

## ECOLOGICAL ECONOMICS

### OVERVIEW

Ecological Economics is a transdisciplinary field that examines the relationships between ecological and economic systems while working to solve humanity's current environmental challenges. It is based on the understanding that the economy is a subsystem of a larger ecological life support system, and it strives to create an ecologically sustainable, socially equitable, and economically efficient future. The certificate is a problem-based, interdisciplinary program focused on developing a practical framework for integrating economic and ecological systems. Students will acquire a theoretical and pragmatic basis to carry these skills into the world of practice.

### DEGREES

- Ecological Economics CGS

### FACULTY

**Erickson, Jon**; Professor, Gund Institute; PHD, Cornell University

**Farley, Joshua C.**; Professor, Department of Community

Development and Applied Economics; PHD, Cornell University

**Ricketts, Taylor H.**; Professor, Rubenstein School of Environment and Natural Resources; PHD, Stanford University

### Courses

#### 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 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, and either NR 143 or NR 146. 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. Prerequisite: 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. Prerequisites: 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.

History, philosophy, and management of wilderness, national parks, and related areas. Prerequisites: Junior standing in Parks, Recreation and Tourism. Cross-listed with PRT 240.

#### 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. Prerequisite: NR 143, GEOG 184, NR 343, NR 146, NR 346, or GEOG 185.

#### NR 243. GIS Practicum. 3 Credits.

An applied course in geospatial technology with a focus on ESRI's ArcGIS software suite. Prerequisite: NR 143 or 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; Either NR 143, GEOG 184, or NR 343 and either STAT 111, STAT 141, NR 140, or STAT 211.

#### 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: BIOL 001 and BIOL 002 or BCOR 011 and BCOR 012, and CHEM 023 and CHEM 026 or CHEM 031 and CHEM 032, and NR 103 or BCOR 102.

#### NR 254. Adv Natural Resource Policy. 3 Credits.

Advanced seminar in natural resource policy, emphasizing current issues in forest policy. Prerequisite: NR 153.

#### 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.

#### NR 260. Wetlands Ecology & Mgmt. 3 Credits.

Structure, dynamics and values of natural and artificial wetlands; wetlands management and issues. Prerequisites: BIOL 001 and BIOL 002 or BCOR 011 and BCOR 012, and NR 103 or BCOR 102.

#### 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.

#### 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, Prerequisites: BCOR 102 or NR 103, and PSS 161. Cross-listed with: PSS 268.

**NR 270. Toxic&Hrds 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. Prerequisites: BIOL 001, and CHEM 023 and CHEM 042, or CHEM 102; 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: 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. Prerequisites: NR 170; 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: BIOL 001 and BIOL 002 or BCOR 011 and BCOR 012, and CHEM 023 and CHEM 026 or CHEM 031 and CHEM 032, and NR 103 or BCOR 102.

**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. Prerequisite: Junior standing.

**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. Prerequisite: NR 288.

**NR 306. Envisioning a Sust Future. 2 Credits.**

Seminar orienting graduate students to RSENR and providing frameworks for collaborative leadership, whole systems thinking, and intercultural competency.

**NR 311. Leadership for Sustainability. 3 Credits.**

Provides an experiential and theoretical orientation to foundational practices, principles, and skills of sustainability leadership with an emphasis on ecological/systems thinking, sustainability, and leadership.

**NR 312. Power Prvlge & Catalyz Change. 3 Credits.**

Focuses on leadership skills and systems frameworks for engaging with issues of diversity, power, and privilege and the implications of these topics on leaders' capacity. Designed to meet the RSENR graduate diversity requirement. Prerequisite: NR 311.

**NR 329. Ecology for Sustainability. 3 Credits.**

Graduate ecology course for students without a prior background in ecology. Course covers basic ecological concepts that inform policy, planning, analysis, and decision-making.

**NR 333. Professional Writing. 0.5-1 Credits.**

Writing workshop that explores essay and report writing, as published in both popular and professional journals that examine the natural world and its resources. Prerequisite: Graduate standing. Cross-listed with: PBIO 333.

**NR 334. Professional Writing. 1 Credit.**

Writing workshop that explores essay and report writing, as published in both popular and professional journals that examine the natural world and its resources. Prerequisite: Graduate standing. Cross-listed with: PBIO 334.

**NR 341. Ecological Economic Theory. 3 Credits.**

A transdisciplinary study of the economic system as embedded and interdependent on social institutions and environmental systems. Prerequisite: Graduate standing.

**NR 342. Ecosystem Services. 3 Credits.**

Examines the economic and other benefits nature provides to people. Covers the ecological foundations of quantifying ecosystem services, the economics of valuing them, and the practical issues involved with putting them to work for conservation. Prerequisites: Graduate standing; Instructor permission.

