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2007-2008 UAF Catalog

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Natural Resources Management

NRM 101 3 Credits**Natural Resources Conservation and Policy**

Conservation of natural resources including history, ecological and social foundations. Examines principles of sustained yield, carrying capacity, supply and demand, and world population growth as applied to agriculture, range, forest, wildlife, fisheries, recreation, minerals and energy management. A wide range of perspectives is presented to help students develop a personal philosophy toward natural resources. Prepare a multiple resource observation plan for an undeveloped area on campus. Optional all-day field trips take place the first two Saturdays of the semester. (Prerequisite: Placement in ENGL 111X.) (3 + 0) Offered Fall

NRM 102 1-2 Credits**Practicum in Natural Resources Management**

Practical experience in natural resources management. Supervised individual study on a farm, in a greenhouse, managed forest, agency or business, or another approved location. (Prerequisites: Natural Resource Management majors only and permission of instructor.)

NRM 106 1 Credit**Orientation to Natural Resource Management**

Overview of career opportunities in natural resources. Includes discussions with research faculty and upper class students involved in various aspects of resource management issues. (1 + 0) Offered Spring

NRM 107 1 Credit**Leaves in Our Lives: Food**

Learn to appreciate the plants in your life. For gardeners or anyone who eats plants. Plant biology will be introduced from the ground up and related to plant use by human civilizations, especially as food. (Recommended: Placement in ENGL 111X.) (1 + 0) Offered Palmer: Spring, As Demand Warrants

NRM 108 1 Credit**Leaves in Our Lives: Diversity**

Learn to appreciate the plants in your life. For gardeners or anyone who eats plants. Plant biology and diversity will be introduced and related to plant use by human civilizations, such as food, wood and medicine. (1 + 0) Offered Palmer: Spring, As Demand Warrants

NRM 109 1 Credit**Leaves in Our Lives: Fungi**

Learn to appreciate the plants in your life. For gardeners or anyone who eats plants. The biology of plants and fungi will be introduced and related to their use by human civilizations as food and drink. (1 + 0) Offered Palmer: Spring, As Demand Warrants

NRM 161 3 Credits**Wilderness Leadership Education**

Introduction to outdoor education. Includes both theoretical and practical exposure to quality judgment and decision-making, environmental education techniques and leadership development in the wilderness setting. Provides detailed exposure to the Wilderness Education Association's 18 essential components of wilderness leadership and backcountry safety. The field portion of the course includes detailed instruction in and mentored experience with modern backcountry travel techniques. Successful completion earns certification in the Wilderness Stewardship Program. Field program requires travel through rough un-trailed terrain with heavy packs and average strength and stamina. No use of alcohol, tobacco, illegal drugs or firearms. (Prerequisites: Permission of instructor. Recommended: BIOL 104X, NRM 101 and physical geography.) Offered Summer, As Demand Warrants

NRM 204 3 Credits**Public Lands Law and Policy**

Background on selected federal lands management legislation and agency policies affecting resources conservation, development and preservation. (3 + 0) Offered Spring

NRM 211 3 Credits**Introduction to Applied Plant Science**

Basic principles and requirements for plant growth and development with special attention to the production and management of field and greenhouse grown crops. (2 + 3) Offered Fall

NRM 212 3 Credits**Greenhouse Management**

The greenhouse as a controlled environment for research, education and commercial production of plants; the physical environment; environmental controls and monitors; plant cultivation techniques and crop scheduling useful in plant science and commercial production. (3 + 0) Offered Spring

NRM 215 3 Credits**Plant Propagation**

Principles and practices of plant propagation useful in horticulture, botany, forestry, agronomy, revegetation projects and plant research. Emphasis on both macro- and micro-propagation (tissue culture) of Alaska native plants by seeds, spores and vegetative propagules such as cuttings. (Prerequisite: NRM 211 or permission of instructor.) (2 + 3) Offered Fall

NRM 251 4 Credits**Silvics and Dendrology**

Ecological requirements and characteristics of tree species of the Northern forest and western North American forest. Silvical characteristics including range, climate, soils, shade tolerance, growth and principal enemies. Family and species characteristics for identification on sight or with a key. Field trips required. (Prerequisite: BIOL 105X, 106X and 271 or permission of instructor.) (3 + 3) Offered Spring

