NATURAL RESOURCE ECOLOGY AND MANAGEMENT (NREM)

Courses primarily for undergraduates:

NREM 1040: Practical Work Experience
Credits: Required.
Three months of relevant work experience in natural resources, animal ecology, or forestry. Study at a summer biological station may be applicable. See advisor for specific requirements and approval process.

NREM 1100: Orientation in Natural Resource Ecology and Management
Credits: 1. Contact Hours: Lecture 1.
Orientation to the University and to the Department of Natural Resource Ecology and Management. Discussion of departmental learning outcomes, strategies for academic success and academic planning. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

NREM 1110: NREM Transitions Learning Community Seminar
Credits: 1. Contact Hours: Lecture 1.
Repeatable.
Enrollment limited to members of the NREM Transitions Learning Community. Designed to assist new transfer students and continuing sophomore students with their transition to the academic expectations and professional development aspects of the natural resource program. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

NREM 1150: Explorations in Natural Resource Ecology & Management
Credits: 1. Contact Hours: Lecture 1.
Prereq: (Animal Ecology or Forestry major); Permission of Instructor
Interact with faculty in the Department of Natural Resource Ecology and Management through lectures, discussions, and field experiences. Offered during the second half of Spring semester. (Typically Offered: Spring)

NREM 1200: Introduction to Renewable Resources
(Cross-listed with AGRON 1200/ ENVS 1200).
Credits: 3. Contact Hours: Lecture 3.
Overview of soil, water, plants, and animals as renewable natural resources in an ecosystem context. History and organization of resource management. Concepts of integrated resource management. (Typically Offered: Fall, Spring)

NREM 1300: Natural Resources and Agriculture
(Cross-listed with ENVS 1300).
Credits: 3. Contact Hours: Lecture 3.
Survey of the ecology and management of fish, forest, and wildlife resources in areas of intensive agriculture, with emphasis on Iowa. Conservation and management practices for private agricultural lands. Designed for nonmajors. (Typically Offered: Spring)

NREM 2070: Natural Resource Management under the North American Model of Conservation
Credits: 1. Contact Hours: Lecture 1.
Introduction to North American model of conservation, current funding for natural resource management, role of hunting and angling in the North American model, critique and refinement of the model for the 21st century, and introduction to natural resource leadership, and outdoor skills and recreation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

NREM 2110: Careers in Natural Resources
Credits: 1. Contact Hours: Lecture 1.
Prereq: Sophomore classification
Career planning exploration in natural resources. Discussion of the job application process, including techniques for successful interviewing and development of an effective resume. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

NREM 2400: Quantitative Problem Solving in Natural Resources
Credits: 3. Contact Hours: Lecture 2, Laboratory 2.
Prereq: (STAT 1010 or STAT 1040) or Permission of Instructor
Applied quantitative problem-solving skills for natural resource management. Focus on group and individual exercises, with practical problems in geography, hydrology, forestry and ecology. Laboratory includes field data collection and computer data processing and modeling. (Typically Offered: Spring)

NREM 2500: Environmental Geography
(Cross-listed with AGRON 2500/ ENVS 2500/ ENSCI 2500).
Credits: 3. Contact Hours: Lecture 3.
The distribution, origins and functions of the earth's physical systems and the spatial relationship between human activity and the natural world. (Typically Offered: Fall)

NREM 2700: Foundations in Natural Resource Policy and History
(Cross-listed with ENVS 2700/ LA 2700).
Credits: 3. Contact Hours: Lecture 3.
The development of natural resource conservation philosophy and policy from the Colonial Era to the present. North American wildlife, forestry, and environmental policy; national parks and other protected lands; federal and state agencies. Relationship to cultural contexts, including urban reform and American planning movement. Discussion of common pool resources, public and private lands. (Typically Offered: Fall)