**NR 343. Fndmntls of Geog Info Systems. 3 Credits.**

Concepts and methods in Geographic Information Systems (GIS) presented at an accelerated pace for Graduate students using ArcGIS software. Prerequisite: Graduate standing.

**NR 346. Digital Image Processing. 2 Credits.**

Principles and applications of digital image processing of remotely sensed imagery. Hands-on analyses of satellite imagery will address environmental issues using ERDAS Imagine software. Prerequisite: Graduate standing.

**NR 354. Seminar:Envrmtl Policy & Mgmt. 3 Credits.**

Seminar examining contemporary environmental policy at local, state, national, and international levels; policy formulation, implementation and design relative to current environmental problems. Prerequisite: Graduate standing.

**NR 356. Conservation, Systems&Sustain. 3 Credits.**

Conservation concepts and practice, viewed through the lens of history, systems, and sustainability. From site to landscape scale, with case studies and practioner interviews. Prerequisite: Graduate standing. Cross-listed with: PBIO 356.

**NR 360. Environmental Sociology. 3 Credits.**

An in-depth exploration of how sociologists understand the relationship between a) the physical environment's effects on society, and b) society's effects on the natural environment. Prerequisite: Graduate standing. Fall. Alternate years.

**NR 361. Politic:Landscape,Place,Nature. 2 Credits.**

Seminar exploring the social and political construction of nature, emphasizing how natural resources and environment are defined through social relationships in particular landscapes and places.

Prerequisite: Graduate standing.

**NR 362. Leadership Relevancy 21st Cent. 3 Credits.**

Perspectives and tools for working on 21st challenges and opportunities. Targets public land managers. Week-long course in Vermont followed by online presentations, readings, online discussions. Part of NPS Graduate Certificate. Prerequisite: Graduate standing.

**NR 375. NR Planning: Laboratory. 1 Credit.**

Experiential laboratory applying natural resource planning theory and methods to local or regional issues. Students conduct a planning exercise for a town or region. Co-requisite: Concurrent enrollment in NR 275.

**NR 376. Graduate Teaching Practicum. 2 Credits.**

Natural Resource teaching practicum for doctoral students in the Rubenstein School. Course is required if students are following the academic option. Should be taken concurrently or one semester in advance of completion of the doctoral teaching requirement. Prerequisite: Doctoral standing.

**NR 377. Land Use Policy & Economics. 3 Credits.**

Economic and social forces that drive urban and suburban land use patterns, such as urban sprawl, and the policy mechanisms designed to intervene in those processes. Prerequisite: Graduate standing. Cross-listed with: TRC 316.

**NR 378. Integrating Analyses NR Issues. 3 Credits.**

Comparison of epistemologies and ontologies of natural resource disciplines. Applications from fields such as ecology, policy, sociology, economics, engineering, and ethics. Prerequisite: Graduate standing.

**NR 380. Seminar in Natural Resources. 0.5-2 Credits.**

Presentation and discussion of advanced problems, research, and current topics in natural resources by faculty, graduate students, and outside guest speakers.

**NR 382. Seminar in Research Planning. 1 Credit.**

Discussions of the planning and activities associated with Graduate student projects and research. Prerequisite: Graduate standing. Cross-listed with: FOR 382.

**NR 384. Independent Study in NR. 1-18 Credits.**

Readings, with conferences, to provide graduate students with backgrounds and specialized knowledge relating to an area in which an appropriate course is not offered.

**NR 387. Education for Sustainability Sem. 3 Credits.**

Focuses on creating conditions for learning our way toward a more sustainable future. Offers tangible skills, pedagogical approaches and theoretical frameworks that can immediately be applied in schools and other learning environments.

**NR 388. Ecological Leadership Seminar. 3 Credits.**

Explores emerging topics and themes related to the theory and practice of ecological leadership. Can be taken in successive semesters (up to 2 times), as learning module topics will change.

**NR 389. Ecological Leadership Practicum. 3 Credits.**

An advanced exploration of ecological/systems thinking, sustainability, leadership skills, and leveraging change; offering students the opportunity to integrate these concepts and skills through an applied leadership practicum. Prerequisite: NR 388.

**NR 390. Internship. 1-18 Credits.**

An 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 391. Master's Thesis Research. 1-18 Credits.****NR 392. Master's Project Research. 1-12 Credits.****NR 395. Special Topics. 1-18 Credits.**

Graduate topics and material that may eventually develop into a regular course offering.

**NR 491. Doctoral Dissertation Rsch. 1-18 Credits.**