NRM 277 3 Credits**Introduction to Conservation Biology****(Cross-listed with BIOL 277)**

Introduction to the basic ecological, genetic, management, legal and historical developments in conservation biology and focused efforts to manage biological diversity resources, with a status review of important habitats and endangered species. (Prerequisites: BIOL 105X, 106X.) (3 + 0) Offered Alternate Spring

NRM 290 2 Credits**Resource Management Issues at High Latitudes**

Broad perspective of high latitude resource management issues. On-site analyses of resource management needs, opportunities and/or conflicts in agriculture, forestry, mining, seafood, petroleum, recreation and tourism. Includes 10 day field trip at the end of the spring semester. Students must provide own sleeping gear, rain gear and hiking boots. Students must be able to hike forest trails and camp under conditions of inclement weather. May be repeated for credit with instructor's permission. Materials fee: \$175. (Prerequisites: Permission of instructor.)

NRM 300 1-6 Credits**Internship in Natural Resources Management**

Supervised pre-professional experience in a business or agency (public or private). Open to students majoring or minoring in natural resources management only. Course may be repeated for credit up to a maximum of 6 credits. (Prerequisites: NRM 101, junior standing, 3.0 GPA, permission of instructor and an approved internship plan.) Offered As Demand Warrants

NRM 303X 3 Credits**Environmental Ethics and Actions (h)**

Exploration of the history of modern Western views of the relationship between people and nature, alternative foundations for an environmental ethic (utilitarianism, spiritual activity, rights-based and respect-based ethics) and practices of such ethics in business, professions and general lifestyle today. (Prerequisite: Junior standing or permission of instructor.) (3 + 0) Offered Spring

NRM 304O 3 Credits**Perspectives in Natural Resources Management**

Analysis of philosophical/ethical, economic, scientific and political foundations of diverse natural resource management perspectives. (Prerequisites: NRM 101, COMM 131X or 141X, junior standing or permission of instructor.) (3 + 0) Offered Fall

NRM 312 3 Credits**Introduction to Range Management**

Applied ecological treatment of soil, plant and grazing animal relationships on uncultivated lands. Origin of the discipline, management practices and important rangelands of North America; emphasis on Alaska's rangelands and grazers. (Prerequisites: BIOL 105X, 106X, BIOL 239 or permission of instructor; NRM 320, 321 recommended. Next offered: 2008-09.) (3 + 0) Offered Alternate Fall

NRM 313 4 Credits**Introduction to Plant Pathology**

Plant pathology; non-parasitic and parasitic causes of plant diseases; methods of plant infestation and mechanism of plant defenses; epidemiology and disease control. (Prerequisites: BIOL 105X, 106X; BIOL 239 recommended. Next offered: 2008-09.) (3 + 3) Offered Alternate Spring

NRM 320 3 Credits**Animal Science**

Introduction to the various disciplines that form the study of animal science. Topics include animal nutrition, physiology of reproduction and lactation, genetics and animal breeding, animal behavior, environmental physiology, animal health and welfare. Information is presented as it applies to traditional and non-traditional livestock species with emphasis on applications pertinent to Alaska. (Prerequisite: Introductory Biology. Next offered: 2008-09.) (2 + 3) Offered Alternate Fall

NRM 338 3 Credits**Introduction to Geographic Information Systems****(Cross-listed with GEOG 338)**

Geographic data concepts including mapping systems, data sources, editing data, GIS analysis and computer mapping. Introduction to global positioning systems. GIS applications in natural resources management. (Prerequisite: Knowledge of PC's or Unix workstations desirable.) (2 + 3) Offered Fall

NRM 340 3 Credits**Natural Resources Measurement and Inventory**

Techniques and instrumentations used to measure and inventory natural resources, including land, timber, range, wildlife, water and recreation resources. (Prerequisite: Junior standing or permission of instructor.) (2 + 3) Offered Fall

NRM 341 4 Credits**GIS Analysis****(Cross-listed with GEOG 341)**

GIS analysis of natural resources including spatial query, attribute query, vector, grid, image, topographic and network analysis techniques. (3 + 3) Offered Spring