NREM 3010: Natural Resource Ecology and Soils
(Cross-listed with ENSCI 3010).
Credits: 4. Contact Hours: Lecture 3, Laboratory 3.
Prereq: BIOL 2110*,* BIOL 2110L*;* FOR 2010 *or a second course in biology*
Effects of environmental factors on ecosystem structure and function using forest, prairie and agricultural ecosystems as models. Special emphasis is given to soil-forming factors and the role of soil in nutrient and water cycling and ecosystem dynamics. Additional emphasis is given to human influences on natural ecosystems and the role of perennial plant communities in agricultural landscapes. (Typically Offered: Fall)

NREM 3030: Internship
Credits: 1-3. Repeatable, maximum of 6 credits.
Prereq: Permission of Instructor; Sophomore classification
Placement with county conservation boards, camps, zoos, parks, etc., for experience as interpreters, rangers, and technicians. (Typically Offered: Fall, Spring, Summer)

NREM 3050: Seminar
Credits: 1-3. Contact Hours: Lecture 3.
Repeatable.
Current topics in natural resources or related issues. (Typically Offered: Fall, Spring)

NREM 3110: Field Ecology in Montana
Credits: 4. Contact Hours: Lecture 2, Laboratory 6.
Prereq: (BIOL 2110; BIOL 2110L*;* BIOL 2120*;* BIOL 2120L*); Permission of Instructor*
Fundamental concepts and principles of ecology dealing with organisms, populations, communities, and ecosystems. Taught at NREM's Rod and Connie French Conservation Education Camp in western Montana. Emphasizes hands-on learning of principles and methods in the field. (Typically Offered: Summer)

NREM 3130: Native Land, Water, and Resources
(Cross-listed with AMIN 3130).
Credits: 3. Contact Hours: Lecture 3.
Examines Native land rights, water rights, and natural resources. Topics may include Native relations to landscapes, cultural resources and infrastructure projects, land rights, water usage agreements, and resource policies as they apply to on- and off-reservation Native communities. AMIN 2100 recommended. Offered even-numbered years. Meets U.S. Diversity Requirement. (Typically Offered: Spring)

NREM 3150: Genetics for Natural Resource Managers
Credits: 3. Contact Hours: Lecture 3.
Prereq: BIOL 2110 *and* BIOL 2120
Introduction into how genetic techniques and technologies can aid the management of the earth's biotic resources. Topics include an overview of DNA structure, function and inheritance; tools and techniques for measuring genetic diversity; genetic management of wild and captive populations: DNA forensics as management tool. The goal of this course is to prepare managers/biologists to interpret genetic data as they relate to natural resource conservation. (Typically Offered: Fall)

NREM 3180: Introduction to Ecosystems
(Cross-listed with AGRON 3180/ BIOL 3180/ ENSCI 3180).
Credits: 3. Contact Hours: Lecture 3.
Prereq: 12 credits in AECL, AGRON, BIOL, CHEM, FOR, GEOL, NREM
Biological and physical processes affecting material and energy flows in natural and managed ecosystems. Understanding and predicting climate and management impacts on ecosystem services and sustainability. (Typically Offered: Spring)

NREM 3300: Principles of Interpretation
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: 6 credits in BIOL
History, objectives, forms, and techniques of interpretation in the settings of county, state, national parks, and zoos. Principles of effective communication as they apply to natural resource fields including wildlife management, forestry, and wildlife rehabilitation. Planning and use of effective communications and outreach campaigns to manage and conserve natural resources. (Typically Offered: Spring)

NREM 3450: Natural Resource Photogrammetry and Geographic Information Systems
(Cross-listed with ENSCI 3450).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: Junior classification
Measurement and interpretation of aerial photos in resource management. Introduction to Geographic Information Systems (GIS) using ArcGIS including digitizing, development and query of attribute tables, georeferencing, and use of multiple GIS layers in simple spatial analyses. (Typically Offered: Spring)

NREM 3570: Midwestern Prairie Plants
Credits: 1.
Offered 1st half semester only. Survey of the major plant families, genera, and representative species of Midwestern prairies with emphasis on plant identification. Prairie management for multiple species of plants and wildlife. (Typically Offered: Fall)

