

Natural Resource Ecology and Management (NREM)

Courses primarily for undergraduates:

NREM 104. Practical Work Experience.

Cr. R.

Three months of relevant work experience in natural resources, animal ecology, or forestry. Study at a summer biological station may be applicable. See adviser for specific requirements and approval process.

NREM 110. Orientation in Natural Resource Ecology and Management.

Cr. 1. F.

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.

NREM 111. NREM Transitions Learning Community Seminar.

(1-0) Cr. 1. Repeatable. F.S.

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.

NREM 112. Orientation to Learning and Productive Team Membership.

(Cross-listed with AER E, CON E, FS HN, HORT). (2-0) Cr. 2. F.

Introduction to developing intentional learners and worthy team members. Learning as the foundation of human enterprise; intellectual curiosity; ethics as a personal responsibility; everyday leadership; effective team and community interactions including team learning and the effects on individuals; and growth through understanding self, demonstrating ownership of own learning, and internalizing commitment to helping others. Intentional mental processing as a means of enhancing learning. Interconnectedness of the individual, the community, and the world.

NREM 114. Developing Responsible Learners and Effective Leaders.

(Cross-listed with CON E, FS HN, HORT). (2-0) Cr. 2. S. Prereq: Hort 112 or NREM 112

Focus on team and community. Application of fundamentals of human learning; evidence of development as a responsible learner; intentional mental processing as a habit of mind; planning and facilitating learning opportunities for others; responsibility of the individual to the community and the world; leading from within; holding self and others accountable for growth and development as learners and leaders.

NREM 120. Introduction to Renewable Resources.

(Cross-listed with AGRON, ENV S). (3-0) Cr. 3. F.S.

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.

NREM 130. Natural Resources and Agriculture.

(Cross-listed with ENV S). (3-0) Cr. 3. S.

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.

NREM 211. Careers in Natural Resources.

Cr. 1. F.S. 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.

NREM 256. Midwestern Prairie Plants.

(1-2) Cr. 1. F.

Offered 1st half semester only. Survey of the major plant families, genera, and representative species of Midwestern prairies with emphasis on plant identification and use of keys. Prairie restoration, conservation, and management issues will also be considered.

NREM 270. Foundations in Natural Resource Policy and History.

(Cross-listed with L A, ENV S). (3-0) Cr. 3. Alt. S., offered 2014.

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.

NREM 301. Natural Resource Ecology and Soils.

(Cross-listed with ENSCI). (3-3) Cr. 4. F. Prereq: BIOL 211, BIOL 211L; FOR 201 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. Nonmajor graduate credit.

NREM 303. Internship.

Cr. 1-3. Repeatable, maximum of 6 credits. F.S.SS. Prereq: Permission of department mentor and sophomore standing

Placement with county conservation boards, camps, zoos, parks, etc., for experience as interpreters, rangers, and technicians.

NREM 303I. Undergraduate Internships.

(Cross-listed with IA LL). Cr. 1-5. SS. Prereq: Permission of instructor and sophomore standing

Placement with county conservation boards, camps, parks, etc. for experience as interpreters, rangers, and technicians.

NREM 305. Seminar.

(2-0) Cr. 1-3. Repeatable. F.S. Prereq: Permission of instructor

Current topics in natural resources or related issues.

NREM 315. Genetics for Natural Resource Managers..

(3-0) Cr. 3. F. Prereq: Prereq: Biol 211 and 212.

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.

NREM 330. Principles of Interpretation.

(2-3) Cr. 3. S. Prereq: 6 credits in biological sciences

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.

NREM 345. Natural Resource Photogrammetry and Geographic Information Systems.

(Cross-listed with ENSCI). (2-3) Cr. 3. F. 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. Nonmajor graduate credit.

NREM 385. Natural Resource Policy.

(Dual-listed with NREM 585). (3-0) Cr. 3. S. Prereq: Junior classification

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. Readings, lectures, projects.

NREM 390. Fire Ecology and Management.

(3-0) Cr. 3. F.

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. Nonmajor graduate credit.

NREM 402. Watershed Hydrology.

(Dual-listed with NREM 502). (Cross-listed with ENSCI, MTEOR, GEOL). (3-3) Cr. 4. F. Prereq: Four courses in physical or biological sciences or engineering; junior standing

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. Nonmajor graduate credit.

NREM 407. Watershed Management.

(Dual-listed with NREM 507). (Cross-listed with ENSCI, ENV S). (3-3) Cr. 4. S.

Prereq: A course in general biology

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.

NREM 446. Integrating GPS and GIS for Natural Resource Management. (Dual-listed with NREM 546). (Cross-listed with ENSCI). (2-3) Cr. 3. S. *Prereq:* 12 credits in student's major at 300 level or above, NREM 345 or equivalent experience with ArcGIS

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.

