NATURAL RESOURCES (NR)

Course numbers with the # symbol included (e.g. #400) have not been taught in the last 3 years.

NR 400 - Professional Perspectives in Natural Resources
Credits: 1
Lectures by departmental faculty provide an informal look at the various natural resource disciplines and professions represented by the Department of Natural Resources. These presentations acquaint students with our faculty and inform them of some of the exciting research being undertaken in the department. Students also learn of opportunities for professional involvement. Required for all first-semester Natural Resources majors.
Grade Mode: Credit/Fail Grading

NR 403 - Introduction to Environmental Science
Credits: 4
A multi-disciplinary introduction to Environmental Sciences, presenting basic concepts and controversies in geology, meteorology/hydrology, global biology and biogeochemistry, integrated through the study of the Earth as system. Intended primarily for declared or perspective majors in Environmental Sciences and related programs. Combines lecture and discussion with discovery and presentation experiences to address the history of ideas, and major questions and controversies, both settled and active.
Attributes: Inquiry (Discovery)
Grade Mode: Letter Grading

NR 415 - Natural Resources Field Methods
Credits: 2
This course is intended to serve first or second year students in Forestry, Wildlife and Conservation Biology, and Environmental Conservation and Sustainability. After taking this course, students are able to navigate successfully in wild terrain using pacing, map, compass, GPS; can conduct a simple planar survey including cartography; and can sample a forest in order to characterize the abundance and quality of forest resources. Moreover, students know the fundamental principles of navigation, surveying, and field sampling.
Grade Mode: Letter Grading

NR 417 - Sophomore Seminar: Wildlife and Conservation Biology
Credits: 2
This course provides a professional foundation and orientation for second-year Wildlife & Conservation Biology (WCB) students. Through readings, seminars, guest speakers, and conservation, students will explore the range of what it means to be a professional Wildlife & Conservation Biologist. After taking this course, students will be better able to navigate and critique the scientific literature, synthesize and communicate information, and understand and articulate the diverse field of Wildlife & Conservation Biology.
Grade Mode: Letter Grading

NR 425 - Field Dendrology
Credits: 4
Students study forest trees in natural communities and urban settings. Identification and nomenclature of important North American trees and shrubs is emphasized. Environmental factors influencing tree growth, combined with study of disturbance history, provide the context for understanding why tree species grow where they do. Students are introduced to the major forest regions of North America. Restricted to NR majors; others by permission.
Equivalent(s): EC 410, FOR 425, NR 420
Grade Mode: Letter Grading
Special Fee: Yes

NR 433 - Wildlife Ecology
Credits: 0 or 4
Historical, biological, ecological, and sociological factors influencing the wildlife resource and its management. Concepts in populations, communities, habitat, and contemporary wildlife issues. Lab.
Attributes: Biological Science(Discovery); Discovery Lab Course
Equivalent(s): WILD 433
Grade Mode: Letter Grading
Special Fee: Yes

NR 435 - Contemporary Conservation Issues and Environmental Awareness
Credits: 4
Explores the impacts of technology and human activity on our environment and natural resources. Key conservation issues are used as examples of past and present biological, social, and environmental conflicts.
Attributes: Environment,TechSociety(Disc)
Equivalent(s): EC 435, NR 435H, NR 435W, NR 535
Grade Mode: Letter Grading

NR 435H - Honors/Contemporary Conservation Issues and Environmental Awareness
Credits: 4
Explores the impacts of technology and human activity on our environment and natural resources. Key conservation issues are used as examples of past and present biological, social, and environmental conflicts.
Attributes: Environment,TechSociety(Disc); Honors course
Equivalent(s): NR 435
Grade Mode: Letter Grading

NR 437 - Principles of Sustainability
Credits: 4
In this course, we investigate the foundational principles of the concept of sustainability. Our objectives include: understanding the many integrated dimensions of sustainability; examining illustrations of unsustainable human-environment relations; recognizing the complexity of sustainability problems and the challenges to finding solutions; comprehending that human-environment relations are a multi-level, complex and dynamic system, and appreciating that the sustainability of ecosystems is necessarily embedded in social, cultural and historical trends.
Grade Mode: Letter Grading

NR 439 - Environmental Biology
Credits: 4
Environmental biology focuses on the origins, functions, and interactions of populations, communities, species and ecosystems in relation to dynamic environmental processes. The main course objective is to provide a basic understanding of ecosystem function and the ecological, evolutionary, and genetic principles necessary to understand biological diversity and its distribution.
Grade Mode: Letter Grading
Special Fee: Yes