NREM 3750X: Environmentalism in Music
Credits: 1. Contact Hours: Lecture 1.
Environmentalism (environmental or ecological activism) is a common topic in popular music. In this seminar, students choose recorded music with an environmental or ecological theme, present their piece to the class, and lead a discussion focused on interpreting lyrics and sound. Through analysis of music from diverse eras, genres, and cultures, students learn about historical events, evaluate attitudes and actions regarding natural resource stewardship and biodiversity preservation, and explore concepts of environmental justice and human dependence on healthy ecosystems for physical and emotional well-being. (Typically Offered: Spring)

NREM 3800: Field Ecology Research and Teaching
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: BIOL 2110 *or Department Permission*
Students work in teams to conduct ecological research projects at a local field site, and develop related teaching modules/lesson plans. Research and teaching activity objectives, methods, and results are shared with diverse audiences as presentations, written reports, and web-based documents, and used to engage K-12 students and community members via field days and visits to schools and other institutions. (Typically Offered: Fall)

NREM 3850: Natural Resource Policy
(Dual-listed with NREM 5850).
Credits: 3. Contact Hours: Lecture 3.
Development, theory and practice of natural resource policy. Integrative approach with topical policy studies in North American wildlife, forestry, and water. Policy formation, the role of science, introduction to federal law compliance. (Typically Offered: Spring)

NREM 3900: Fire Ecology and Management
Credits: 3. Contact Hours: Lecture 3.
Characteristics and role of fire in forest ecosystems. Major topics covered include fuels, fire weather, fire behavior, fire danger rating systems, fire control, prescribed burning, and fire dynamics in major ecosystem types. (Typically Offered: Fall)

NREM 4020: Watershed Hydrology
(Dual-listed with GEOL 5020/ ENSCI 5020/ MTEOR 5020/ NREM 5020). (Cross-listed with ENSCI 4020/ MTEOR 4020/ GEOL 4020).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Examination of watersheds as systems, emphasizing the surface components of the hydrologic cycle. Combines qualitative understanding of hydrological processes and uncertainty with quantitative representation. Laboratory emphasizes field investigation and measurement of watershed processes. (Typically Offered: Fall)

NREM 4070: Watershed Management
(Cross-listed with ENSCI 4070/ ENVS 4070).
Credits: 4. Contact Hours: Lecture 3, Laboratory 3.
Prereq: 1 course in BIOL
Managing human impacts on the hydrologic cycle. Field and watershed level best management practices for modifying the impacts on water quality, quantity and timing are discussed. Field project includes developing a management plan using landscape buffers. (Typically Offered: Spring)

NREM 4460: Integrating GPS and GIS for Natural Resource Management
(Dual-listed with NREM 5460/ ENSCI 5460). (Cross-listed with ENSCI 4460).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: 12 credits in student's major (AECL/FOR) at 3000 level or above
Emphasis on the use of GPS as a data collection tool for GIS. Basic theory of GPS. Use of Global Positioning System technology for spatial data collection and navigation. Post-processing and real-time correction of GPS data. GPS data transfer to GIS for mapping applications. Use of GIS to construct waypoints for use in GPS navigation. (Typically Offered: Fall)

NREM 4520: Ecosystem Management: Integrating Ecology, Society, and Policy
(Dual-listed with FOR 5520/ NREM 5520). (Cross-listed with FOR 4520).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
*Prereq: Junior or Senior classification; (*NREM 1200 *or* BIOL 1730*)*
Principles of planning, regulating, and decision-making associated with public and private lands, with consideration of forest, grassland, wetland, and freshwater aquatic ecosystems. Integrated natural resources management within ecological, social, economic and policy constraints. (Typically Offered: Spring)

NREM 4550: Stream restoration
(Dual-listed with NREM 5550).
Credits: 2. Contact Hours: Lecture 2.
Prereq: CE 3720 *or* GEOL 4020 *or* NREM 4070 *or* AECL 4180 *or* ABE 4310
interdisciplinary introduction to the science and practice of stream restoration, with emphasis on restoring physical and biological integrity and ecosystem services to streams and riparian corridors. Lecture highlights philosophical, scientific, and engineering principles. Offered odd-numbered years. (Typically Offered: Fall)