NREM 452. Ecosystem Management.

(Cross-listed with FOR). (2-3) Cr. 3. F. *Prereq:* Junior classification, and NREM 301 or A ECL 312

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. Nonmajor graduate credit.

NREM 460. Controversies in Natural Resource Management.

(Cross-listed with ENV S). (3-0) Cr. 3. F.S. *Prereq:* NREM 120, and A ECL 312 or NREM 301, 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. Nonmajor graduate credit.

NREM 465. Landscape Change and Conservation.

(Dual-listed with NREM 565). (3-0) Cr. 3. F. *Prereq:* L A 202

Exploration of issues in landscape ecology and conservation biology relevant to landscape change, design, and planning. Examination of foundational principles and their applications across a continuum of land uses, from wilderness to urban areas.

NREM 471. Agroforestry Systems; Local and Global Perspectives.

(Dual-listed with NREM 571). (2-3) Cr. 3. Alt. S., offered 2012. *Prereq:* 6 credits in biological science at 300 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. Meets International Perspectives Requirement.

NREM 490. Independent Study.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq:* Junior or senior classification, permission of instructor

NREM 490A. Independent Study: Animal Ecology.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq:* Junior or senior classification, permission of instructor

NREM 490B. Independent Study: Forestry.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq:* Junior or senior classification, permission of instructor

NREM 490E. Independent Study: Entrepreneurship.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq:* Junior or senior classification, permission of instructor

NREM 490H. Independent Study: Honors Program.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq:* Junior or senior classification, permission of instructor

NREM 490I. Independent Study: Undergraduate Independent Study.

(Cross-listed with ANTHR, IA LL). Cr. 1-4. Repeatable. SS. *Prereq:* Junior or senior classification and permission of instructor

NREM 496. Travel Course.

(Dual-listed with NREM 596B). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq:* Permission of instructor

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 496A. Travel Course: International.

(Dual-listed with NREM 596). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq:* Permission of instructor

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 496B. Travel Course: Domestic.

(Dual-listed with NREM 596). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq:* Permission of instructor

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 498. Cooperative Education.

Cr. 1-3. *Prereq:* Permission of departmental chair

Required of all cooperative education students. Students must register prior to commencing each work period.

Courses primarily for graduate students, open to qualified undergraduates:

NREM 501. Genecology.

(3-0) Cr. 3. Alt. F., offered 2011. *Prereq:* GEN 320 or BIOL 313

Genecology principles as they apply to natural and improved populations of plants and animals. Genetic systems as they interact with long-term natural selection to produce clinal or ecotypic variation. The impact of current environments and genetic modifications of domesticated organisms on short-term selection pressures. Special coverage of species of interest to students enrolled in the course.

NREM 502. Watershed Hydrology.

(Dual-listed with NREM 402). (Cross-listed with ENSCI, MTEOR, GEOL). (3-3) Cr. 4. F. *Prereq:* Four courses in physical or biological sciences or engineering; junior standing

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. Nonmajor graduate credit.

NREM 504. Forest Landscapes, Wildlife, and Silviculture.

(3-3) Cr. 4. F. *Prereq:* NREM 301

Detailed analysis of factors and processes underlying forest and stand growth and development. Applications of this knowledge to forest culture to support a diversity of use and protection objectives. Discussions of regional silviculture, tropical forests, and experimentation in forest biology.

NREM 505. Seminar.

(2-0) Cr. 1-3. Repeatable, maximum of 3 times. F.S. *Prereq:* Permission of instructor or graduate classification

Current topics in natural resources research and management.

NREM 507. Watershed Management.

(Dual-listed with NREM 407). (Cross-listed with ENSCI, ENV S). (3-3) Cr. 4. S. *Prereq:* A course in general biology

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.

NREM 508I. Aquatic Ecology.

(Cross-listed with ENSCI, IA LL). Cr. 4. SS. *Prereq:* Courses in ecology, chemistry, and physics

Analysis of aquatic ecosystems; emphasis on basic ecological principles; ecological theories tested in the field; identification of common plants and animals.

NREM 529. Publishing in Biological Sciences Journals.

(Cross-listed with AGRON, HORT). (3-0) Cr. 3. S. *Prereq:* Permission of instructor; evidence of a publishable unit of the student's research data

Process of preparing a manuscript for submission to a refereed journal in the biological sciences. Emphasis on publishing self-generated data from thesis or dissertation research.

NREM 535. Restoration Ecology.

(Cross-listed with ENSCI, EEOB). (2-3) Cr. 3. F. *Prereq:* BIOL 366 or BIOL 474 or graduate standing

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.

NREM 542. Introduction to Molecular Biology Techniques.