NRM 351 3 Credits**Silviculture for Wildlife Managers**

Examines the biological, environmental and silvicultural concepts essential for successful manipulation of forest,

woodland and shrubland vegetation for wildlife and fish habitat. Emphasis on temperate and boreal forest ecosystems of North America. Includes stand characterization, thinning, timber harvest and silviculture systems (regeneration methods) e.g., clear-cut, shelter wood, selection, coppice and forest health. (Prerequisites: BIOL 105X, BIOL 106X, BIOL 271, NRM 101 or permission of instructor.) (3 + 0) Offered Alternate Fall

NRM 353 3 Credits
Forest Regeneration

Forest regeneration from preharvest prescription through free-to-grow stages. Includes preharvest prescription, ecosystem functions and processes, forest genetic seed collection and processing, natural and artificial regeneration, planting, site preparation and vegetation management. (Prerequisite: BIOL 105X, 106X or 271; or permission of instructor.) (3 + 0) Offered Alternate Fall

NRM 361 3 Credits
Advanced Wilderness Leadership Education

The natural environment, concentrating on outdoor leadership, environmental ethics, minimum impact camping, forest and arctic natural history, and adaptable judgement and decision-making. Includes hiking through boreal forest and along tundra ridges, river crossing, glacier ascent, and skills to do these activities safely. This demanding educational field program of 26 days requires travel through rough un-trailed terrain with heavy packs (one-third of body weight) and average strength and stamina. No use of alcohol, tobacco, illegal drugs or firearms. (Prerequisites: NRM 101 or equivalent; NRM 161 or equivalent. Recommended: NRM/GEOG 463 and NRM 465.) Offered Summer, As Demand Warrants

NRM 365W 3 Credits
Principles of Outdoor Recreation Management

Theories, practices, economics and problems fundamental to the use of land and related natural resources for recreation. (Prerequisites: ENGL 111X; ENGL 211X or ENGL 213X; Junior standing, or permission of instructor.) (2 + 3) Offered Fall

NRM 370 3 Credits
Introduction to Watershed Management

The hydrologic cycle and the influence of land management techniques on water quantity, quality and timing. Water yield, soil erosion and non-point pollution, snowpack management, and land use alternatives. (Prerequisites: NRM 101 and GEOS 101X or permission of instructor.) (2 + 3) Offered Fall

NRM 375 3 Credits
Forest Ecology

Basic forest ecology concepts, including physical (wind, temperature, water, etc.), biotic (population and community dynamics), genetic and successional and landscape dynamics and how this basic information can be used in development of wise management plans for forest ecosystems. The laboratory will cover basic principles of measurement of the forest resource and will include field work for the first six weeks followed by laboratory analysis of collected samples and preparation of a detailed report describing the ecology of the measured forest. Due to the short snow-free field season, the first laboratory session will be a full introduction to the field procedures that will be used throughout the first six weeks. (Prerequisite: NRM 251.) (2 + 3) Offered Fall

NRM 380W 3 Credits
Soils and the Environment

Soil development and classification; physical and chemical properties; biological activity; water movement and nutrient cycling in natural and manipulated ecosystems. (Prerequisites: CHEM 105X and ENGL 111X; ENGL 211X or ENGL 213X or permission of instructor.) (2 + 3) Offered Fall

NRM 400W 3 Credits
Fisheries Science
(Cross-listed with FISH 400W)

The subject of fishery science is reviewed to reflect the emerging concept of a study area integrated over a broad sweep of disciplines: oceanography, limnology, marine biology, fish population dynamics, aquaculture, economics, processing, product quality and development, and marketing. Demonstrates how such different subjects have feedback loops to one another and stresses the science fundamentals involved. (Prerequisites: ENGL 111X; ENGL 211X or ENGL 213X or permission of instructor; and one 200-level biology class. Co-requisite: STAT 200X [STAT 373-J].) (3 + 0) Offered Spring

NRM 401W, O/2 3 Credits
Fisheries Management
(Cross-listed with FISH 401W, O/2)

Principles, concepts and techniques of fisheries management in terms of biological, economic, social and political aspects. Topics include stocking and introductions, habitat manipulation, sustainable yield, regulation, management organizations and their responsibilities. Examples of several fisheries are used to clarify concepts and practices. (Prerequisites: BIOL 271; COMM 131X or 141X; and ENGL 111X; ENGL 211X or ENGL 213X or permission of instructor.) (3 + 0) Offered Fairbanks, Alternate Spring; Offered Juneau, Alternate Fall