NREM 4550L: Stream Restoration Lab
(Dual-listed with NREM 5550L).
Credits: 1. Contact Hours: Laboratory 3.
Prereq: CE 3720 *or* GEOL 4020 *or* NREM 4070 *or* AECL 4180 *or* ABE 4310
Introduction to measurement and analysis of stream form and function for restoration and rehabilitation. Includes field data collection, map and image analysis, and computation for assessment of channel stability, biotic integrity, and recovery potential. Offered odd-numbered years. (Typically Offered: Fall)

NREM 4600: Controversies in Natural Resource Management
(Cross-listed with ENVS 4600).
Credits: 3. Contact Hours: Lecture 3.
Prereq: AECL 3120 or NREM 3010, NREM 1200, and Junior classification
Analysis of controversial natural resource issues using a case approach that considers uncertainty and adequacy of information and scientific understanding. Ecological, social, political, economic, and ethical implications of issues will be analyzed. (Typically Offered: Fall, Spring)

NREM 4660: Ecosystm Services
(Dual-listed with ENSCI 5660/ NREM 5660). (Cross-listed with ENSCI 4660).
Credits: 3. Contact Hours: Lecture 2, Discussion 1.
Prereq: 15 credits in AECL, AGRON, BIOL, CHEM, FOR, GEOL, NREM
Ecosystem services are the societal benefits provided by natural and managed ecosystems. Benefits such as provision of food, purification of air and water, and regulation of climate are essential to human survival and prosperity, but rely upon maintenance of healthy ecosystems. This course will cover the science, policy, and practice of ecosystem services assessment and management, with a special focus on biodiversity, water quality, food production, and climate. Offered odd-numbered years. (Typically Offered: Spring)

NREM 4710: Agroforestry Systems
(Dual-listed with NREM 5710/ SUSAG 5710).
Credits: 3. Contact Hours: Lecture 3.
Prereq: 6 credits in biological science at 3000 level or above
Concepts of sustainable land use, agroecological dynamics, and component interactions of agroforestry systems. Agroforestry systems in temperate and tropical regions. Design and evaluation techniques for agroforestry systems. Ecological, socioeconomic and political aspects of agroforestry. Offered even-numbered years. Meets International Perspectives Requirement. (Typically Offered: Spring)

NREM 4830: Science + Design: Interpretation of Natural Resources in Montana
(Cross-listed with ARTGR 4830).
Credits: 3. Contact Hours: Lecture 1, Studio 4.
Prereq: Enrollment in ARTGR major; ARTGR 2710 *or* BIOL 2110*; Permission of Instructor.*
Interdisciplinary service-learning. Design and production of natural resource related interpretive signs for Montana natural areas. Field-work experience followed by on-campus studio. (Typically Offered: Fall)

NREM 4850: Undergraduate Seminar
Credits: 1. Contact Hours: Lecture 1.
Repeatable, maximum of 2 times.
Prereq: Major in Animal Ecology or Forestry; Junior or Senior classification; Permission of Instructor
Weekly seminars on current research topics in natural resource ecology and management. Style and best practice in oral research communication. Skills and principles for evaluating research merit and quality of technical communication. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

NREM 4890: Survey of Remote Sensing Technologies
(Cross-listed with EE 4890/ ENSCI 4890/ GEOL 4890/ MTEOR 4890).
Credits: 3. Contact Hours: Lecture 3.
Electromagnetic-radiation principles, active and passive sensors, multispectral and hyperspectral sensors, imaging radar, SAR, thermal imaging, lidar. Examples of applications. Also offered online S. (Typically Offered: Fall)

NREM 4890L: Satellite Remote Sensing Laboratory
(Cross-listed with EE 4890L/ GEOL 4890L/ MTEOR 4890L).
Credits: 1. Contact Hours: Laboratory 3.
*Prereq: Completion or concurrent enrollment in MTEOR/GEOL/ NREM/*EE 4890*/5890*
Processing and analysis of satellite sensor data (optical and radar). Provides practical applications in an environmental context. (Typically Offered: Fall)

NREM 4900A: Independent Study: Animal Ecology
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Restricted to Junior or Senior classifications, Instructor permission required

NREM 4900B: Independent Study: Forestry
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Restricted to Junior or Senior classifications, Instructor permission required

NREM 4900E: Independent Study: Entrepreneurship
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Restricted to Junior or Senior classifications, Instructor permission required

NREM 4900H: Independent Study: Honors Program
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Restricted to Junior or Senior classifications, Instructor permission required

NREM 4960A: Travel Course: International
(Dual-listed with NREM 5960A).
Credits: 1-5. Repeatable, maximum of 3 times.
Prereq: Instructor Permission for Course
Limited enrollment. Extended field trips to study ecological and management topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students. Meets International Perspectives Requirement.