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, GDCB, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. *Prereq:* Graduate classification

Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

NREM 542A. Introduction to Molecular Biology Techniques: DNA.

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, GDCB, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. *Prereq: Graduate classification*
Includes genetic engineering procedures, sequencing, PCR, and genotyping. Offered on a satisfactory-fail basis only.

NREM 542B. Introduction to Molecular Biology Techniques: Protein.

(Cross-listed with B M S, GDCB, EEOB, FS HN, HORT, GDCB, NUTRS). Cr. 1. Repeatable. S.SS. *Prereq: Graduate classification*
Techniques. Includes fermentation, protein isolation, protein purification, SDS-PAGE, Western blotting, NMR, confocal microscopy and laser microdissection, Immunophenotyping, and monoclonal antibody production. Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

NREM 542C. Introduction to Molecular Biology Techniques: Cell.

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, GDCB, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S. *Prereq: Graduate classification*
Includes immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection. Offered on a satisfactory-fail basis only.

NREM 542D. Introduction to Molecular Biology Techniques: Plant Transformation.

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, GDCB, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S. *Prereq: Graduate classification*
Includes Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of transformants. Offered on a satisfactory-fail basis only.

NREM 542E. Proteomics. Includes two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. (F.)

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. *Prereq: Graduate classification*
Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

NREM 542F. Techniques in Metabolomics. metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects.

(Cross-listed with B M S, BBMB, EEOB, FS HN, GDCB, HORT, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. *Prereq: Graduate classification*
Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

NREM 542G. Introduction to Molecular Biology Techniques: Genomic.

(Cross-listed with B M S, EEOB, FS HN, GDCB, HORT, GDCB, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S. *Prereq: Graduate classification*
Offered on a satisfactory-fail basis only.

NREM 546. Integrating GPS and GIS for Natural Resource Management.

(Dual-listed with NREM 446). (Cross-listed with ENSCI). (2-3) Cr. 3. S. *Prereq: 12 credits in student's major at 300 level or above, NREM 345 or equivalent experience with ArcGIS*
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.

NREM 565. Landscape Change and Conservation.

(Dual-listed with NREM 465). (3-0) Cr. 3. F. *Prereq: L A 202*
Exploration of issues in landscape ecology and conservation biology relevant to landscape change, design, and planning. Examination of foundational principles and their applications across a continuum of land uses, from wilderness to urban areas.

NREM 570. Advanced Decision-making in Natural Resource Allocation.

(2-2) Cr. 3. Alt. S., offered 2012. *Prereq: FOR 451 or two courses in economics*
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.

NREM 571. Agroforestry Systems.

(Dual-listed with NREM 471). (2-3) Cr. 3. Alt. S., offered 2012. *Prereq: 6 credits in biological science at 300 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. Meets International Perspectives Requirement.

NREM 580. Research Orientation.

(2-0) Cr. 2. F. *Prereq: 20 credits in biological sciences and a course in statistics*
Research design, proposal preparation, and technical writing.

NREM 585. Natural Resource Policy.

(Dual-listed with NREM 385). (3-0) Cr. 3. Alt. S., offered 2013. *Prereq: Graduate classification or permission of instructor*
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.

NREM 590. Special Topics.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq: Permission of instructor*

NREM 590A. Special Topics: Animal Ecology.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq: Permission of instructor*

NREM 590B. Special Topics: Forestry.

Cr. 1-4. Repeatable, maximum of 4 credits. *Prereq: Permission of instructor*

NREM 593. Workshop.

Cr. 1-3. Repeatable. *Prereq: Graduate classification*

NREM 596. Travel Course.

(Dual-listed with NREM 496B). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq: Permission of instructor*
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 596A. Travel Course: International.

(Dual-listed with NREM 496). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq: Permission of instructor*
Limited enrollment. Extended field trips to study ecological topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students.

NREM 596B. Travel Course: Domestic.

(Dual-listed with NREM 496). Cr. 1-5. Repeatable, maximum of 3 times. *Prereq: Permission of instructor*
Limited enrollment. Extended field trips to study ecological topics in varied environments. Location and duration of trips will vary. Pre-trip sessions arranged. Trip expenses paid by students.

NREM 598. Natural Resource Ecology and Management Teaching Practicum.

Cr. 1. F.S.SS. *Prereq: Graduate classification as M.S. candidate in a NREM major 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.

NREM 599. Creative Component.

Cr. arr.

Courses for graduate students:**NREM 600. Seminar.**

Cr. 1. Repeatable. F.S.
Current topics in natural resources research and management.

NREM 698. Natural Resource Ecology and Management Teaching Practicum.

Cr. 1. F.S.SS. *Prereq: Graduate classification as a Ph.D. candidate in a NREM major 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.

NREM 699. Research.

Cr. 1-12. Repeatable, maximum of 12 credits.