NR #444E - Eye of Newt and Toe of Frog: The World of Poisonous Animals
Credits: 4
Course examines a variety of animal poisons and venoms in different contexts. Historical, cultural, physiological, pharmacological, and evolutionary viewpoints are explored. Readings, guest lectures, and peer blog entries are used to refine critical thinking skills and form the basis of in-class discussions.
Attributes: Biological Science(Discovery); Inquiry (Discovery)
Grade Mode: Letter Grading

NR #444F - Does Extinction Matter
Credits: 4
This course examines the causes and potential consequences of biodiversity loss. By considering ecological, economic, and ethical perspectives students will be asked to develop an informed personal answer to the question Does extinction matter? Development of critical thinking as well as written and oral communication skills will be stressed through a variety of in-class and outside class activities.
Attributes: Humanities(Disc); Inquiry (Discovery)
Grade Mode: Letter Grading

NR #458 - The Science of Where
Credits: 4
This online course introduces the principles and practices of spatial thinking through lectures, readings, discussions, and hands-on laboratory exercises. Students learn not only to think spatially, but also how to apply this knowledge in their own fields of study.
Attributes: Discovery Lab Course; Physical Science(Discovery)
Grade Mode: Letter Grading

NR 501 - Studio Soils
Credits: 0 or 4
An overview of physical, chemical, and biological properties of soil. Sub-disciplines of soil chemistry, soil physics, soil microbiology, soil genesis, and classification. Lab.
Attributes: Writing Intensive Course
Equivalent(s): SOIL 501
Grade Mode: Letter Grading
Special Fee: Yes

NR 502 - Forest Ecosystems and Environmental Change
Credits: 4
Forest ecosystems cover a large fraction of the Earth's land surface and account for most of its terrestrial biological productivity. This course introduces forest ecosystems around the world and explores both the natural processes that regulate them and the environmental factors that cause change over time. Topics include tree growth strategies, successional change, nutrient cycling, and human-induced stressors such as air pollution and climate change.
Attributes: Environment,TechSociety(Disc)
Equivalent(s): FOR 502, NR 502W
Grade Mode: Letter Grading
Special Fee: Yes

NR 504 - Freshwater Resources
Credits: 0 or 4
Major determinants of freshwater resources including hydrologic cycle and water balance, precipitation, stream-flow measurement, pollution, water supply and sewage treatment, water resource management and regulation. Lab/field trips.
Attributes: Discovery Lab Course; Physical Science(Discovery)
Equivalent(s): WARM 504
Grade Mode: Letter Grading
Special Fee: Yes

NR 506 - Forest Entomology
Credits: 0 or 4
Insects are among the most diverse and abundant organisms on the planet and play a crucial role in forest ecosystems. Insects from the base of the consumer food web in forests and are key drivers of nutrient cycling, pollination, etc. This course surveys common and important insect orders, families, and species found in forest systems and provides the tools for basic identification and biological study of these fascinating creatures.
Equivalent(s): FOR 506
Grade Mode: Letter Grading
Special Fee: Yes

NR 507 - Introduction to our Energy System and Sustainable Energy
Credits: 4
This course introduces students to our domestic energy system and the expanding efforts to develop our use and acceptance of sustainable energy. It provides a historical context of our system that explains where we are today in terms of the grid, technologies, energy use and production and energy markets, primarily for electricity and building use. The course examines how our current impedes and enhances opportunities for innovation in renewable technologies and financing.
Attributes: Environment,TechSociety(Disc)
Grade Mode: Letter Grading

NR 508 - Communicating Science
Credits: 4
Effective communication and community engagement with science are critical, particularly in our modern era of information overwhelm. In this course, we actively explore tools and techniques for oral, written, and visual communication of science in various mediums and with a range of publics and motivations. With an emphasis on critical and creative thinking, we will cultivate a set of skills and best practices as students develop a personal philosophy for communicating science with diverse audiences.
Prerequisite(s): ENGL 401 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 527 - Forest Ecology
Credits: 4
Introduces basic and applied ecology of forests, with emphasis on ecosystem processes, including water, energy, and nutrient cycles; biological interactions, including biodiversity and plant-plant, plant-animal, and plant-microbe relationships; and human impacts, including forest management, land-use/land cover-change, and changes in atmospheric chemistry. Lab.
Equivalent(s): FORT 527
Grade Mode: Letter Grading
Special Fee: Yes

