Credits.**
Introduction to the dynamics of the natural world. Basic concepts of biological, chemical, physical, and ecological sciences and the application and interpretation of quantitative measurements are presented within a natural history context.

**NR 002. Nature & Culture. 0 or 3 Credits.**
Introduction to natural resources and the environment from a social/cultural perspective. Emphasis on environmental history, values, and ethics with application to natural resource and environmental policy.

**NR 006. D1:Race & Culture in NR. 0 or 2 Credits.**
Introduces the First-Year student to issues of race and culture and their relevance to society, natural resources, and the environment.

**NR 015. Ecology of Place. 1 Credit.**
Opportunities for first-time residents of GreenHouse Residential Learning Community to deepen their sense of place through participation in a diversity of environmental explorations.

**NR 016. Ecological Citizenship. 1 Credit.**
Provides members of the GreenHouse Residential Learning Community with opportunities to pursue ecological interests and community service projects with mentorship from GreenHouse staff members. Prerequisite: NR 015.

**NR 021. 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 025. Measurements & Mapping. 0 or 4 Credits.**
Introduction to surveying, mapping, aerial photo measurements, and interpretation for natural resource planning and management. Prerequisite: A course in high school or college trigonometry; permission required of nonmajors.

**NR 085. Intro Special Topics-Env & NR. 1-6 Credits.**
Introductory topics in environmental and natural resource issues beyond the scope of exiting courses.

**NR 099. 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 102. Water as a Natural Resource. 3 Credits.**
Uses of water resources and impacts on aquatic systems and human society. Similar to GEOG 145. Prerequisite: NR 001, NR 002 or equivalent.

**NR 103. 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: NR 001; concurrent enrollment in NR 104 required.

**NR 104. 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. Prerequisites: NR 002; concurrent enrollment in NR 103 required.

**NR 107. Human Health & the Environment. 3 Credits.**
Interdisciplinary understanding of the effects of anthropogenic factors including pollution, reduced biodiversity, climate change, overpopulation, and resource depletion on the health of natural systems and human populations. Pre/co-requisites: a college level science course; Sophomore standing. Cross-listed with: ENVS 107, HLTH 107.

**NR 125. Ecological Coop Living. 2 Credits.**
Engaging students in the Slade Special Interest Program in the development of their residence as a self-sufficient, ecological cooperative on campus through the design, implementation, and maintenance of an ecologically-minded infrastructure of technology and day-to-day living arrangements. Pre/co-requisite: Current resident in Slade Hall.
NR 137. Landscape Design Fundamentals. 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. Pre/co-requisites: Junior standing; at least one course in drawing, design, or mapping, or Instructor permission. Cross-listed with: CDAE 137, ENVS 137, PSS 137.

NR 140. Applied Environ Statistics. 0 or 4 Credits.
Introduction to the design, application, interpretation and critical assessment of biostatistical analyses for natural resource applications. Concepts are applied through service learning partnerships. Prerequisites: Sophomore standing, two years of high school algebra.

NR 141. 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. Prerequisites: ENVS 001 or NR 002. Cross-listed with: ENVS 141.

NR 143. Intro to Geog Info Systems. 0 or 3 Credits.
Understanding and application of computer-based, geographically-referenced information systems. Prerequisite: Junior standing.

NR 146. Remote Sensing of Natural Res. 3 Credits.
Cross-listed with: FOR 146, GEOG 185.

NR 153. Intro 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. Pre/co-requisite: NR 104 or POLS 021. Cross-listed with: ENVS 142.

NR 170. Intro Dynamic Simulation Mdlg. 1 Credit.
Elementary principles of dynamic simulation modeling and use of the STELLA II dynamic simulation software. Example simulations of natural environmental systems. Prerequisite: Sophomore standing.

NR 176. Water Quality Analysis. 0 or 3 Credits.
Selected aspects of elementary water chemistry and bioassay as related to surface and ground waters. Five laboratory experiences. Two and a half hours lecture per week and twenty hours lab per semester.

NR 185. Special Topics. 1-6 Credits.
Special topics in natural resources beyond the scope of existing formal courses. Variable credit.

NR 189. Student-Designed Course Work. 1-3 Credits.
Student-taught course work beyond the scope of formal courses in natural resources. Developed according to RSENR guidelines with sponsorship by interested faculty. Variable credit.

NR 199. 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.

Integration of natural and social science into ecosystem management and policy. Consideration of ecosystem integrity, ecosystem degradation, human needs and values, and the application of management principles within a holistic context. Prerequisites: NR 001, NR 002, NR 103, NR 104.

NR 206. Env Prob Sol & Impact Assessmt. 0 or 4 Credits.

NR 207. D1: Power, Privilege & Envrnmt. 1 Credit.
This course provides seniors with the opportunity to understand aspects of power, privilege, and injustice and its implications for the natural resource and environmental fields. Prerequisites: NR 001, NR 002, NR 006, NR 103, and NR 104. Co-requisite: NR 205.

NR 220. 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 103 or BCOR 102; Senior/Graduate standing.

NR 222. Pollution Ecology. 3 Credits.
Impacts of pollutants on the structure and function of ecosystems. Examination of how air, land, and water influence ecological fate and effects of pollutants. Prerequisites: BIOL 001; CHEM 023; NR 103 or equivalent ecology course.

NR 224. Conservation Biology. 3 Credits.
Conservation of biological diversity at genetic, species, ecosystem, and landscape levels. Emphasis on genetic diversity, population viability, endangered species, critical habitats, international implications. Prerequisites: BIOL 001, BIOL 002, a 100-level ecology course.