NREM 4960B: Travel Course: Domestic
(Dual-listed with NREM 5960B).
Credits: 1-5. Repeatable, maximum of 3 times.
Prereq: Instructor Permission for Course
Limited enrollment. Extended field trips to study ecological and management topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students.

NREM 4980: Cooperative Education
Credits: 1-3. Repeatable.
Prereq: Department Chair Permission for Course
Required of all cooperative education students. Students must register prior to commencing each work period. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

Courses primarily for graduate students, open to qualified undergraduates:

NREM 5020: Watershed Hydrology
(Dual-listed with GEOL 4020/ ENSCI 4020/ MTEOR 4020/ NREM 4020).
(Cross-listed with ENSCI 5020/ MTEOR 5020/ GEOL 5020).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Examination of watersheds as systems, emphasizing the surface components of the hydrologic cycle. Combines qualitative understanding of hydrological processes and uncertainty with quantitative representation. Laboratory emphasizes field investigation and measurement of watershed processes. (Typically Offered: Fall)

NREM 5040: Forest Landscapes, Wildlife, and Silviculture
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Desired forest habitat conditions for fish and wildlife. Silvicultural approaches to protecting/improving such habitats. Focus on key forest elements related to animal species, groups and overall diversity. The lab focuses on team observations and discussions of diverse habitats including one weekend field trip. Offered odd-numbered years. (Typically Offered: Fall)

NREM 5050: Seminar
Credits: 1-3. Contact Hours: Lecture 3.
Repeatable, maximum of 3 times.
Current topics in natural resources research and management. (Typically Offered: Fall, Spring)

NREM 5070: Watershed Management
(Cross-listed with ENSCI 5070).
Credits: 4. Contact Hours: Lecture 3, Laboratory 3.
Managing human impacts on the hydrologic cycle. Field and watershed level best management practices for modifying the impacts on water quality, quantity and timing are discussed. Field project includes developing a management plan using landscape buffers. (Typically Offered: Spring)

NREM 5330: Erosion and Sediment Transport
(Cross-listed with ABE 5330/ ENSCI 5330).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Soil erosion processes, soil loss equations and their application to conservation planning, sediment properties, initiation of sediment motion and over land flow, flow in alluvial channels and theory of sediment transport, channel stability, reservoir sedimentation, wind erosion, BMPs for controlling erosion. Offered even-numbered years. (Typically Offered: Fall)

NREM 5350: Restoration Ecology
(Cross-listed with EEOB 5350/ ENSCI 5350).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Theory and practice of restoring animal and plant diversity, structure and function of disturbed ecosystems. Restored freshwater wetlands, forests, prairies and reintroduced species populations will be used as case studies. Offered even-numbered years. (Typically Offered: Fall)

NREM 5420A: Introduction to Molecular Biology Techniques: DNA Techniques
(Cross-listed with BMS 5420A/ EEOB 5420A/ FSHN 5420A/ GDCB 5420A/ HORT 5420A/ BBMB 5420A/ NUTRS 5420A/ VDPAM 5420A/ VMPM 5420A).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes genetic engineering procedures, sequencing, PCR, and genotyping. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

NREM 5420B: Introduction to Molecular Biology Techniques: Protein
(Cross-listed with BMS 5420B/ EEOB 5420B/ FSHN 5420B/ GDCB 5420B/ HORT 5420B/ BBMB 5420B/ NUTRS 5420B/ VDPAM 5420B).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection. Offered on a satisfactory-fail basis only. (Typically Offered: Spring, Summer)