NR 561 - Chemistry of the Environment
Credits: 4
The course is designed for students who desire a deeper understanding of chemical principles in environmental- and ecology-related disciplines. This course will focus on understanding key principles that underline many of the important chemical processes that influence the functioning and health of environmental systems. These include reaction rates, oxidation-reduction, kinetics and enzyme dynamics, pH and acid-base equilibria, organic transformations, colloids and particulate behavior, and analytical approaches to understanding environmental chemistry.
Prerequisite(s): (CHEM 403 with a minimum grade of D- and CHEM 405 with a minimum grade of D-) or CHEM 411 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 600 - Work Experience
Credits: 0
As part of their degree program, students are expected to engage in a work experience or internship under professional supervision and approved by natural resources faculty. This experience may occur at any time during their sophomore through senior years. Students are responsible for arranging their own experience in consultation with their advisor and NREN faculty members.
Equivalent(s): NR 599
Grade Mode: Credit/Fail Grading

NR 602 - Natural Resources and Environmental Policy
Credits: 4
Contemporary natural resource and environmental policy problems/issues are addressed from a policy sciences perspective with emphasis on domestic policy solutions. Critical assessment of major policy initiatives and their implementation toward sustainable resource use and a healthy environment. Public policies are analyzed to determine the extent to which their implementation strategies have succeeded, and to assess their adequacy within a bioregional or ecosystem approach, and/or capacity to integrate economic and environmental decisions. Cases include national and local policies in their global context. Students apply public policy analysis and decision tools in laboratory sessions.
Attributes: Writing Intensive Course
Equivalent(s): EC 702
Grade Mode: Letter Grading
Special Fee: Yes

NR 603 - Landscape Ecology
Credits: 4
This course focuses on the relationships between scale, spatial patterns and ecological processes. Through lecture, discussion and lab exercises students learn about scale and scaling techniques, the abiotic and biotic processes creating landscape patterns, how landscape patterns are characterized , and the application of landscape ecology theory to contemporary issues in conservation and management. Emphasis placed on landscape perspectives and practices as they relate to understanding and managing populations and communities.
Prerequisite(s): BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 606 - International Energy Topics
Credits: 4
This course introduces students to international energy topics. Students will be exposed to a historical context and current status of several energy-related issues from an international perspective. Topics range from energy poverty, energy and climate change and global fossil fuel subsidies. Studies of specific technologies will be delivered through the context of international leaders, Iceland and geothermal, the UK and offshore wind and solar in Germany.
Grade Mode: Letter Grading

NR 615 - Wildlife Habitats
Credits: 4
Introduces animal-habitat associations, including an examination of spatial and temporal features of wildlife habitat, the evolution of habitat selection, and how habitat suitability/productivity is evaluated.
Attributes: Writing Intensive Course
Prerequisite(s): BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-.
Equivalent(s): WILD 615
Grade Mode: Letter Grading
Special Fee: Yes

NR #625 - Physiological Ecology
Credits: 4
Course examines the physiological mechanisms and adaptive responses of organisms that facilitate their survival in changing natural environments. Following an introduction to homeostasis and general physiological principles, topics focus on adaptations to the marine and freshwater environments, to estuarine challenges, and the specific requirements of terrestrial and aerial environments. Additional topics center on adaptations to extreme habitats and to parasitic life styles. Furthermore, the physiological bases of migrations, sleep, and mating/life history strategies are also explored. Examples are drawn from invertebrates, vertebrates, and plants.
Prerequisite(s): BIOL 411 with a minimum grade of D- or BIOL 412 with a minimum grade of D-.
Grade Mode: Letter Grading

NR #637 - Practicum in Environmental Conservation
Credits: 4
Independent participation in an environmental conservation activity in the area of the student's specialization. Individual or group projects may be developed under the supervision of any faculty member within or outside natural resources or with supervisors in public and private agencies, upon approval of the course instructor. Research projects not acceptable.
Equivalent(s): EC 637, NR 637H
Grade Mode: Credit/Fail Grading

NR 640 - Wildlife Population Ecology
Credits: 4
An overview of the mechanisms that influence the characteristics of terrestrial wildlife populations. Lecture covers concepts and theory, with a central focus on population growth, how it is influenced by demographic rates of survival, recruitment, immigration/emigration, with additional consideration given to predation and competition, and how population status is monitored for wildlife, including occupancy, abundance, and viability. Lab provides hands-on exercises, often using computer software, with analysis and interpretation of data from local case studies.
Prerequisite(s): BIOL 412 with a minimum grade of D- and (BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-) and (MATH 424B with a minimum grade of D- or MATH 420 with a minimum grade of D-).
Grade Mode: Letter Grading

NR 642 - Introduction to Biogeography
Credits: 4
Biogeography is an integrative field of inquiry that unites concepts and information from evolutionary biology, ecology, systematics, geology, and physical geography. Students are introduced to the distribution patterns of wild animals and plants and to the factors that determine these patterns. In this course, the emphasis is on evolutionary aspects of biogeography, biodiversity, and implications for conservation issues.
Prerequisite(s): BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 643 - Economics of Forestry
Credits: 4
Intermediate-level analysis of supply and demand for forest-based goods and services, managerial economics, taxation, capital investments.
Prerequisite(s): EREC 411 with a minimum grade of D- or ECON 402 with a minimum grade of D-.
Equivalent(s): FOR 643
Grade Mode: Letter Grading

