

NATURAL RESOURCES MANAGEMENT (NRM)

College of Natural Science and Mathematics

Department of Natural Resources and Environment (<https://www.uaf.edu/nre/>)
907-474-7188

NRM F101 Natural Resources Conservation and Policy

3 Credits

Offered Fall

History of natural resources conservation and policy in the United States, including the evolution of federal land and water management agencies and policies. Case studies of current natural resource conservation issues, both in the United States and internationally, that examine the interaction of society and the environment and explore solutions.

Prerequisites: Placement in WRTG F111X.

Lecture + Lab + Other: 3 + 0 + 0

NRM F102 Practicum in Natural Resources Management

1-2 Credits

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.

Lecture + Lab + Other: 1-2 + 0 + 0

NRM F111X Introduction to Sustainability Science

3 Credits

Offered Spring

The field of sustainability science provides a useful framework for understanding and responding to complex environmental problems. This course introduces the theory and principles that form the basis of sustainability science, focusing on feedbacks between society and the environment with an emphasis on environmental and related change in Alaska.

Prerequisite: placement in WRTG F111X.

Attributes: UAF GER Social Sciences Req

Lecture + Lab + Other: 3 + 0 + 0

NRM F125 Our Changing Climate: Past, Present, Future (s)

3 Credits

Offered Spring

Examines how the biophysical impacts of climate change define and intersect with social, ecological, economic, political and cultural dimensions of our lives. Provides a foundation in both Indigenous and Western science perspectives of the causes, impacts and feedbacks of a changing climate. Includes theoretical and project-based experience in climate change.

Prerequisites: Placement in WRTG F111X.

Cross-listed with ACNS F125, HONR F125, RD F125.

Lecture + Lab + Other: 3 + 0 + 0

NRM F161 Wilderness Leadership Education

3 Credits

Offered As Demand Warrants

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. 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 F104X, NRM F101 and physical geography.

Special Notes: the field portion of the course includes detailed instruction in and mentored experience with modern backcountry travel techniques.

Lecture + Lab + Other: 0.5 + 0 + 6

NRM F204 Public Lands Law and Policy

3 Credits

Offered Spring

Background on selected federal lands management legislation and agency policies affecting resources conservation, development and preservation.

Prerequisites: Sophomore class standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F210 Principles of Sustainable Agriculture

3 Credits

Offered Spring

Basic principles of sustainable agriculture including economic, social, and environmental concepts. Agroecology is introduced as the basis for sustainable soil, plant, and animal agriculture techniques. Sustainable agriculture concepts will be related to current issues such as population growth, resource availability, and developing social structures and preferences.

Prerequisites: NRM F101.

Lecture + Lab + Other: 3 + 0 + 0

NRM F211 Introduction to Applied Plant Science

3 Credits

Offered Fall

Basic principles and requirements for plant growth and development with special attention to the production and management of field and greenhouse grown crops.

Lecture + Lab + Other: 2 + 3 + 0

NRM F212 Greenhouse Management

3 Credits

Offered Spring

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.

Lecture + Lab + Other: 3 + 0 + 0

NRM F240 Natural Resources Measurement and Inventory

3 Credits

Offered Fall

Techniques and instrumentations used to measure and inventory natural resources, including land, timber, range, wildlife, water and recreation resources.

Prerequisites: MATH F151X.

Lecture + Lab + Other: 2 + 3 + 0

NRM F277 Introduction to Conservation Biology

3 Credits

Offered Spring Even-numbered Years

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 F115X; BIOL F116X.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F290 Field Course of Natural Resource Management Complexity in Alaska**

2 Credits

Offered Spring

A 10-day field course examining ecological and societal factors that create challenges to sustainable management of Alaska's natural resources. Topics include agriculture, forestry, fisheries, wildlife management, wildland fire response and management, energy development, recreation and tourism.

Prerequisite: Permission of instructor.**Lecture + Lab + Other:** 1 + 0 + 3**NRM F300 Internship in Natural Resources Management**

1-3 Credits

Offered As Demand Warrants

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 F101; junior standing with 3.0 GPA; permission of instructor; an approved internship plan.**Lecture + Lab + Other:** 0 + 0 + 3-10**NRM F303X Environmental Ethics and Actions (h)**

3 Credits

Offered Spring

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, profession and general lifestyle today.

Prerequisites: Junior standing; placement in WRTG F111X.**Attributes:** UAF GER Ethics Req**Lecture + Lab + Other:** 3 + 0 + 0**NRM F313 Introduction to Plant Pathology**

4 Credits

Offered As Demand Warrants

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 F115X; BIOL F116X.**Recommended:** BIOL F239.**Lecture + Lab + Other:** 3 + 3 + 0**NRM F338 Introduction to Geographic Information Systems**

3 Credits

Offered Fall

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.

