RANGELAND ECOLOGY & MGMT (REM)

REM 144 Wildland Fire Management
3 credits
Introduction to wildland fire management including fire behavior, fuels, fire prevention and suppression, fire policy and fire ecology. Includes discussion of current fire management issues.

REM 151 Rangeland Principles
3 credits
Rangelands are vast landscapes that cover most of western North America and the earth. Students will examine the ecological principles that cause these grasslands, shrublands, woodlands and deserts to change or stay the same. How humans use and manage these ecosystems will also be explored. The modern challenges of rangeland management must be met with broad thinking and new, sustainable practices to maintain and restore rangelands and the human communities that rely on them. Course requires in-class projects and field experience(s).

REM 152 Rangeland Ecosystem Exploration
1 credit
Students will explore the climates, plants, animals, and human communities of rangeland throughout North America and the globe. The grasslands, shrublands, woodlands, and deserts that are collectively called rangelands include extensive challenges and opportunities for management and conservation. Students will individually explore these ecosystems through photos, ecosystem descriptions, videos, and internet-based tools. In discussions and presentations, students will collectively share their findings about these incredible rangeland ecosystems. (Fall only)

REM 200 (s) Seminar
Credit arranged.

REM 203 (s) Workshop
Credit arranged.

REM 204 (s) Special Topics
Credit arranged.

REM 221 Principles of Ecology
3 credits
Cross-listed with FOR 221 and WLF 220. Principles of ecology and their relevance to management of natural resources. Major topics include plant and wildlife population, community, ecosystem, and landscape level processes and how these processes interact with the environment. Exploration of how ecosystems are affected by humans and global change. Introduction to the types of questions asked by ecologists, the principal concepts and theories that guide ecological inquiry, and the methods that are used to answer ecological questions. Both terrestrial and aquatic systems are considered.
Prereq: BIOL 102/BIOL 102L or BIOL 114 or BIOL 115 or PLSC 205; or Permission.

REM 252 Wildland Plant Identification
3 credits
Develop skills to identify and classify major rangeland plants. Focus is on identification of grasses, forbs, and shrubs. Discussions will also encompass the ecological roles of wildland plants and the ecosystem classification. This course includes a 1-day field trip. Required for REM majors. (Spring only)

REM 253 Wildland Plant Identification Field Studies
1 credit
Develop skills to identify rangeland plants in the field. Focus is on identification of grasses, forbs, and shrubs. Exploration will include ecosystem roles of wildland plants and developing ecological site descriptions. This course includes a 6-day field trip at the beginning of the summer semester. Required for REM majors.
Prereq: REM 252.

REM 280 Introduction to Wildland Restoration
2 credits
History and overview of the ecological, social, and economic aspects of wildland restoration using case studies. Students will explore approaches and philosophies towards restoring and rehabilitating wildlands that have been damaged through natural forces and human activities such as wildfire, overgrazing, cultivation, and weed invasion.

REM 299 (s) Directed Study
Credit arranged.

REM 340 Ethnobotany
2 credits
Course covers the relationships between humans and plants and the ecology of important native wildland plants of western North America. Course focus is on the natural ecology, identification and cultural attributes (historical and present) of 50 to 75 important native wildland plant species found in forestland, rangeland and other wildland settings in the Northwest U.S. Recommended preparation: plant identification course. (Spring only)

REM 341 Systematic Botany
3 credits
Phylogenetic approach to understanding plant systematics and evolution with a primary focus on the flora of the Pacific Northwest. Includes identification of important plant families and the use of dichotomous keys for species identification. (Spring only)
Prereq: BIOL 114 or BIOL 115; and BIOL 213 or PLSC 205.

REM 353 Rangeland Plant Identification and Ecology
3 credits
Classification, description, and identification of the most important rangeland and riparian plants in North America; particular reference to important ecological roles of these plants. Recommended Preparation: FOR 221 or REM 221. (Fall only)

REM 360 Rangeland Entomology
2 credits
Much of the world's population depends upon the resources available from rangeland habitats. Rangeland resources are not only an economic asset, but they also serve a multitude of ecological functions. Students will be introduced to the complex community of insects that inhabit rangeland ecosystems and will be better able to understand the roles played by insects in rangeland systems and the impact that selected management practices may have on their ability to fulfill those roles. Recommended Preparation: STAT 251 and REM 221. (Fall only)

REM 398 Renewable Natural Resources Internship
Credit arranged
Supervised field experience with an appropriate public or private agency. Req'd for cooperative education students. Graded P/F.
Prereq: Permission of department.

REM 400 (s) Seminar
Credit arranged.

REM 403 (s) Workshop
Credit arranged.
REM 404 (s) Special Topics  
Credit arranged.

REM 405 (s) Professional Development  
Credit arranged.