NR 650 - Principles of Conservation Biology
Credits: 4
Examines the major issues relevant to conservation of biodiversity from the genetic to the ecosystem level. In addition to addressing ecological and biological principles, the interdisciplinary nature and challenges of managing for conservation biology, including the role of economic and social factors are examined.
Equivalent(s): EC 502
Grade Mode: Letter Grading
Special Fee: Yes

NR #655 - Vertebrate Biology
Credits: 4
Introduces the diversity and evolution of vertebrates. Topics span the morphological, physiological, behavioral, and ecological diversity among the major vertebrate taxa. Labs stress identification of vertebrate taxa based on specimens and morphological structures. Lab.
Prerequisite(s): BIOL 411 with a minimum grade of D- and BIOL 412 with a minimum grade of D-.
Equivalent(s): NR 655H, WILD 655, WILD 655H
Grade Mode: Letter Grading
Special Fee: Yes

NR 658 - Introduction to Geographic Information Systems
Credits: 4
Introduces the use of geographic information systems (GIS) for natural resources and related fields. Data models/structures, map projections, data input/output/storage, data analysis/modeling, interpolation, and data quality/standards. Hands-on lab using ArcGIS software. Restricted to NR majors or permission.
Equivalent(s): GEOG 658
Grade Mode: Letter Grading

NR 660 - Ecology and Biogeography of New Zealand
Credits: 5
Covers the principles of ecology and biogeography, with a distinct focus on New Zealand. Students investigate the processes that have shaped the New Zealand landmass and its biota. Impact of human settlement on New Zealand's ecosystems is explored in-depth. Methods and techniques of scientific research are incorporated in this course. Field exercises focus on topical case studies in a variety of ecosystems and are designed to strengthen students' conceptual knowledge, enable students to apply this knowledge, as well as develop field skills including classification systems, mapping, habitat assessment, field identification, and sampling techniques.
Co-requisite: INCO 588, NR 661, NR 662, NR 663
Equivalent(s): EC 660
Grade Mode: Letter Grading
Special Fee: Yes

NR 661 - Restoration Ecology and Ecosystem Management in New Zealand
Credits: 4
Current restoration projects and strategies for management of natural resources in New Zealand form the framework for this course. Solving problems related to introduced species, changes in habitat, the preservation of ecological processes and watershed management are the major foci of this course. Management of resources for multiple uses, as well as primary and extractive industries is included. Field exercises focus on topical case studies in a variety of terrestrial and coastal-marine ecosystems and include the identification of habitats and communities, stresses on the environment, and risk analysis.
Co-requisite: NR 660, NR 662, NR 663
Equivalent(s): EC 661
Grade Mode: Letter Grading
Special Fee: Yes

NR 662 - Environmental Policy, Planning and Sustainability in New Zealand
Credits: 3
Introduces students to politics in New Zealand. Investigating policy pathways and planning forms part of the curriculum. Students assess scope of legislation, including the Resource Management Act (1991), for the economic and socio-political environment in New Zealand. Government obligations to the Treaty of Waitangi, and customary uses of resources are included as part of this course. Students are exposed to diverse perspectives of local authority planners and policy makers, local iwi (tribes), the Department of Conservation, and community groups. Students examine case studies involving the resource consent process at several levels of decision-making. Case studies provide a comprehensive overview of the interactions between the environment and people and their cultural and socio-economic needs.
Co-requisite: NR 660, NR 661, NR 663
Equivalent(s): EC 662
Grade Mode: Letter Grading
Special Fee: Yes

NR 663 - Applied Directed Research in New Zealand
Credits: 4
Working closely with faculty, student teams investigate selected ecological, resource management or policy issues. All projects have scientific and societal relevance, and contribute to ongoing/existing projects in the region. Students use the scientific method to design and carry out their projects. Development of rigorous field investigations, experimental design, data analysis, and scientific writing are emphasized. Students prepare a research report and present their findings in a seminar that includes stakeholders and people from the local community.
Co-requisite: NR 660, NR 661, NR 662
Attributes: Writing Intensive Course
Equivalent(s): EC 663
Grade Mode: Letter Grading
Special Fee: Yes