Prerequisites: Knowledge of PCs or Unix workstations desirable.**Cross-listed with** GEOG F338.**Lecture + Lab + Other:** 2 + 3 + 0**NRM F361 Advanced Wilderness Leadership Education**

3 Credits

Offered Spring

Natural environment, concentrating on outdoor leadership, environmental ethics, minimum impact camping, forest and Arctic natural history, and adaptable judgment and decision-making. Includes boreal forest and along tundra-ridge hiking, river crossing, glacier ascent, and skills to do these activities safely. Other possible travel mediums include sea kayaks, canoes or rock climbing. No use of alcohol, tobacco, illegal drugs or firearms.

Prerequisites: NRM F101; NRM F161.

Special Notes: Three lecture sessions will preview a demanding educational field program of 5-15 days requires travel through rough un-trailed terrain with heavy packs or boats and average strength and stamina.

Lecture + Lab + Other: 0.5 + 0 + 6**NRM F365 Principles of Outdoor Recreation Management**

3 Credits

Offered Fall Even-numbered Years

Theories, practices, economics and problems fundamental to the use of land and related natural resources for recreation. The course focuses on human dimension related issues faced by recreation managers and research to address those issues.

Prerequisites: NRM F101; STAT F200X; junior standing.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F366 Survey Research in Natural Resources Management**

3 Credits

Offered Spring

Research methods to support research and planning in recreation and human dimensions of natural resources management. Course topics include quantitative theories and concepts that have been applied to study human dimensions of natural resource management, study design, survey development and administration, sampling and data analysis.

Prerequisites: NRM F101; STAT F200X.**Lecture + Lab + Other:** 2 + 3 + 0**NRM F370 Introduction to Watershed Management**

3 Credits

Offered Fall Odd-numbered Years

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 F101.**Lecture + Lab + Other:** 2 + 3 + 0**NRM F375 Natural Resource Ecology**

3 Credits

Offered Spring

Basic ecology concepts, including physical (wind, temperature, water, etc.), biotic (population and community dynamics), genetic successional and landscape dynamics will be covered. Basic physiological characteristics of trees, succession, vegetation classification, and related concepts. Stand structure, diversity, competition, growth, forest-soil interactions, biomass, nutrient distribution and dynamics, energy relations, ecology of disturbances.

Prerequisites: NRM F240.**Lecture + Lab + Other:** 3 + 0 + 0

NRM F380 Soils and the Environment

3 Credits

Offered Fall

Soil development and classification; physical and chemical properties; biological activity; water movement and nutrient cycling in natural and manipulated ecosystems.

Prerequisites: CHEM F105X; WRTG F111X; WRTG F211X, WRTG F212X, WRTG F213X or WRTG F214X.

Lecture + Lab + Other: 2 + 3 + 0

NRM F403 Environmental Decision-Making

3 Credits

Offered Fall

Analysis of philosophical/ethical, economic, scientific and political foundations of diverse natural resource management perspectives.

Prerequisites: COJO F131X or COJO F141X; NRM F101; junior standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F407 Environmental Law

3 Credits

Offered Spring Odd-numbered Years

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.

Prerequisites: Junior or senior class standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F430 Resource Management Planning

3 Credits

Offered Spring

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. Review resource management plans and develop plans for a local resource management issue.

Prerequisites: Senior standing.

Stacked with NRM F630.

Lecture + Lab + Other: 3 + 0 + 0

NRM F435 GIS Analysis

4 Credits

Offered Spring

GIS analysis of natural resources including spatial query, attribute query, vector, grid, image, topographic and network analysis techniques.

Cross-listed with GEOG F435.

Lecture + Lab + Other: 3 + 3 + 0

NRM F453 Harvesting and Utilization of Forest Products

3 Credits

Offered Fall Odd-numbered Years

Manual and mechanized timber harvesting systems including timber cutting, yarding and transport processes. Technology of processing wood into various products. 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 F101.

Lecture + Lab + Other: 2 + 3 + 0

NRM F461 Interpretive Services

3 Credits

Offered As Demand Warrants

Naturalist and other visitor programs in outdoor recreation areas: philosophy, planning and development of interpretive programs; resources, agencies, users, interpretive media and program evaluation.