NREM 5420C: Introduction to Molecular Biology Techniques: Cell Techniques
(Cross-listed with BMS 5420C/ EEOB 5420C/ FSHN 5420C/ GDCB 5420C/ HORT 5420C/ BBMB 5420C/ NUTRS 5420C/ VMPM 5420C/ VDPAM 5420C).
Credits: 1. Contact Hours: Laboratory 2.
Repeatable.
Includes: immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection.ular biology techniques and related procedures. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

NREM 5420D: Introduction to Molecular Biology Techniques: Plant Transformation
(Cross-listed with BMS 5420D/ EEOB 5420D/ FSHN 5420D/ GDCB 5420D/ HORT 5420D/ BBMB 5420D/ NUTRS 5420D/ VMPM 5420D/ VDPAM 5420D).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of tranformants. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

NREM 5420E: Introduction to Molecular Biology Techniques: Proteomics
(Cross-listed with BMS 5420E/ EEOB 5420E/ FSHN 5420E/ GDCB 5420E/ HORT 5420E/ BBMB 5420E/ NUTRS 5420E/ VMPM 5420E/ VDPAM 5420E).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

NREM 5420F: Introduction to Molecular Biology Techniques: Metabolomics
(Cross-listed with BMS 5420F/ EEOB 5420F/ FSHN 5420F/ GDCB 5420F/ HORT 5420F/ BBMB 5420F/ NUTRS 5420F/ VMPM 5420F/ VDPAM 5420F).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

NREM 5420G: Introduction to Molecular Biology Techniques: Genomic
(Cross-listed with BMS 5420G/ EEOB 5420G/ FSHN 5420G/ GDCB 5420G/ HORT 5420G/ BBMB 5420G/ NUTRS 5420G/ VMPM 5420G/ VDPAM 5420G).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

NREM 5460: Integrating GPS and GIS for Natural Resource Management
(Dual-listed with NREM 4460/ ENSCI 4460). (Cross-listed with ENSCI 5460).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Emphasis on the use of GPS as a data collection tool for GIS. Basic theory of GPS. Use of Global Positioning System technology for spatial data collection and navigation. Post-processing and real-time correction of GPS data. GPS data transfer to GIS for mapping applications. Use of GIS to construct waypoints for use in GPS navigation. (Typically Offered: Fall)

NREM 5520: Ecosystem Managemnt
(Dual-listed with FOR 4520/ NREM 4520). (Cross-listed with FOR 5520).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Principles of planning, regulating, and decision-making associated with public and private lands, with consideration of forest, grassland, wetland, and freshwater aquatic ecosystems. Integrated natural resources management within ecological, social, economic and policy constraints. (Typically Offered: Spring)

NREM 5550: Stream Restoration
(Dual-listed with NREM 4550).
Credits: 2. Contact Hours: Lecture 2.
interdisciplinary introduction to the science and practice of stream restoration, with emphasis on restoring physical and biological integrity and ecosystem services to streams and riparian corridors. Lecture highlights philosophical, scientific, and engineering principles. Offered odd-numbered years. (Typically Offered: Fall)

NREM 5550L: Stream Restoration Lab
(Dual-listed with NREM 4550L).
Credits: 1. Contact Hours: Laboratory 3.
Introduction to measurement and analysis of stream form and function for restoration and rehabilitation. Includes field data collection, map and image analysis, and computation for assessment of channel stability, biotic integrity, and recovery potential. Offered odd-numbered years. (Typically Offered: Fall)

NREM 5660: Ecosystem Services
(Dual-listed with ENSCI 4660/ NREM 4660). (Cross-listed with ENSCI 5660).
Credits: 3. Contact Hours: Lecture 2, Discussion 1.
Ecosystem services are the societal benefits provided by natural and managed ecosystems. Benefits such as provision of food, purification of air and water, and regulation of climate are essential to human survival and prosperity, but rely upon maintenance of healthy ecosystems. This course will cover the science, policy, and practice of ecosystem services assessment and management, with a special focus on biodiversity, water quality, food production, and climate. Offered odd-numbered years. (Typically Offered: Spring)