NRM 405W 2 Credits
NRM 406W 2 Credits
Senior Thesis in Natural Resources Management I and II

Problem-solving with emphasis on writing and analysis. Individual project under the guidance of faculty sponsor involving formulation of a question in natural resources management and preparation of a formal, comprehensive written report. First semester: thesis proposal, presentation and research. Second semester: final thesis and presentation. (Prerequisites for NRM 405: ENGL 111X, ENGL 211X or ENGL 213X, NRM core, senior standing or permission of instructor. Prerequisite for NRM 406: ENGL 111X, ENGL 211X or ENGL 213X; NRM 405.) (2 + 0) Offered Fall, Spring

NRM 407 3 Credits
Environmental Law

The role of common law theory in regulatory, statutory and constitutional interpretation in the field of environmental protection, including air and water pollution, toxic/hazardous substances and land-use regulation. (Prerequisite: Junior or senior class standing or permission of instructor.) (3 + 0) Offered Spring

NRM 412 3 Credits
Field Crop Production

Agronomic principles and practices involved in the production, storage, marketing and use of field crops. (Prerequisite: NRM 211.) (3 + 0) Offered As Demand Warrants

NRM 430 3 Credits
Resource Management Planning
(Stacked with NRM 630)

Application of planning and conflict resolution principles to natural resources management. Examines plans prepared in response to current Alaska resource disputes, including wolf, brown bear, boreal forest and recreation river plans. Includes public involvement, consensus building, the basic steps in the planning process and resource dispute simulations. (Prerequisite: Senior standing or permission of instructor.) (3 + 0) Offered Spring

NRM 431 3 Credits
Wildlife Law and Policy
(Cross-listed with WLF 431)

Study of laws and agencies shaping wildlife management in North America. History and current status of major policy issues. Organization of and funding sources for state and federal programs in wildlife conservation. (Prerequisite: A 3 credit course in wildlife management principles or permission of instructor.) (3 + 0) Offered Spring

NRM 432 3 Credits
Literature of Science and the Environment (h)
(Stacked with NRM 632 and NORS 632 and cross-listed with NORS 432)

Reading, analysis and discussion of classic and contemporary works in science, natural history and environmental literature. Some semesters all of the readings will follow one theme; other semesters a variety of fiction, poetry, oral tradition and nonfiction will be considered. Readings are selected from a spectrum of opinion on the relationship of people to the natural world and both analytical and creative writing are required. Resource management professionals and students in the sciences and humanities are welcome. May be repeated once for additional credit. (Prerequisite: Senior standing or permission of the instructor.) (3 + 0) Offered As Demand Warrants

NRM 450 3 Credits
Forest Management

Forest land management for production of goods and services; relation of timber production to other forest land uses. Sustained yield, allowable cut, information needs, valuation and decision making. (Prerequisites: NRM 251, 340, ECON 235 [or equivalent], or permission of instructor. Next offered: 2008-09.) (3 + 0) Offered Alternate Fall

NRM 451W 3 Credits
Silviculture

Examines biological, environmental and silvicultural considerations essential for successful regeneration and maintenance of boreal and western North American forests. For persons in land management, including timber, woodlot, wildfire habitat, streamside, aesthetics. Looks at the science and art of forest stand management. Involves considerable critical writing. Field trips required. (Prerequisites: BIOL 271, ENGL 111X; ENGL 211X or ENGL 213X, NRM 251, junior standing, or permission of instructor. Next offered: 2008-09.) (2 + 3) Offered Alternate Spring

NRM 452 3 Credits

Forest Health and Protection

Principles and practical management systems for protecting forests from fire, insects and diseases. Factors in managing forest ecosystems and problems and techniques important in high latitude forests, especially in Alaska. (Prerequisites: BIOL 105X, 106X, 271, BIOL 239; NRM 251 or instructor's permission. Next offered: 2008-09.) (3 + 0) Offered Alternate Fall

NRM 453 3 Credits**Harvesting and Utilization of Forest Products**

Manual and mechanized timber harvesting systems including timber cutting, yarding and transport processes. Technology of processing wood into various products including lumber, plywood, veneer, pulp and energy. Introduction to supply and demand of forest products from a world, state, and local perspective. Labs include visits to local forest products companies, chainsaw safety and wood identification. (Prerequisites: NRM 101 or permission of instructor.) (2 + 3) Offered Alternate Fall (odd years)