NR 228. 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: CHEM 031, CHEM 032, NR 103, NR 143, NR 146, or Instructor permission. Cross-listed with: FOR 228.

NR 235. 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. Pre/co-requisite: Senior Standing.

NR 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. Pre/co-requisites: minimum Junior standing, PSS 137 or one course in ecology plus one course in design or drawing. Cross-listed with: CDAE 238, ENVS 238, PSS 238.
NR 240. Park and Wilderness Mgmt. 3 Credits.
Cross-listed with PRT 240. History, philosophy, and management of wilderness, national parks, and related areas. Prerequisites: Junior/Senior standing in Parks, Recreation and Tourism.

NR 242. 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. Prerequisites: Introductory GIS (NR 143 or GEOG 184 or NR 343) or remote sensing (NR 146, NR 346, GEOG 185) course as determined by Instructor.

NR 243. GIS Practicum. 3 Credits.
An applied course in geospatial technology with a focus on ESRI’s ArcGIS software suite. Prerequisite: NR 143/NR 343.

NR 245. Integrating GIS & Statistics. 3 Credits.
Advanced approaches in integrating Geographic Information Systems (GIS) and statistical methods to analyze quantitatively spatial patterns and relationships. Prerequisites: Senior/Graduate standing, one introductory GIS course, one introductory Statistics course.

NR 250. 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: One year Biology; one year Chemistry; ecology course.

NR 254. Adv Natural Resource Policy. 3 Credits.
Advanced seminar in natural resource policy, emphasizing current issues in forest policy. Prerequisite: Graduate or advanced undergraduate standing; Instructor permission.

NR 255. Field Mthds in Water Resources. 3 Credits.
Techniques used in field assessment of water quality in rivers and lakes. Case studies on the LaPlatte River and Lake Champlain. Sampling strategies, field measurements, and data evaluation. Extensive field work. Prerequisite: NR 102 or equivalent basic course in water.

NR 256. Ecology of a Large Lake. 4 Credits.
A field exploration of the littoral zone and deep lake environments and human impacts on large lakes using Lake Champlain as the class laboratory. Prerequisite: 100-level ecology course.

NR 260. Wetlands Ecology & Mgmt. 3 Credits.
Structure, dynamics and values of natural and artificial wetlands; wetlands management and issues. Prerequisite: BIOL 001 and BIOL 002; an upper-level ecology course.

NR 261. Wetlands Ecology Lab. 1 Credit.

NR 262. Int’l Problems in NR Mgmt. 3 Credits.
Discussion of problems associated with the management of natural resources which have international implications. Topics may include deforestation, desertification, fisheries, wildlife, refuges, fuelwood, pollution. Prerequisite: Senior standing; permission.

NR 264. SL: C Ross Env Publ Serv Pract. 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 103, NR 104, or equivalent. NR 153 or equivalent is recommended.

NR 265. Environment & Human Behavior. 3 Credits.
Applies social psychological frameworks--attitudes, exchange theory, symbolic interaction, group processes, social cognition, discourse theory--to help understand environmentally related behaviors, conflict, and management. Prerequisite: Junior standing.

NR 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, PSS 161. Cross-listed with: PSS 268.

NR 270. Toxic&Hzrds Subst in Srf Water. 3 Credits.
The fate of toxic and hazardous pollutants, including trace elements and organics, in surface waters; effects on human health and aquatic biota. Prerequisite: BIOL 001, CHEM 023, CHEM 042; CHEM 102 or equivalent; Senior standing.

NR 275. NR Planning: Theory & Methods. 3 Credits.
Investigates theoretical development of natural resource planning. Studies planning methods appropriate to protection and use of scenic, recreational, forest, agriculture, and historic resources and ecologically sensitive areas. Prerequisite: Senior standing.

NR 276. Water Quality Anlys & Interp. 0 or 3 Credits.
Selected aspects of water chemistry and bioassay as related to surface and ground waters. Laboratory analysis of water quality parameters and data interpretation. Prerequisite: One course in Chemistry, calculus, and Statistics; Senior standing.

NR 279. Watershed Management Hydrology. 0 or 3 Credits.
Fundamental elements of hydrology and contaminant transport in watersheds. Application of dynamic simulation techniques. Discussion of new technologies for watershed management. Prerequisite: NR 170 or equivalent or as a co-requisite; NR 020, PHYS 011, CHEM 023, CHEM 026 or equivalent; Senior standing.

NR 280. Stream Ecology. 0 or 4 Credits.
Ecology of streams including hydrodynamics, morphology, sediment transport, chemistry, biology and human impacts. Field and laboratory experience. Prerequisites: One year Biology; one year Chemistry; ecology course.

NR 285. Advanced Special Topics. 1-6 Credits.
Advanced special topics in natural resource planning beyond the scope of existing formal courses. Prerequisite: Graduate/Senior standing; Instructor permission.

NR 288. Ecol Design & Living Technol. 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. Pre/co-requisites: Junior/Senior standing, background in ecology/systems theory.
NR 289. 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.

NR 298. Honors 'Project' Planning. 2 Credits.
Process, procedures, and strategies leading to the development of an individual or group Honors Project Proposal, to be submitted for review and approval. Prerequisites: Junior standing; concurrent enrollment in NR 199 for HCOL students; Instructor permission; undergraduate only.

NR 299. Honors. 1-6 Credits.
Honors project dealing with aquatic resources, terrestrial ecology, or integrated natural resources. Prerequisite: By application only; see Program Chair.