NREM 5700: Advanced Decision-making in Natural Resource Allocation
Credits: 3. Contact Hours: Lecture 2, Laboratory 2.
Analytical approach to economic aspects of forest resource management problems. Theory and application of economic decision-making criteria to traditional and modern forest resource management issues. Current problems in the allocation of forest resources. Offered even-numbered years. (Typically Offered: Spring)

NREM 5710: Agroforestry Systems
(Dual-listed with NREM 4710/ SUSAG 4710). (Cross-listed with SUSAG 5710).
Credits: 3. Contact Hours: Lecture 3.
Concepts of sustainable land use, agroecological dynamics, and component interactions of agroforestry systems. Agroforestry systems in temperate and tropical regions. Design and evaluation techniques for agroforestry systems. Ecological, socioeconomic and political aspects of agroforestry. Offered even-numbered years. Meets International Perspectives Requirement. (Typically Offered: Spring)

NREM 5830: Science + Design: Interpretation of Natural Resources in Montana
(Cross-listed with ARTGR 5830).
Credits: 3. Contact Hours: Lecture 1, Studio 4.
Interdisciplinary service-learning. Design and production of natural resource related interpretive signs for Montana natural areas. Field-work experience followed by on-campus studio. (Typically Offered: Fall)

NREM 5850: Natural Resource Policy
(Dual-listed with NREM 3850).
Credits: 3. Contact Hours: Lecture 3.
Development, theory and practice of natural resource policy. Integrative approach with topical policy studies in North American wildlife, forestry, and water. Policy formation, the role of science, introduction to federal law compliance. (Typically Offered: Spring)

NREM 5890: Survey of Remote Sensing Technologies
(Cross-listed with EE 5890/ ENSCI 5890/ GEOL 5890/ MTEOR 5890).
Credits: 3. Contact Hours: Lecture 3.
Electromagnetic-radiation principles, active and passive sensors, multispectral and hyperspectral sensors, imaging radar, SAR, thermal imaging, lidar. Examples of applications. Also offered online S. (Typically Offered: Fall)

NREM 5890L: Satellite Remote Sensing Laboratory
(Cross-listed with EE 5890L/ GEOL 5890L/ MTEOR 5890L).
Credits: Required. Contact Hours: Laboratory 3.
Processing and analysis of satellite sensor data (optical and radar). Provides practical applications in an environmental context. (Typically Offered: Fall)

NREM 5900A: Special Topics: Animal Ecology
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Instructor Permission for Course

NREM 5900B: Special Topics: Forestry
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Instructor Permission for Course

NREM 5930: Workshop
Credits: 1-3. Repeatable.

NREM 5960A: Travel Course: International
(Dual-listed with NREM 4960A).
Credits: 1-5. Repeatable, maximum of 3 times.
Limited enrollment. Extended field trips to study ecological and management topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students.

NREM 5960B: Travel Course: Domestic
(Dual-listed with NREM 4960B).
Credits: 1-5. Repeatable, maximum of 3 times.
Limited enrollment. Extended field trips to study ecological and management topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students.

NREM 5980: Natural Resource Ecology and Management Teaching Practicum
Credits: 1.
Prereq: Graduate classification and Permission of Instructor
Graduate student experience in teaching. Student must plan and present at least one unit of subject matter in a course or extension workshop. Teaching practicum must be documented by the student and approved by the student's POS committee. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

NREM 5990: Creative Component
Credits: 1-30. Repeatable.

Courses for graduate students:

NREM 6000: Seminar
Credits: 1. Contact Hours: Lecture 1.
Repeatable.
Current topics in natural resources research and management. (Typically Offered: Fall, Spring)

NREM 6980: Natural Resource Ecology and Management Teaching Practicum
Credits: 1.
Prereq: Graduate classification and Permission of Instructor
Graduate student experience in teaching. Student must plan and present substantive subject matter for a minimum of three weeks in lecture and/or laboratory formats, or a series of extension seminars/workshops. Teaching practicum must be documented by the student and approved by the student's POS committee. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

NREM 6990: Research
Credits: 1-12. Repeatable, maximum of 12 credits.