NRM 459 1 Credit**Boreal Forest Management and Soils (n)****(Stacked with NRM 659)**

Field trip in the Tanana Valley to focus on forest management and soils. Includes sites from Fairbanks to Northway and south to the Alaska Range. Includes soils of aeolian, glacial, fluvial and residual landforms, supporting conifer, mixed conifer-hardwood and hardwood forests. Includes wildfire sites, young plantations, immature forest stands, mature forest, subalpine and thermokarst sites. Requires appropriate clothing/foot gear; provide own camping gear (sleeping bag, bedroll); able to walk on uneven or rocky ground through brush; physically fit for long days and field work. Materials fee: \$160. (Prerequisites: Soils course; ecology course; B.S. degree in agriculture or natural resources, or permission of instructor. Graded Pass/Fail.) (.5 + 0 + 30) Offered Alternate Summer, As Demand Warrants

NRM 461 3 Credits**Interpretive Services**

Naturalist and other visitor programs in outdoor recreation areas: philosophy, planning and development of interpretive programs; resources, agencies, users, interpretive media and program evaluation. (Prerequisite: Junior standing or permission of instructor.) (3 + 0) Offered As Demand Warrants

NRM 463 3 Credits**Wilderness Concepts****(Stacked with NRM 663 and GEOG 663 and cross-listed with GEOG 463)**

Discovery of wilderness concepts, including the history and evolution of wilderness thought, the contemporary meaning of wilderness and survey of economic and noneconomic wilderness values for individuals and society. (3 + 0) Offered Fall

NRM 464 3 Credits**Wilderness Management****(Cross-listed with GEOG 464)**

Wilderness ecology and land management practices on lands designated as wilderness. Analysis of visitor management regimes. Both national and international views of wilderness are presented. (Prerequisite: A basic course in ecology, resource management, or permission of instructor.) (3 + 0) Offered Spring

NRM 465 3 Credits**Outdoor Recreation Planning**

Outdoor recreation planning frameworks with an emphasis on experience-based management. Research methods to support outdoor recreation planning, including survey design, sampling in different planning situations and data analysis. (Prerequisites: NRM 101 and ECON 235 or equivalent, or permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 466 3 Credits**Environmental Soil Chemistry**

Basic principles of soil chemical processes. Covers soil solution chemistry; precipitation/dissolution and soil colloids; soil solid phase; acidity/alkalinity; adsorption and ion exchange; reduction/oxidation reactions; and kinetics of soil chemical processes. In the lab students will operate equipment for soil chemical analysis, experience computer simulation models for soil chemistry and become familiar with the terms and approaches for writing technical reports. (Prerequisites: CHEM 105X, CHEM 106X, and NRM 380.) (2 + 3) Offered Alternate Spring

NRM 480 3 Credits**Soil Management for Quality and Conservation**

Managing soil in disturbed and natural ecosystems to reduce soil losses and maintain or improve soil quality. Methods for maintaining soil quality, preserving soil against loss from erosion, remediating contaminated soil and reclaiming degraded soils. (Prerequisite: NRM 380.) (3 + 0) Offered Alternate Fall

NRM 482 1 Credit**Why do Boreal Forests Matter**

Introduction to the importance of boreal forests. Includes presentations by scientists and professionals, readings, and first-hand observations of components and process at work in the forest. Course is for non-forestry professionals and non-forestry majors. (Note: Be prepared for the typical demands of a field situation. Requires walking short distances over rough, uneven and wet terrain. Appropriate clothing is required.) (.5 + 1) Offered Summer, As Demand Warrants

NRM 485 3 Credits**Soil Biology (n)**

Major groups of organisms in the soil and their interrelationships; the major biological processes which take place in the soil and their significance to soil productivity, plant growth and environmental quality; and methodology for studying soil organisms and soil biological processes. (Prerequisites: A course in biology or microbiology and a course in soils or permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 488 3 Credits**Land Management of Ecosystems (n)****(Stacked with NRM 688)**

Natural resource topics related to the management of the terrestrial environment in regions such as the Pacific Northwest, Hawaii and the circumpolar North. A basic understanding of the ecology of a specific region is presented prior to a spring break field trip designed to give the student a broad understanding of important topics

affecting the management of important natural resources in the selected region. Lab fee: \$750. (Prerequisites: NRM 211, 277, 375 or BIOL 271.) (3 + 0 + 40) Offered Spring

