NATURAL RESOURCES MANAGEMENT (NRM)

NRM F101 Natural Resources Conservation and Policy
3 Credits
Offered Fall
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.
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 F106 Orientation to Natural Resource Management
1 Credit
Offered Spring
Overview of career opportunities in natural resources. Includes
discussions with research faculty and upper class students involved in
various aspects of resource management issues.
Lecture + Lab + Other: 1 + 0 + 0

NRM F111 Introduction to Sustainability Science
3 Credits
Offered Spring
Sustaining the health, wellbeing, and productivity of social-ecological
systems requires integrated assessments of social, economic, and
ecological sustainability challenges. Meeting these challenges often
requires action plans that move from understanding theory to the
implementation of new policies and facilitation of behavioral change.
This course introduces the principles that form the basis of sustainability
science, with an emphasis on natural resource management issues.
Prerequisite: NRM F101; placement in WRTG F111X.
Lecture + Lab + Other: 3 + 0 + 0

NRM F150 Plant Propagation I: Seeds and Seed Germination
1 Credit
Principles and practices of plant propagation useful in horticulture,
botany, forestry, agronomy, revegetation and land reclamation projects
and plant research. Emphasis on seed and fern spore biology, seed
dormancy mechanisms, germination techniques, and the seed industry of
Alaska native and economically useful plants.
Recommended: a high school course in biology.
Lecture + Lab + Other: 1 + 0 + 0

NRM F151 Plant Propagation II: Vegetative Propagation
(a)
1 Credit
Principles and practices of plant propagation useful in horticulture,
botany, forestry, agronomy, revegetation and land reclamation projects
and plant research. Course will cover methods of vegetative propagation
including cuttings; layering; grafting; bulb, corm and tuber propagation;
and micro propagation through tissue culture. Emphasis will be on Alaska
native and economically useful plants.
Recommended: basic course in high school biology.
Lecture + Lab + Other: 1 + 0 + 0

NRM F152 Plant Propagation Practicum
(a)
1 Credit
Methods of plant propagation useful in horticulture, botany, forestry,
agronomy, revegetation and land reclamation projects and plant
research. The practicum will emphasize hands on applications of
propagation methods for commercial, educational and research
applications. Emphasis will include horticultural seed production,
landscape seeding and restoration practices, intermittent mist
propagation systems, spore propagation and commercial micro-
propagation (tissue culture).
Prerequisites: NRM F150 and F151.
Lecture + Lab + Other: 0 + 0 + 3

NRM F154 Wild and Cultivated Berries of Alaska
1 Credit
Introduction to cultivated fruit crops and Alaska wild berries. Course
includes plant biology, management of wild berry stands, field cultivation
and uses of fruits including strawberries, blueberries, currants,
gooseberries, cloudberrys, raspberries and more.
Recommended: High school biology; or completion of master gardener
program.
Lecture + Lab + Other: 1 + 0 + 0

NRM F161 Wilderness Leadership Education
3 Credits
Offered Summer 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. 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 F104X, NRM F101 and physical geography.
Lecture + Lab + Other: 3 + 0 + 0

NRM F204 Public Lands Law and Policy
3 Credits
Offered Palmer: Even-numbered Years
Background on selected federal lands management legislation and
agency policies affecting resources conservation, development and
preservation. Offered Fairbanks: Spring.
Prerequisites: Sophomore class standing.
Lecture + Lab + Other: 3 + 0 + 0
NRM F210  Principles of Sustainable Agriculture  (a)
3 Credits
Offered Spring
Development of a basic understanding of sustainable agriculture concepts including exposure to economic, social, and environments principles and ideas of sustainable agricultural practices. Agroecology is introduced as a backdrop for the development of sustainable techniques for soil, plant, and animal agriculture. Throughout the semester, sustainable agriculture concepts and principles will be related to current issues such as population growth, resource use and availability, and changing 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 F220  Introduction to Animal Science
3 Credits
Offered Fall
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.
Prerequisites: NRM F210
Lecture + Lab + Other: 3 + 0 + 0

NRM F240  Natural Resources Measurement and Inventory
3 Credits
Offered Fall
Techniques and instrumentation 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 F251  Silvics and Dendrology
4 Credits
Offered Spring
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.
Prerequisites: BIOL F115X; BIOL F116X; NRM F375; or permission of instructor.
Lecture + Lab + Other: 3 + 3 + 0