NR 664 - Conservation Genetics and Applied Evolution
Credits: 4
This course provides an overview of key concepts of conservation genetics and the use of genetic tools and data to address them. It addresses how evolutionary theory underpins processes and solutions relevant to biodiversity conservation. Major topics include genetic diversity and variation in natural populations, inbreeding, captive management, genetic rescue), genetic monitoring, and evolutionary responses to anthropogenic impacts. Practical exercises and case studies explore the application of genetic techniques and the analysis of genetic data.
Prerequisite(s): (BIOL 411 with a minimum grade of D- or NR 439 with a minimum grade of D- or BIOL 412 with a minimum grade of D-) and (BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-).
Mutual Exclusion: No credit for students who have taken GEN 705.
Grade Mode: Letter Grading

NR 703 - Watershed Water Quality Management
Credits: 4
Principles of land use as they relate to water quality and quantity. Lectures focus on biogeochemical cycles and the watershed approach to land and water resource management. Labs and field trips focus on methods of water sampling and analysis. One year of chemistry is recommended. Lab/field trips.
Prerequisite(s): NR 504 with a minimum grade of D-.
Equivalent(s): WARM 703
Grade Mode: Letter Grading
Special Fee: Yes

NR 706 - Soil Ecology
Credits: 4
Examines the ecological relationships between soil microorganisms and their biotic and abiotic environment, with emphasis on the role of soil microorganisms in biogeochemical cycling. Specific objectives are to examine the biodiversity present in soil systems, factors controlling microbial community composition and diversity, and linkages between soil microbial communities, soil physical properties, and soil organic matter and nutrient cycling dynamics. Lab.
Attributes: Writing Intensive Course
Prerequisite(s): (BIOL 412 with a minimum grade of D- or BIOL 409 with a minimum grade of D-) and CHEM 403 with a minimum grade of D-.
Equivalent(s): SOIL 706
Grade Mode: Letter Grading
Special Fee: Yes

NR 707 - Environmental Modeling
Credits: 4
Environmental Modeling introduces students to a range of key mathematical and computer modeling concepts and the ways they can be used to address important scientific questions. The course is divided into four topical sections: Population and Community Ecology, Hydrology, Biogeochemistry, and Ecosystems. In each section, modeling concepts and skills are presented together with environmental information to emphasize the linkage between quantitative methods and relevant scientific results.
Prerequisite(s): MATH 425 with a minimum grade of D- or MATH 424B with a minimum grade of D-.
Grade Mode: Letter Grading

NR 712 - Mammalogy
Credits: 4
Evolution, ecology, behavior, physiology and diversity of mammals. The focus of the course is on conceptual issues, such as the relation of structure, function, physiology and ecology of species; reproductive physiology and life history strategies; and the evolution of mating systems and social structure. Familiarity of mammalian groups to the family level and identification of local fauna to species will be required. Lab.
Prerequisite(s): BIOL 411 with a minimum grade of D- and BIOL 412 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 713 - Quantitative Ecology
Credits: 4
Basic quantitative concepts applied to ecological systems including: population and community dynamics, experimental design, spatial patterns, species abundance and diversity, community organization, metapopulations, and landscapes.
Prerequisite(s): (BIOL 528 with a minimum grade of D- or EREC 525 with a minimum grade of D-) and (NR 527 with a minimum grade of D- or BIOL 541 with a minimum grade of D-).
Equivalent(s): FORS 713
Grade Mode: Letter Grading

NR 720 - International Environmental Politics and Policies for the 21st Century
Credits: 4
Students examine policies for managing human activities to sustain the health of regional ecosystems and planetary life-support systems. Selected problems of the international commons (oceans, marine resources, atmosphere, migratory species); global and regional carrying capacity (population, resource consumption), internationally shared ecosystems (transboundary watersheds and waterbodies, tropical forests); and the relevant international institutions and politics for policy formation, conflict resolution, and implementation. Using a policy-analytic framework, students develop case studies to assess international policies and institutional arrangements to achieve the objectives of Agenda 21--Earth Summit Strategy to Save the Planet.
Attributes: Writing Intensive Course
Equivalent(s): EC 720
Grade Mode: Letter Grading

NR 724 - Resolving Environmental Conflicts
Credits: 4
Theories and practices of environmental dispute settlement. Roles of public, non-governmental and governmental organizations. Effectiveness of public participation initiatives in influencing public policy decisions and/or resolving environmental conflicts. Alternative approaches to consensus (policy dialogues, joint problem solving; strategic planning; negotiation, mediation) as well as litigation. Specific cases are critiqued and evaluated; conflict resolution skills are developed. Students observe and/or participate in ongoing local decision processes. Lab.
Attributes: Writing Intensive Course
Equivalent(s): EC 724
Grade Mode: Letter Grading
Special Fee: Yes