REM 407 GIS Application in Fire Ecology and Management  
2 credits  
Joint-listed with REM 510  
Introduces applications of GIS in fire ecology, research, and management including incident mapping, fire progression mapping, GIS overlay analysis, remote sensing fire severity assessments, fire atlas analysis and the role of GIS in the Fire Regime Condition Class concept and the National Fire Plan. Additional assignment/projects required for graduate credit. (Spring only)  
Prereq: FOR 375 or GEOG 385; or Permission.

REM 410 Principles of Vegetation Monitoring and Measurement  
2 credits  
This course introduces theory and application of quantitative and qualitative methods for measuring and monitoring vegetation in grasslands, shrublands, woodlands, and forests. Students will gain a solid understanding of how to measure and evaluate vegetation attributes and design and implement monitoring programs relative to wildlife habitat, livestock forage, fire fuel characteristics, watershed function, and many other wildland values. Class field trip required. Recommended Preparation: A basic understanding of how to use computer spreadsheets such as Excel. Students are encouraged to also enroll in REM 411 which builds on the principles of REM 410 for wildland habitat assessment. (Fall only)  
Prereq: STAT 251 or permission.

REM 411 Ecological Monitoring and Analysis  
2 credits  
This course integrates field sampling with quantitative and theoretical concepts related to scientific research, wildlife habitat, and land management practices. Students collect, analyze, and report on ecological data in various formats, and learn specific protocols used by professionals to assess wildlife habitat. Class field trips required. Recommended preparation: REM 252 and REM 253, REM 341, or other plant identification class; ability to use excel. Co-enrollment in REM 410 is recommended.  
Prereq: STAT 251 or Permission.

REM 429 Landscape Ecology  
3 credits  
Cross-listed with FOR 429  
Ecological relationships and conservation issues for biotic communities across the landscape, including spatial and temporal dynamics and patterns, and importance of landscapes in maintenance of ecosystem diversity and function. One or more field trips; one 2-3 hour lab period per week. Recommended Preparation: Familiarity with spreadsheet programs and problem solving using computers. (Spring only)  
Prereq: FOR 221 or REM 221.

REM 440 Wildland Restoration Ecology  
3 credits  
Cross-listed with NRS 440  
Ecological principles and management practices involved in restoring and rehabilitating wildland ecosystems after disturbance or alteration to return damaged ecosystems to a productive and stable state. (Spring only)  
Prereq: FOR 221, or REM 221, or equivalent general ecology course.

REM 452 Western Wildland Landscapes  
2 credits  
Survey of wildland plant communities of western North America, focusing on their natural history, including the effects of use by human beings, based on their physical, climatic, and biological characteristics. (Spring only)  
Prereq: FOR 221 or REM 221; or Permission.

REM 456 Integrated Rangeland Management  
3 credits  
Gen Ed: Senior Experience  
Management strategies for integrating grazing with other natural resource values such as wildlife, water, timber, recreation, and aesthetics; emphasis on herbivore ecology including ecological impacts of grazing, ways to manage grazing, and nutritional relationships between plants and free-ranging ungulates on rangeland, pastureland, and forest ecosystems. One 4 to 5 day field trip. Recommended Preparation: REM 151. (Spring only)  
Prereq: ENGL 313 or ENGL 317.

REM 459 Rangeland Ecology  
2 credits  
Application of ecological principles in rangeland management; stressing response and behavior of range ecosystems to various kinds and intensity of disturbance and management practice. Recommended Preparation: courses in general ecology (e.g., REM 221), technical writing (e.g., ENGL 317), and vegetation assessment (e.g., REM 410 or FOR 274) or Permission. (Fall only)

REM 460 Integrating GIS and Field Studies in Rangelands  
1 credit  
Topics related to changing knowledge and technology related to GIS and spatial analysis relevant to ecology of grasslands, shrublands and woodlands. Min. six integrated GIS labs; one five-day field trip. Required for REM majors. (Fall only)  
Coreq: REM 459.

REM 472 Remote Sensing of the Environment  
3-4 credits  
Cross-listed with FOR 472 and NRS 472  
Current airborne and satellite systems, data acquisition on ground and from remote locations, instrumentation, imagery interpretation and digital analysis, applications for natural resource science and management. Two 75-minute lectures and one two-hour lab per week. Recommended Preparation: MATH 143. Cooperative: open to WSU degree-seeking students.

REM 473 ECB Senior Presentation  
1 credit  
Gen Ed: Senior Experience  
Cross-listed with FISH 473, FOR 473, NRS 473, RMAT 473, and WLF 473  
Reporting and presenting the senior project (thesis or internship); taken after or concurrently with REM 485 or REM 497. Serves as the senior capstone course for Ecology and Conservation Biology (ECB).  
Prereq: Instructor Permission.