NRM F277  Introduction to Conservation Biology
3 Credits
Offered Spring
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  Resource Management Issues at High Latitudes
2 Credits
Offered Summer
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 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 F300P  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, 3.0 GPA, permission of instructor, and 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 or higher; or permission of instructor.
Attributes: UAF GER Ethics Req
Lecture + Lab + Other: 3 + 0 + 0
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<td>Introduction to Watershed Management</td>
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<td>NRM F375</td>
<td>Natural Resource Ecology</td>
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<td>NRM F376</td>
<td>Survey Research in Natural Resources Management</td>
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<td>CHEM F105X; IDEO F131X or IDEO F141X; or permission of instructor.</td>
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**Prerequisites:**
- BIOL F115X: Biologis 115X
- BIOL F116X: Biologis 116X
- BIOL F239: Biologis 239
- CHEM F105X: Chemistry 105X
- WRTG F111X: Writing 111X
- WRTG F211X: Writing 211X
- NRM F101: Natural Resources Management
- NRM F161: Environmental Studies
- NRM/GEOG F463: Geographic Information Systems
- NRM F465: Advanced Geographic Information Systems
- CHEM F105X: Chemistry 105X
- WRTG F211X: Writing 211X
- WRTG F213X: Writing 213X
- IDEO F131X: Ideas and Innovation
- IDEO F141X: Ideas and Innovation
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 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

NRM F410 Numerical Methods for Natural Resources Management
4 Credits
Offered Fall
Teaches the most up-to-date numerical methods for natural resources managers and researchers. Labs cover important computer skills to help students excel in modern natural resources management. Recommended: MATH F314
Lecture + Lab + Other: 3 + 3 + 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 or permission of instructor.
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 F440 Silviculture
3 Credits
Offered Fall Even-numbered Years
Provides an understanding of the science and art of forest stand management. Silviculture is the theory and practice of controlling forest establishment, composition, structure and growth of forests. For persons in land management, including timber, woodlot, wildlife habitat, streamside and aesthetics.
Prerequisites: NRM F251; NRM F375 or BIOL F371; junior standing; or permission of instructor.
Lecture + Lab + Other: 2 + 3 + 0

NRM F450 Forest Management
3 Credits
Offered Spring Odd-numbered Years
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: ECON F235X; NRM F251; NRM F240; Junior standing.
Lecture + Lab + Other: 3 + 0 + 0

NRM F452 Forest Health and Protection
3 Credits
Offered Spring Even-numbered Years
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 F115X; BIOL F116X; BIOL F239; NRM F251; NRM F375 or BIOL F371; or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 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 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 F101 or permission of instructor.
Lecture + Lab + Other: 2 + 3 + 0

NRM F454 Comparative Farming and Sustainable Food Systems
3 Credits
Offered Fall
Principles of food systems geography and food security. Cross-cultural examination of dietary traditions, poverty, hunger, equity and food access and distribution. Comparison of multiple varieties and scales of agricultural systems in the context of social, ecological and economic sustainability. Considers Alaskan and other high-latitude food systems, including country food, wild game harvest and rural to urban nutrition transition.
Prerequisites: WRTG F211X or WRTG F213X; junior standing; or permission of instructor.
Cross-listed with GEOG F454 and CCS F454.
Lecture + Lab + Other: 3 + 0 + 0

NRM F461 Interpretive Services
3 Credits
Offered As Demand Warrants
Principle and practice of interpreting natural resources to the public. Planning and development of interpretive programs; 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 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

NRM F464 Wilderness Management
3 Credits
Offered Spring
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.
Prerequisites: A basic course in ecology, resource management, or permission of instructor.
Cross-listed with GEOG F464.
Lecture + Lab + Other: 3 + 0 + 0
NRM F466  Environmental Soil Chemistry
3 Credits
Offered Spring Odd-numbered Years
Basic principles of soil chemical processes. Covers solute 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. 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 F105X; CHEM F106X; NRM F380.
Lecture + Lab + Other: 2 + 3 + 0

NRM F470  Terrestrial Carbon Management
3 Credits
Offered Spring
Climate change and its relationship to carbon dynamics have become elements of natural resource management options for land owners within the state and across the country and the globe. The course will present a broad scale description of the direction for forest carbon management and proposed methods for inventorying and documenting carbon dynamics attached to industry and down to the landowner.
Prerequisites: BIOL F371 or NRM F375 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 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 F483  Research Design, Writing and Presentation Methods
(O, W, n)
3 Credits
Offered Fall
This course is designed as a capstone research and professional development course for geography, natural resources management and geoscience majors. Students will focus on designing an individual research project and proposal. This course will provide real world active learning assignments that seek to integrate the knowledge and skills gained through undergraduate work, and prepares students for graduate and professional level projects. The course will focus on scientific writing, and the oral, written and graphical presentation of data and research results.
Prerequisites: COJO F131X or COJO F141X; WRTG F211X or WRTG F213X; junior standing.
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: NRM F483 and permission of instructor.
Lecture + Lab + Other: 2 + 0 + 0