NRM 489 1 Credit

Alaska Soil Geography Field Trip
(Stacked with NRM 689)

Soil geography along ecological transect in selected areas of Alaska. Hands-on experiences on soil morphology and exposure of the relationships between soil genesis and other ecological factors including vegetation, geology, landform, climate and hydrology. Includes discussion of soil classification and land use interpretations. Student must provide their own camp gear, be able to walk on uneven or rocky ground and be physically fit for field work. (Prerequisites: NRM 380, or a course in soils, or permission of instructor.) (1 + 0) Offered Summer, As Demand Warrants

NRM 601 2 Credits

Research Methods in Natural Resources Management

Introduction for graduate students to the research methods employed in the various fields of resource management, including agriculture, forestry, ecology and social sciences. Designed to acquaint students with the relationship between theory and research, the nature of scientific inquiry, approaches to research, the sequence of steps involved in scientific investigation and the presentation of research results. (Prerequisite: Graduate standing or permission of instructor.) (2 + 0) Offered Fall

NRM 613 2 Credits

Resilience Internship

(Cross-listed with ANTH 617, BIOL 613 and ECON 613)

Students of the Resilience and Adaptation Program participate in internships to broaden their interdisciplinary training, develop new research tools and build expertise outside their home disciplines. Internships are for eight to ten weeks of full-time commitment and take place during the student's first summer in the program. In the autumn students meet to discuss their internship experiences and make public presentations. (Prerequisite: ANTH/BIOL/ECON/NRM 667 or 668 or permission of instructor.) (2 + 0) Offered Spring and Fall

NRM 630 3 Credits

Resource Management Planning

(Stacked with NRM 430)

Application of planning and conflict resolution principles to natural resources management. Examines plans prepared in response to current Alaska resource disputes, including wolf, brown bear, boreal forest and recreation river plans. Includes public involvement, consensus building, the basic steps in the planning process, and resource dispute simulations. (Prerequisite: Graduate standing or permission of instructor.) (3 + 0) Offered Spring

NRM 631 3 Credits

Resource Planning Practicum

Application of principles and processes through group projects focused on Alaska land or resource problems. (Prerequisite: NRM 630 or permission of instructor.) (3 + 0) Offered As Demand Warrants

NRM 632 3 Credits**Literature of Science and the Environment****(Stacked with NRM 432 and NORS 432 and cross-listed with NORS 632)**

Reading, analysis and discussion of classic and contemporary works in science, natural history and environmental literature. Some semesters all of the readings will follow one theme; other semesters a variety of fiction, poetry, oral tradition and nonfiction will be considered. Readings are selected from a spectrum of opinion on the relationship of people to the natural world and both analytical and creative writing are required. Resource management professionals and students in the sciences and humanities are welcome. May be repeated once for additional credit. (Prerequisite: Graduate standing or permission of the instructor.) (3 + 0) Offered As Demand Warrants

NRM 634 2 Credits**Resource Management in Developing Countries**

Complex relationship between sustainable development and the social, economic and environmental conditions in low income countries of the "Global South." Through lectures, readings, films and structured discussions, we examine major contemporary issues facing low-income societies (e.g. urbanization, migration, agricultural development, deforestation, water shortages, rural poverty, gender and development, environmental degradation and sustainable development). Case study readings will draw upon empirical research from Latin America, Africa and Asia. (2 + 0) Offered Spring

NRM 638 3 Credits**GIS Programming**

GIS programming for ArcView, Arc/Info and ArcGIS. Programming techniques for customizing GIS, efficient batch processing and development of custom tools for GIS display and analysis. (Prerequisite: NRM 338 or equivalent. Next offered: 2008-09.) (3 + 0) Offered Alternate Spring

NRM 640 3 Credits**Simulation and Modeling in Resource Management**

Introduction to and discussion of the use of simulation and modeling in natural resource management. Emphasis on concepts, strategies and case studies. (Prerequisite: Graduate standing or permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 641 4 Credits**Natural Resource Applications of Remote Sensing**