NR 729 - Silviculture
Credits: 4
The science and art of establishing, growing, and tending forests to meet multiple objectives. Basics of forest stand dynamics applied to the problems of timber management, wildlife habitat, water quality, and carbon sequestration.
Prerequisite(s): NR 425 with a minimum grade of D- and NR 527 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 730 - Terrestrial Ecosystems
Credits: 4
Processes controlling the energy, water, and nutrient dynamics of terrestrial ecosystems; concepts of study at the ecosystem level, controls on primary production, transpiration, decomposition, herbivory; links to earth-system science, acid deposition, agriculture. One semester each of biology, chemistry and ecology required prior to taking this course; possible courses include: BIOL 409, BIOL 411, BIOL 412 OR NR 439 AND CHEM 403, CHEM 405 OR CHEM 411 AND BIOL 541 OR NR 527.
Equivalent(s): EOS 730, FOR 730, FORS 730
Grade Mode: Letter Grading

NR 734 - Tropical Ecology
Credits: 4
This course introduces students to the ecology of different tropical ecosystems, and involves students in analyzing and interpreting ecological field data and remotely sensed data. An important emphasis is to understand patterns and processes across scales - from individual plants to ecosystems and landscapes. The course also addresses important global issues in the tropics, including climate change, land use change, diverse ecosystem services, and sustainable resource management.
Prerequisite(s): NR 527 with a minimum grade of D- and BIOL 541 with a minimum grade of D-.
Equivalent(s): FOR 734
Grade Mode: Letter Grading

NR 740 - Inventory and Monitoring of Ecological Communities
Credits: 4
Provides an introduction to the major concepts associated with monitoring change in ecological communities. Students develop an appreciation for such issues as: identification of appropriate baselines for comparison; use of indicator species; the tools used to inventory common, rare, and secretive species; how trend data are analyzed; and the implications of failing to detect an indicator species. Lab.
Attributes: Writing Intensive Course
Grade Mode: Letter Grading
Special Fee: Yes

NR 743 - Addressing Arctic Challenges
Credits: 4
Students will gain knowledge on the effect of climate change on Arctic environmental, social, and built systems, and apply transdisciplinary approaches to addressing arctic challenges. This course employs inquiry-based, peer-to-peer, and self-driven approaches. Students will tackle a research project, including data analysis, with the aim of contributing new knowledge in the form of a proposal, publication, outreach product, or other.
Prerequisite(s): BIOL 528 with a minimum grade of D- or SOC 402 with a minimum grade of D- or MATH 539 with a minimum grade of D- or MATH 644 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 744 - Biogeochemistry
Credits: 4
Examines the influence of biological and physical processes on elemental cycling and geochemical transformations from the molecular to the global scale, involving microorganisms, higher plants and animals and whole ecosystems; factors that regulate element cycles including soils, climate, disturbance and human activities; interactions among the biosphere, hydrosphere, lithosphere, and atmosphere; transformations of C, N, S, and trace elements.
Prerequisite(s): (BIOL 409 with a minimum grade of D- or BIOL 411 with a minimum grade of D- or BIOL 412 with a minimum grade of D- or NR 439 with a minimum grade of D-) and (CHEM 403 with a minimum grade of D- or CHEM 405 with a minimum grade of D- or CHEM 411 with a minimum grade of D-) and (BIOL 541 with a minimum grade of D- or NR 527 with a minimum grade of D-).
Grade Mode: Letter Grading

NR 745 - Forest Management
Credits: 4
Forest land ownership, management objectives, forest inventory regulation and policy, forest administration, professional responsibilities and opportunities. Lab.
Attributes: Writing Intensive Course
Equivalent(s): FOR 745
Grade Mode: Letter Grading
Special Fee: Yes