Prerequisites: Junior standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F466 Environmental Soil Chemistry

3 Credits

Offered Spring Odd-numbered Years

Covers basic principles of soil chemical processes, including soil solution chemistry; precipitation/dissolution and soil colloids; soil solid phase; soil acidity/alkalinity; adsorption and ion exchange; reduction/oxidation reactions; and kinetics of soil chemical processes. Labs include soil chemical analyses, computer simulation models for soil chemistry, and experience writing technical reports.

Prerequisites: CHEM F105X; CHEM F106X; NRM F380.

Lecture + Lab + Other: 2 + 3 + 0

NRM F469 Survey Research in Human Dimensions of Natural Resources

3 Credits

Offered Spring

Social science concepts applied to survey-based human dimensions research. Survey research methods including operationalizing research questions into measurable variables, designing survey instruments, assessing reliability and validity, developing a sampling plan, data management, data analysis, and reporting results.

Prerequisites: NRM F101; STAT F200X.

Stacked with NRM F669.

Lecture + Lab + Other: 2 + 3 + 0

NRM F480 Soil Management for Quality and Conservation

3 Credits

Offered Fall Odd-numbered Years

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.

Prerequisites: NRM F380.

Lecture + Lab + Other: 3 + 0 + 0

NRM F484 Senior Thesis in Natural Resources Management

2 Credits

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. Final thesis and presentation.

Prerequisites: GEOG F483 and permission of instructor.

Lecture + Lab + Other: 2 + 0 + 0

NRM F485 Soil Biology (n)

3 Credits

Offered Fall Even-numbered Years

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.

Lecture + Lab + Other: 3 + 0 + 0

NRM F489 Alaska Soil Geography Field Trip

1 Credit

Offered Summer; As Demand Warrants

Soil geography transect from Pacific (Anchorage) to Arctic (Deadhorse) coast. Hands-on experience describing and sampling soils, with emphasis on how a variety of ecological factors and climate affect soil formation and classification.

Prerequisites: NRM F380, or a course in soils.**Stacked with** NRM F689.**Special Notes:** Students must provide their own camp gear, be able to walk on uneven or rocky ground and be physically fit for fieldwork.**Lecture + Lab + Other:** 1 + 0 + 0**NRM F601 Research Methods in Natural Resources Management**

2 Credits

Offered Fall

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.

Prerequisites: Graduate standing.**Lecture + Lab + Other:** 2 + 0 + 0**NRM F613 Resilience Internship**

2 Credits

Offered As Demand Warrants

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 autumn students meet to discuss their internship experiences and make public presentations.

Prerequisites: ANTH F667, BIOL F667, ECON F667 or NRM F667; ANTH F668, BIOL F668, ECON F668 or NRM F668.**Cross-listed with** ANTH F617; BIOL F613; ECON F613.**Lecture + Lab + Other:** 2 + 0 + 0**NRM F616 Ecological Background for Resilience and Adaptation**

1 Credit

Offered Fall

Provides the ecological background that is necessary for understanding the role of ecology in complex systems involving interactions among biological, economic, and social processes. Designed for incoming students of the Resilience and Adaptation Program (RAP), who have not received training in ecology.

Prerequisites: Graduate standing.**Cross-listed with** BIOL F616.**Lecture + Lab + Other:** 1 + 0 + 0**NRM F630 Resource Management Planning**

3 Credits

Offered Spring

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. Review resource management plans and develop plans for a local resource management issue.

Prerequisites: Graduate standing.**Stacked with** NRM F430.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F637 Evolution of Conservation Concepts and Policy**

3 Credits

Offered As Demand Warrants

Resource policy issues development and implementation including forestry, mining, fisheries, oil, wildlife and other topics as demand warrants. Focus on policy issues involved in management of Alaska's resources.

Prerequisites: Graduate standing.**Cross-listed with** ECON F637.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F638 GIS Programming**

3 Credits

Offered Spring Odd-numbered Years

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.

Prerequisites: NRM F338.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F641 Natural Resource Applications of Remote Sensing**

3 Credits

Offered Spring Even-numbered Years

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.

Prerequisites: NRM F338.**Lecture + Lab + Other:** 3 + 0 + 0**NRM F647 Sustainability in the Changing North**

3 Credits

Offered As Demand Warrants

Explores the basic principles of sustainability of environmental and social systems. Principles are applied across a range of scales from local communities to the globe, with an emphasis on examples in Alaska and the Arctic. Specific attention to the theory and practice of boundary spanning and knowledge coproduction.

Prerequisites: Graduate standing.**Cross-listed with** ANTH F647; BIOL F647; ECON F647.**Lecture + Lab + Other:** 3 + 0 + 0

NRM F649 Integrated Assessment and Adaptive Management

3 Credits

Offered As Demand Warrants

An interdisciplinary exploration of the theoretical and practical considerations of integrated assessment and adaptive management. Students survey 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.