NRM F485  Soil Biology
3 Credits
Offered Spring 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 or permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0

NRM F488  Land Management of Ecosystems
3 Credits
Offered Spring As Demand Warrants
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.
Prerequisites: NRM F211; NRM F277 or BIOL F277; NRM F375 or BIOL F371.
Stacked with NRM F688.
Lecture + Lab + Other: 3 + 0 + 40

NRM F489  Alaska Soil Geography Field Trip
1 Credit
Offered Summer; As Demand Warrants
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 F380, or a course in soils, or permission of instructor.
Stacked with NRM F689.
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 or permission of instructor.
Lecture + Lab + Other: 2 + 0 + 0
NRM F613  Resilience Internship
2 Credits
Offered Fall
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.
Prerequisites: ANTH/BIOL/ECON/NRM F667; or ANTH/BIOL/ECON/NRM F668; or permission of instructor.
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 student enrollment or permission of instructor.
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.
Prerequisites: Graduate standing or permission of instructor.
Stacked with NRM F430.
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 or equivalent.
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 or equivalent.
Lecture + Lab + Other: 3 + 0 + 0

NRM F647  Global to Local Sustainability
3 Credits
Offered Fall
Explores the basic principles that govern resilience and change of ecological and social systems. Principles are applied across a range of scales from local communities to 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 northern examples.
Prerequisites: Graduate standing in a natural science, social science, humanities or interdisciplinary program at UAF; and permission of instructor.
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 Spring
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. 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. 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.
Prerequisites: Graduate student standing in a natural science, social science, humanities or interdisciplinary program at UAF or another university or permission of instructor.
Recommended: ANTH/BIOL/ECON/NRM F647 and ANTH/BIOL/ECON/NRM F667 (previously or concurrently).
Cross-listed with ANTH F649; BIOL F649; ECON F649.
Lecture + Lab + Other: 3 + 0 + 0

NRM F651  Advanced Silviculture
3 Credits
Offered Spring Odd-numbered Years
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: Graduate standing and permission of instructor.
Lecture + Lab + Other: 3 + 0 + 0
NRM F656  Sustainable Livelihoods and Community Well-Being  
3 Credits  
Offered Fall  
Review the basic principles that govern the sustainability of systems and look at the cultural practices and individual behaviors that enhance or degrade sustainable livelihoods and community well-being. Emphasis is on understanding the historical context of ideas about sustainability, on understanding the nature and magnitude of the social, economic and ecological dimensions of contemporary change, and the "best practices" currently in place for communities to respond effectively to change. Cross-listed with NRM F656 and GEOG F656  
Prerequisites: Graduate standing or permission of instructor.  
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 F666  Survey Research in Human Dimensions of Natural Resources  
3 Credits  
Offered Fall Even-Numbered Years  
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, sampling and data analysis.  
Prerequisites: Graduate standing.  
Lecture + Lab + Other: 3 + 0 + 0

NRM F667  Resilience Seminar I  
1 Credit  
Offered Fall  
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: Must be enrolled in the Resilience and Adaptation graduate program; or permission of instructor.  
Recommended: ANTH/BIOL/ECON/NRM F647 (taken concurrently).  
Cross-listed with ANTH F667; BIOL F667; ECON F667.  
Lecture + Lab + Other: 2 + 0 + 0

NRM F668  Resilience Seminar II  
1 Credit  
Offered Spring  
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 F647; ANTH/BIOL/ECON/ 
NRM F647; or permission of instructor.  
Cross-listed with ANTH F668; BIOL F668; ECON F668.  
Lecture + Lab + Other: 2 + 0 + 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; or permission of instructor.  
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 F375; NRM F380; or permission of instructor.  
Lecture + Lab + Other: 3 + 0 + 0

NRM F675  Theoretical Forest Ecosystem Science  
3 Credits  
Offered Spring Even-numbered Years  
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.  
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; or permission of instructor.  
Lecture + Lab + Other: 3 + 0 + 0

NRM F688  Land Management of Ecosystems  
3 Credits  
Offered Spring As Demand Warrants  
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.  
Prerequisites: NRM F211; NRM F277 or BIOL F277; NRM F375 or BIOL F371.  
Stacked with NRM F488.  
Lecture + Lab + Other: 3 + 0 + 40
NRM F689  Alaska Soil Geography Field Trip  (a)
1 Credit
Offered Summer As Demand Warrants
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 F380, or a course in soils, or permission of instructor.
Stacked with NRM F489.
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 or permission of instructor.
Cross-listed with GEOG F692.
Lecture + Lab + Other: 1-3 + 0 + 0

NRM F692P  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 or permission of instructor.
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