Application of remote sensing for inventory and analysis of natural resources. Topics include aerial photography applications and digital remote sensing, including image display, rectification, classification and accuracy assessment. (Prerequisite: NRM 338 or equivalent.) (3 + 3) Offered Alternate Spring

NRM 647 3 Credits**Regional Sustainability****(Cross-listed with ANTH 647, BIOL 647 and ECON 647)**

Explores the basic principles that govern resilience and change of ecological and social systems. Principles are applied at the level of populations, communities, regions and the globe. Working within and across each of these scales, students address the processes that influence ecological, cultural and economic sustainability, with an emphasis on Alaska examples. (Prerequisite: Graduate standing in a natural science, social science, humanities

or interdisciplinary program at UAF, or permission of instructor.) (3 + 0) Offered Fall

NRM 648 3 Credits
Integrative Modeling of Natural and Social Systems
(Cross-listed with ANTH 648, BIOL 648 and ECON 648)

A modeling approach to structuring knowledge from natural and social scientific disciplines so that relevant aspects of a complex societal problem are considered for the purpose of making management and policy decisions. Designed to help graduate students use models to integrate understanding about interactions among natural and social systems for the purpose of managing biological and human resources. (Prerequisite: STAT 200X or equivalent, graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF or another university, or permission of instructor. The course is designed to fit into the sequence of the Resilience and Adaptation program's core courses. It is open to other graduate students interested in and prepared to conduct interdisciplinary studies relating to regional sustainability. Recommended: ANTH/BIOL/ECON/NRM 647.) (3 + 3) Offered Fall

NRM 649 3 Credits
Integrated Assessment and Adaptive Management
(Cross-listed with ANTH 649, BIOL 649 and ECON 649)

Interdisciplinary exploration of theoretical and practical considerations of integrated assessment and adaptive management. Concepts important in understanding societal and professional-level decision-making. Students work as individuals and as a team to undertake case studies with relevance to integrated assessment and adaptive management. Collectively, the class builds a portfolio of cases and conducts an integrated assessment. (Prerequisite: Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF or another university, or permission of instructor. The course is designed to fit into the sequence of the Resilience and Adaptation program's core courses. It is open to other graduate students interested in and prepared to conduct interdisciplinary studies relating to sustainability. Recommended: ANTH/BIOL/ECON/NRM 667; and ANTH/BIOL/ECON/NRM 647 and 648. In case of enrollment limits, priority will be given to graduate students in the Resilience and Adaptation program in order for them to be able to meet their core requirements.) (3 + 0) Offered Spring

NRM 651 3 Credits
Advanced Silviculture

Examines biological and environmental aspects of silviculture. Addresses stand manipulation from the "silvicultural system" approach and includes regeneration, vegetation management, stand tending, "harvest" with considerations for biodiversity, "old-growth," wildlife habitat and timber production. Ecological classification, landscape management and pre-harvest silvicultural prescriptions will be addressed. Must be able to participate in one weekend field trip. (Prerequisites: Permission of instructor and graduate student standing. Next offered: 2008-09.) (3 + 0) Offered Alternate Spring

NRM 659 1 Credit
Boreal Forest Management and Soils (n)
(Stacked with NRM 459)

Field trip in the Tanana Valley to focus on forest management and soils. Includes sites from Fairbanks to Northway and south to the Alaska Range. Includes soils of aeolian, glacial, fluvial and residual landforms, supporting conifer, mixed conifer-hardwood and hardwood forests. Includes wildfire sites, young plantations, immature forest stands, mature forest, subalpine and thermokarst sites. Requires appropriate clothing/foot gear; provide own camping gear (sleeping bag, bedroll); able to walk on uneven or rocky ground through brush;

physically fit for long days and field work. Materials fee: \$160. (Prerequisites: Soils course; ecology course; B.S. degree in agriculture or natural resources, or permission of instructor. Next offered: 2007-08. Graded Pass/Fail.) (.5 + 0 + 30) Offered Alternate Summer

NRM 663 3 Credits**Wilderness Concepts**

(Stacked with NRM 463 and GEOG 463 and cross-listed with GEOG 663)

History and evolution of wilderness thought, the contemporary meaning of wilderness, and survey of economic and noneconomic wilderness values for individuals and society. (3 + 0) Offered Fall