NR 749 - Forest Inventory and Modeling
Credits: 4
Applied sampling and statistical techniques for assessing current forest conditions and predicting future growth, yield, and structure. Topics include plot and point sampling, ecological inventory, and evaluation of site quality and stand density.
Prerequisite(s): NR 415 with a minimum grade of D- and BIOL 528 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 750 - Sustaining Biological Diversity
Credits: 4
This course examines the approaches to recover and restore declining populations and at-risk communities. Major concepts addressed include: population viability analysis; use of simulation models to explore conservation alternatives; integrating the political, economic, and social realities that affect natural resource management; the adaptive nature of any restoration of rare organisms and communities; and preparing for the challenges associated with invasive organisms and climate change.
Prerequisite(s): NR 650 with a minimum grade of D- and BIOL 528 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 751 - Aquatic Ecosystems
Credits: 4
Energy flow and nutrient cycling in streams, rivers and lakes, with an emphasis on understanding the control of primary productivity, decomposition and community structure by both hydrologic and biotic drivers. Role of aquatic ecosystems in carbon and nitrogen budgets at watershed, regional, and global scales. Impacts of environmental changes such as global climate change and suburbanization on aquatic ecosystems. Lab.
Prerequisite(s): NR 504 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 753 - Critical Issues in Sustainability: Sustainability as an Abundance Paradigm
Credits: 2
After 30 years in common parlance, the success of "Sustainability" still seems far from its goal. In part, this is because sustainability is typically applied as another way to manage scarcity, a paradigm informing economic and social policy for well over a century. Underlying this dominant view of sustainability, an increasing number of approaches to sustainability projects, some of longstanding are entering the mainstream as pieces of an identifiable, and distinctly novel, paradigm based on the assumption of abundance, rather than scarcity. These include ideas of the Natural Step and Natural Capital, as well as Cradle to Cradle and Biomicry. The goals of this seminar are (1) to survey and discuss this growing literature and its application to the solution of sustainability problems; and (2) research and analysis towards transforming scarcity-based to abundance-based solutions. To be considered as a capstone option for majors in Environmental and Conservation Sustainability, students must also register for NR 754 in the Spring semester.
Grade Mode: Letter Grading
Special Fee: Yes

NR 754 - Critical Issues in Sustainability: Sense of Place
Credits: 2
Costa Rica is the happiest country on Earth. Bhutan is a living laboratory for education. Bolivia has a Law of Mother Earth in its constitution. Cities and towns in the US create local solutions to problems of resource sustainability while the national dialogue stagnates. What drives some places to lay the foundations for sustainable futures, while others do not? Sense of Place is a powerful lends though which to view the relative achievements of places and organizations toward creating a sustainable future. The goals of this seminar are (1) to survey the Sense of Place literature and to analyze case studies of the role of Sense of Place in the success of sustainability efforts nationally and internationally; and (2) to research the role of Sense of Place in our local community environment and to relate it to stated goals in existing sustainability plans. To be considered as a capstone option for majors in Environmental and Conservation Sustainability, students must also register for NR 753 in the Fall semester.
Grade Mode: Letter Grading

NR 757 - Remote Sensing of the Environment
Credits: 4
Practical and conceptual presentation of the use of remote sensing and other geospatial technologies for mapping and monitoring the environment. This course begins with the use of aerial photographs (photogrammetry, and photo interpretation) and includes measures of photo scale and area, parallax and stereo viewing, object heights, flight planning, photo geometry, the electromagnetic spectrum, camera systems and vegetation/land cover mapping. The course concludes with an introduction to other geospatial technologies including digital image analysis, global positioning (GPS), and geographic information systems (GIS). Conceptual lectures are augmented with practical homework assignments and hands-on lab exercises. Lab.
Equivalent(s): FOR 757, FORS 757, GEOG 757
Grade Mode: Letter Grading
Special Fee: Yes

NR 759 - Digital Image Processing for Natural Resources
Credits: 4
Introduces digital remote sensing including multispectral scanners (Landsat and SPOT) radar, and thermal imagery. Hands-on image processing including filtering, image display, ratios, classification, registration, and accuracy assessment. GIS as it applies to image processing. Discussion of practical applications. Use of ERDAS image-processing software. Knowledge of PCs required.
Prerequisite(s): NR 757 with a minimum grade of D-.
Equivalent(s): FOR 759, FORS 759, GEOG 759
Grade Mode: Letter Grading

NR 760 - Geographic Information Systems in Natural Resources
Credits: 4
This course in geographic information systems (GIS), covers advanced theory, concepts, and applications of GIS for natural resource and related disciplines. Discussion of database structures, data sources, spatial data manipulation/analysis/modeling, data quality and assessment. Students conduct a project of their design exploring aspects of GIS most useful to them. Lecture emphasizes concepts and applications through a text and selected peer-reviewed articles. Lab uses the latest version of ArcGIS software and provides hands-on experience.
Prerequisite(s): NR 658 with a minimum grade of D-.
Equivalent(s): FOR 760, FORS 760, GEOG 760
Grade Mode: Letter Grading

NR 761 - Environmental Soil Chemistry
Credits: 4
Chemical transformations in soils are the basis for soil fertility and plant productivity in natural and managed ecosystems, and also influence key ecosystem processes including soil organic matter turnover and soil-atmosphere exchange of trace gases. This class will explore soil chemistry processes and transformations related to soil nutrient cycling, plant nutrient acquisition, and other critical environmental services.
Grade Mode: Letter Grading