REM 480 Ecological Restoration  
3 credits  
Joint-listed with REM 580  
Planning and implementing restoration projects in conjunction with land agencies and stakeholders. Includes service-learning projects. Field trip(s) required. Additional literature review, reports, discussion and/or a class project are required for students pursuing this as a 500-level course.  
Prereq: REM 440 or Permission.
REM 483 Senior Project Presentation
1 credit
Cross-listed with FISH 483, FOR 483, NRS 483, and WLF 483
Reporting and presenting the senior project (thesis or internship); taken after or concurrently with REM 485 or REM 497.

REM 495 Teaching Practicum
1-3 credits, max arranged

REM 497 Senior Research and Thesis
Credit arranged
A research investigation, selected and designed jointly by the student and professor, during which the student has the opportunity to learn research techniques of experimental design, proposal writing, data collection and analysis, scientific writing, and publication; at completion, the student will produce a publishable journal manuscript and/or a conference presentation.
Prereq: Permission.

REM 498 (s) Internship
Credit arranged
Supervised field experience where students define specific topics and skills in rangeland management they wish to gain, develop a learning plan, and present a final report of knowledge gained or project outcomes. The internships will be overseen by an on-site field supervisor and a faculty mentor. Instructor permission required.

REM 499 (s) Directed Study
Credit arranged
For the individual student; conferences, library, field, or lab work.
Prereq: Senior standing, GPA 2.5, and Permission.

REM 501 (s) Seminar
Credit arranged
Major philosophy, management, and research problems of wildlands; presentation of individual studies on assigned topics.
Prereq: Permission.

REM 502 (s) Directed Study
Credit arranged.

REM 503 (s) Workshop
Credit arranged
Selected topics in the conservation and management of natural resources.
Prereq: Permission.

REM 504 (s) Special Topics
Credit arranged.

REM 505 (s) Professional Development
Credit arranged.

REM 507 Landscape and Habitat Dynamics
3 credits
Students explore landscape change occurring a variety of spatial and temporal scales, including global change, succession, disturbance events, and change induced by humans. Via scientific readings, models and spatial analysis students will learn how to quantify landscape change and how a change in environmental conditions and disturbance regimes may affect the composition of landscapes, specifically plant and animal habitats. Recommended Preparation: courses in ecology, statistics, and GIS. (Spring, alt/yr)
Prereq: Permission.

REM 510 GIS Application in Fire Ecology and Management
2 credits
Joint-listed with REM 407
Introduces applications of GIS in fire ecology, research, and management including incident mapping, fire progression mapping, GIS overlay analysis, remote sensing fire severity assessments, fire atlas analysis and the role of GIS in the Fire Regime Condition Class concept and the National Fire Plan. Additional assignment/projects required for graduate credit. (Spring only)
Prereq: FOR 375 or GEOG 385; or Permission.

REM 530 Stream Ecology
3 credits
Cross-listed with FISH 530
Structure and function of running water ecosystems; principles of population, community, and ecosystem ecology in streams and rivers. Three 1-day field trips reqd. (Fall, Alt/yr)

REM 556 Foraging Ecology of Herbivores
2 credits
Synthesis of foraging behavior concepts including nutritive quality of forages, digestive and metabolic constraints, and diet and habitat selection. Cooperative: open to WSU degree-seeking students. (Fall, Alt/yr)

REM 560 Ecophysiology
3 credits
Functional responses and adaptations of individual species to their environment, emphasizing the physiological mechanisms that influence the interactions between organisms and the major environmental factors (e.g., solar radiation, energy balance, temperature, water and nutrients, climate), and how this affects the interactions among species and their growth and survival (e.g., competition, herbivory, and allelopathy). The interactive learning materials are compatible only with computers that are 100% compatible with the Windows operating system and the browser, Internet Explorer. (Fall only)
Prereq: A course in general ecology (i.e. REM 221) and general botany, or Permission [www.EcologyOnline.net].

REM 580 Ecological Restoration
3 credits
Joint-listed with REM 480
Planning and implementing restoration projects in conjunction with land agencies and stakeholders. Includes service-learning projects. Field trip(s) required. Additional literature review, reports, discussion and/or a class project are required for students pursuing this as a 500-level course.
Prereq: REM 440 or Permission.
REM 595 Teaching Practicum
1-3 credits, max arranged
Joint-listed with REM 495
Provides students with peer teaching experience and assisting an instructor. May include classroom activities, grading assignments, developing materials, and/or participating in field trips. Students who take this course as the graduate level, as REM 595, will be asked to do additional work related to developing a teaching philosophy, developing assessment, or experimenting with specific pedagogical approaches with the faculty supervisor.
Prereq: Permission.

REM 597 (s) Practicum
Credit arranged.

REM 598 (s) Internship
Credit arranged.

REM 599 (s) Non-thesis Master's Research
Credit arranged
Research not directly related to a thesis or dissertation.
Prereq: Permission.

REM 600 Doctoral Research and Dissertation
Credit arranged
Prereq: Admission to the doctoral program in “natural resources” and Permission of department.