Prerequisites: Graduate student standing in a natural science, social science or interdisciplinary program at UAF or another university.

Recommended: ANTH F647, BIOL F647, ECON F647, NRM F647; ANTH F667, BIOL F667, ECON F667, NRM F667.

Cross-listed with ANTH F649; BIOL F649; ECON F649.

Special Notes: In case of enrollment limit, 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.

Lecture + Lab + Other: 3 + 0 + 0

NRM F656 Sustainable Livelihoods and Community Well-being

3 Credits

Offered Fall

Review principles governing the sustainability of systems, cultural practices and behaviors that enhance or degrade sustainable livelihoods and community wellbeing. Emphasis is on historical context of sustainability, nature and magnitude of the social, economic and ecological dimensions of contemporary change, and "best practices" for communities to respond effectively to change.

Prerequisites: Graduate standing.

Cross-listed with CCS F656.

Lecture + Lab + Other: 3 + 0 + 0

NRM F665 Advanced Outdoor Recreation

3 Credits

Offered Fall Even-numbered Years

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.

Prerequisites: Graduate standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F667 Resilience Seminar I

1 Credit

Offered As Demand Warrants

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.

Prerequisites: Enrolled in Resilience and Adaptation Graduate Program.

Recommended: ANTH F647, BIOL F647, ECON F647 or NRM F647 (taken concurrently).

Cross-listed with ANTH F667; BIOL F667; ECON F667.

Lecture + Lab + Other: 2 + 0 + 0

NRM F668 Interdisciplinary Research Methods-Resilience Seminar II

1 Credit

Offered As Demand Warrants

Provides a forum for new students of the Resilience and Adaptation graduate program to explore issues of interdisciplinary research 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 F647, BIOL F647, ECON F647 or NRM F647; ANTH F667, BIOL F667, ECON F667 or NRM F667.

Cross-listed with ANTH F668; BIOL F668; ECON F668.

Lecture + Lab + Other: 2 + 0 + 0

NRM F669 Survey Research in Human Dimensions of Natural Resources

3 Credits

Offered Spring

Social science concepts applied to survey-based human dimensions research. Survey research methods including operationalizing research questions into measurable variables, designing survey instruments, assessing reliability and validity, developing a sampling plan, data management, data analysis, and reporting results.

Prerequisites: Graduate standing.

Stacked with NRM F469.

Lecture + Lab + Other: 2 + 3 + 0

NRM F670 Biometeorology

3 Credits

Offered Fall Odd-numbered Years

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; graduate standing.

Lecture + Lab + Other: 3 + 0 + 0

NRM F672 Nutrient Cycling

3 Credits

Offered Spring Odd-numbered Years

Examination of physical, chemical and biological processes controlling nutrient element recycling, availability and retention in natural and managed ecosystems.

Prerequisites: CHEM F106X; NRM F375 or BIOL F371; NRM F380.

Lecture + Lab + Other: 3 + 0 + 0

NRM F685 Soil Microbiology and Biochemistry

3 Credits

Offered As Demand Warrants

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; one course in microbiology.

Lecture + Lab + Other: 3 + 0 + 0

NRM F689 Alaska Soil Geography Field Trip

1 Credit

Offered Summer As Demand Warrants

Soil geography transect from Pacific (Anchorage) to Arctic (Deadhorse) coast. Hands-on experience describing and sampling soils, with emphasis on how a variety of ecological factors and climate affect soil formation and classification.

Prerequisites: NRM F380, or a course in soils.

Stacked with NRM F489.

Special Notes: Students must provide their own camp gear, be able to walk on uneven or rocky ground and be physically fit for fieldwork.

Lecture + Lab + Other: 1 + 0 + 0

NRM F692 Graduate Seminar

1-3 Credits

Topics in natural resources management and geography explored through readings, student presentations, group discussions and guest speakers.

Prerequisites: Graduate standing.

Cross-listed with GEOG F692.

Lecture + Lab + Other: 1-3 + 0 + 0

NRM F698 Non-thesis Research/Project

1-9 Credits

Lecture + Lab + Other: 0 + 0 + 0

NRM F699 Thesis

1-12 Credits

Lecture + Lab + Other: 0 + 0 + 0

NRM F699A Thesis

1-12 Credits

Lecture + Lab + Other: 1-12 + 0 + 0

NRM F699B Thesis

1-12 Credits

Lecture + Lab + Other: 1-12 + 0 + 0

NRM F699C Thesis

1-12 Credits

Lecture + Lab + Other: 1-12 + 0 + 0