NR #765 - Community Ecology
Credits: 4
Properties of biotic communities, especially biodiversity. Effects of physical stress, disturbance, competition, predation, positive interactions, and dispersal on community properties. Community dynamics, including succession and stability. Lecture and discussion.
Prerequisite(s): BIOL 528 with a minimum grade of D- and BIOL 541 with a minimum grade of D-.
Grade Mode: Letter Grading

NR 782 - Forest Health in a Changing World
Credits: 4
Forests cover over 30% of the land surface of the Earth and are incredibly important ecologically, economically, and to the health of the planet. While forests show great capacity to withstand disturbance, these ecosystems are increasingly threatened worldwide by climate change, native and introduced insects and disease, poor management practices, land clearing, drought, fire, and pollution. This course offers an overview of the dominant threats to forests, their causes and consequences, and options for monitoring, management, and mitigation.
Grade Mode: Letter Grading
Special Fee: Yes

NR 784 - Sustainable Living - Global Perspectives
Credits: 4
The pursuit of sustainable solutions to living in our contemporary world is a global endeavor. In this course, the concept of living sustainably is explored from a broad international perspective. Global scale issues impacting sustainable resource use are considered, including population growth, economic globalization and development, social equity, and cultural values. We will expand our awareness of alternatives to those current practices that impede the sustainability of human societies as part of the earth's natural systems. We will also pursue an understanding of the interrelated socio-economic conditions, combined with social and personal ethics and values necessary to move toward a more sustainable future. And each of us will come to value what sustainable living means for our own lives.
Prerequisite(s): NR 437 with a minimum grade of D- or NR 435 with a minimum grade of D-.
Equivalent(s): EC 784
Grade Mode: Letter Grading

NR 785 - Systems Thinking for Sustainable Solutions
Credits: 4
This course applies systems thinking as a problem-solving approach aimed at exploring possibilities for creating a future based on sustainable relationships between healthy human societies and their natural environments. Types of systems and systems tools are utilized to describe human-environment relationships and to emphasize their resiliency or vulnerability to future unsustainable events and/or practices. We explore how systems may be restructured to create more sustainable outcomes.
Prerequisite(s): NR 437 (may be taken concurrently) with a minimum grade of D- or NR 435 (may be taken concurrently) with a minimum grade of D-.
Equivalent(s): EC 785
Grade Mode: Letter Grading

NR 786 - Leadership for Sustainability
Credits: 4
In this course we review and evaluate current knowledge and practice regarding the attainment of sustainability in social and environmental relations. We particularly focus on the meaning and qualities of leadership for achieving a sustainable future. Along the way, we also reflect on our own leadership styles and qualities. Topics include the role of leaders and leadership practices in government, business, academia etc; concepts and theories for achieving social change; and case studies exemplifying a range of leaders and approaches toward sustainability.
Attributes: Writing Intensive Course
Prerequisite(s): NR 437 with a minimum grade of D- or NR 435 with a minimum grade of D-.
Grade Mode: Letter Grading
Special Fee: Yes

NR 787 - Advanced Topics in Sustainable Energy
Credits: 4
This course engages students in advanced topics in sustainable energy. Course reviews basic structures of our energy system, energy markets and economics, and the environmental, economic and technological of energy landscape. Focus is on electricity and building use with introductions to the transportation system. Students gain the knowledge to evaluate innovations in technology, policy and financing necessary to implement sustainable energy goals from conservation and efficiency to renewables and energy storage.
Grade Mode: Letter Grading
Special Fee: Yes

NR 791 - Preparation for Capstone
Credits: 1
This class will require that students develop a proposal for their senior capstone experience, seek approval for that proposal from a faculty sponsor, and be prepared to complete the capstone senior year. Students will also work on resume development, on writing text introducing themselves to prospective employers, and on interviewing strategies.
Grade Mode: Credit/Fail Grading

NR 795 - Investigations
Credits: 1-4
Investigations in Natural Resources may include topics in environmental conservation, forestry, soil and watershed management, ecosystems, and wildlife management. Special fee on some topics.
Grade Mode: Letter Grading
Special Fee: Yes

NR 795W - Investigations
Credits: 1-4
Investigations in Natural Resources may include topics in environmental conservation, forestry, soil and watershed management, ecosystems, and wildlife management.
Attributes: Writing Intensive Course
Grade Mode: Letter Grading

NR 799 - Honors Senior Thesis
Credits: 1-4
Honor/thesis students conduct an independent research project, relevant to the student's area of specialization in the major, under the direction of a faculty sponsor. Students submit a research proposal, write a final report, and provide an oral presentation. One or two semester sequence.
Attributes: Honors course; Writing Intensive Course
Repeat Rule: May be repeated for a maximum of 8 credits.
Equivalent(s): EC 799, FOR 799, WARM 795, WILD 799
Grade Mode: Letter Grading