NRM 665 3 Credits**Advanced Outdoor Recreation**

Evaluation of contemporary outdoor recreation management models and the linkage between management programming and visitor response. Development of a synthesized model and testing with contemporary problems. (Prerequisite: Graduate standing.) (3 + 0) Offered Alternate Fall

NRM 667 1 Credit**Resilience Seminar I**

(Cross-listed with ANTH 667, BIOL 667 and ECON 667)

Provides a forum for new students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research that are relevant to sustainability. A considerable portion of the seminar is student-directed, with students assuming leadership in planning seminar activities with the instructor. (Prerequisite: Must be enrolled in the Resilience and Adaptation graduate program or have permission of instructor. Recommended: ANTH/BIOL/ECON/NRM 647 [taken concurrently].) (2 + 0) Offered Fall

NRM 668 1 Credit**Resilience Seminar II**

(Cross-listed with ANTH 668, BIOL 668 and ECON 668)

Provides a forum for new students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research that are relevant to sustainability. The seminar provides support to each student planning his/her summer internship and preparing and presenting a thesis research prospectus. (Prerequisites: ANTH/BIOL/ECON/NRM 667; and ANTH/BIOL/ECON/NRM 647 or permission of instructor.) (2 + 0) Offered Spring

NRM 670 3 Credits**Biometeorology**

Radiation and energy balance relationships for natural and modified surfaces; physical environment in relation to biology and ecology of plants and animals; implications for resource and environmental management. (Prerequisites: Biological or physical science background and graduate standing or permission of instructor.) (3 + 0) Offered Alternate Fall

NRM 672 3 Credits**Nutrient Cycling**

Examination of physical, chemical and biological processes controlling nutrient element recycling, availability and retention in natural and managed ecosystems. (Prerequisites: NRM 380, CHEM 106X, BIOL 271 or permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 675 3 Credits
Theoretical Forest Ecosystem Science

Theoretical concepts of forest ecosystem dynamics including theoretical developments in the description of plant growth, ecosystem productivity, decomposition and plant carbon allocation. Development of a model using the basic theoretical constructs. (Prerequisites: Undergraduate major in biological sciences or renewable resources including at least one course in ecology, one approved college-level mathematics course and graduate standing or permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 678 3 Credits
Ecosystem Management

Current concepts being debated and used to manage renewable resources. Through reading, discussion and written exercises, students will develop understanding and applications of the concept as well as draft definitions. (Prerequisites: B.S./B.A. with basic biology, wildlife, natural resources, forestry background, or demonstrated knowledge; seniors with permission of instructor only; public with knowledge/experience only; permission of instructor.) (3 + 0) Offered Alternate Spring

NRM 685 3 Credits
Soil Microbiology and Biochemistry

Current topics in soil microbiology and biochemistry. Based on readings from the primary literature and discussions in class. Each student will be expected to lead at least one discussion, write a research proposal and present the proposal to class. (Prerequisites: at least one course in soil science and one course in microbiology or permission of instructor.) (3 + 0) Offered As Demand Warrants

NRM 688 3 Credits
Land Management of Ecosystems (n)
(Stacked with NRM 488)

Natural resource topics related to management of the terrestrial environment in regions such as the Pacific Northwest, Hawaii and the circumpolar North. A basic understanding of the ecology of a specific region is presented prior to a spring break field trip designed to give the student a broad understanding of important topics affecting the management of important natural resources in the selected region. Lab fee: \$750. (Prerequisites: NRM 211, 277, 375 or BIOL 271.) (3 + 0 + 40) Offered Spring

NRM 689 1 Credit
Alaska Soil Geography Field Trip
(Stacked with NRM 489)

Soil geography along an ecological transect in selected areas of Alaska. Hands-on experiences with soil morphology and exploration of the relationships between soil genesis and other ecological factors including vegetation, geology, landform, climate and hydrology. Includes discussion of soil classification and land use interpretations. Students must provide their own camp gear, be able to walk on uneven or rocky ground and be physically fit for field work. (Prerequisites: NRM 380, or a course in soils, or permission of instructor.) (1 + 0) Offered Summer, As Demand Warrants

NRM 692 1 Credit

Graduate Seminar

Topics in natural resources management explored through readings, student presentations, group discussions and guest speakers. (Prerequisite: Graduate standing or permission of instructor.) (0 + 0 + 1) Offered Fall, Spring

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*Send comments or questions to the [UAF Admissions Office](#).
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