College of Natural Resources

Proposed Catalog Changes

Effective Term (unless otherwise noted) = Summer 2016

FOREST, RANGELAND, AND FIRE SCIENCES

1. Reactivate the following courses

   For 429 Landscape Ecology (3 cr)
   Same as Rem 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

   **Available via distance:**
   **Geographical Area Availability:** Moscow
   **Rationale:** Adding FOR429 will allow for students in Forest Resources and other programs to broaden their academic

2. Add the following courses

   For J447/J557 Woody Plant Physiology (3 cr)
   Examine woody plants interactions with their environment and tolerance or avoidance of stress. This course covers quantitative analysis of environmental biophysics, gas exchange, water relations and nutrition in woody plants. Students will also learn to use all of the major methods/equipment used in woody plant physiology research. Includes two weekly 1-hour lectures and one weekly 3-hour lab. Students registered for 500-level credit must complete a research project and presentation in addition to the requirements for the 400-level credit.

   **Available via distance:** No
   **Geographical Area Availability:** Moscow
   **Rationale:** The request is to bring a quantitative hands-on woody plant physiology course to the Department of Forest, Rangeland and Fire Sciences. Upper level undergraduates and graduate students in many disciplines in our department need this background and many have asked if I would teach such a course. This course would strengthen both the quantitative thinking skills and fundamental understanding of tree physiology and growth of our undergraduate and graduate students. There is no equivalent course at the UI or WSU. The course will be taught by existing faculty.

   For 490 The Resilient Landscape (3 cr)
   Same as LARC 480. A capstone course addressing the concept of trade-offs in coupled social ecological technological systems, where landscapes and the communities they support are adaptive and evolving but the ideal is rarely attainable. This is a reading, critical thinking and discussion course with assessment based on class participation in a term project, problem solving, verbal and written communication, collegiality and collaboration (Spring only).
   **Prereq:** For 235 or CSS 235; and Junior Standing
Available via distance: No
Geographical Area Availability: Moscow
Rationale: The course is already being taught as LARC 480, the addition of a FOR cross-listed course would be accommodated within Professor Andrew Kliskey’s existing teaching workload. The current LARC 480 course has steady numbers, expanding the course to a FOR cross-listing has good potential to see growth in the course through FOR and other CNR enrolments. The Forest Resources program in FRFS have agreed to add FOR 4xx as a restricted elective for the Forest Resources major.

3. Change the following courses

For 424 Forest Dynamics and Management Silviculture Principles and Practices (4 cr)
Gen Ed: Senior Experience
Integrated methods and techniques for sustainable management of forest ecosystems including, stand and disturbance dynamics, exercises in forest assessment, thinning, harvesting, silviculture prescriptions, forest modeling and communicating management guidelines. Major integrative final project required. Course includes field labs and lectures; on average 3-hrs of lectures and 2-hrs of lab per week. Theory underlying silvicultural practices to control forest composition and growth, including forest stand dynamics, tree growth and quality, and growth-density relationships. Study of intermediate stand treatments and reproduction methods. Final project required involving field data collection and forest modeling to develop and mark silvicultural prescriptions. 3-hrs of lecture and 2-hrs of lab per week.
Prereq: Senior standing and For 274, For 320, For 324 and For 330

Available via distance: No
Geographical Area Availability: Moscow
Rationale: Silviculture, the art and science of forest management at the stand level, integrates knowledge learned by students across the Forest Resources curriculum. The course builds on subjects learned in prerequisite courses including tree identification, ecology, ecosystem processes, and forest measurements and introduces students to the concepts of forest structural changes over time and tree interactions within forests. This holistic understanding of forest responses to disturbance is then used to discuss introductory topics in forest manipulation with accompanying field activities to practice marking stands for silvicultural treatments.

The course title has been revised to better reflect the material covered.

The course description has been revised to explicitly state the silvicultural concepts that will be covered to understand fundamental forest growth and predict stand responses to treatments. The course will be broadened to include the major intermediate stand treatments (e.g. thinning and compositional improvement) and reproduction methods (e.g. even-aged and uneven-aged). These topics are imperative for successful and environmentally-sound forest resource management and necessary to maintain accreditation by the Society of American Foresters. For 424 is a required senior experience course for students in the Forest Resource major. The course will be taught by existing faculty.

REM 341 Systematic Botany (3 cr)
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

Available via distance: No
**Geographical Area Availability:** Moscow

**Rationale:** The biology department has made changes to their introductory biology courses. It is now appropriate to accept Biol 114 (Organisms and Environments) as a prerequisite for REM 314 (Systematic Botany).

This change will not add to the current workload of the faculty or advisors.

**REM 410 Principles of Vegetation Measurement and Assessment (2 cr)**
On-line course designed to give an overview of vegetation measurement techniques for grasslands, shrublands, woodlands, and forests. Students will gain a solid understanding of how to assess evaluate and monitor vegetation attributes relative to wildlife habitat, livestock forage, fire fuel characteristics, watershed function, and many other wildland values. Recommended Preparation: A basic statistics course and understanding of how to use computer spreadsheets such as Excel. (Fall only). Students who desire a hands-on and interactive experience with vegetation measurement are encouraged to also enroll in REM 411 which is a course the builds on the principles delivered in REM410 and includes field experiences.

**Available via distance:** Yes

**Geographical Area Availability:** Moscow

**Rationale:** REM 410 (Principles of Vegetation Measurement and Assessment) is a companion course with REM 411 (Ecological Monitoring and Analysis). We are requesting changes to the titles and descriptions of both course to make the course sound more appealing to students and increase clarity of how courses are delivered and related to each other.

This change will not affect department workload as REM410 and 411 are both currently offered each year.

**REM 411 Ecological Monitoring and Analysis Wildland Habitat Ecology and Assessment (2 cr)**
Field and data analysis course where students collect, analyze, and report ecological data related to scientific research, wildlife habitat, fire, grazing, and land management practices. Class field trips required. Recommended preparation: Ability to use excel. Co-enrollment in REM 410 is recommended.

**Prereq:** Stat 251 or Permission

**Prereq or Coreq:** REM 410

**Available via distance:** No

**Geographical Area Availability:** Moscow

**Rationale:** 1) A change in title is requested to reflect a change in focus of the class to more fully include aspects of habitat assessment.

2) The co-requisite requirement of REM 410 (Principles of Vegetation Measurement) will be removed and replaced with the statement that co-enrollment in REM 410 and 411 is recommended. This will allow students on the UI campus who desire a hands-on experience on a limited array of habitat assessment techniques to take the course. REM 410 will continue to offer the general overview of the topic. Students who need a strong and broad understanding of vegetation measurement and assessment will be encouraged or required to take both REM 410 and 411.

3) This change has been discussed with the faculty of the Wildlife Resources degree. This change will not affect department workload as REM410 and 411 are both currently offered each year.

**REM 450 Global Environmental Change (3 cr)**

**Same as NRS 450.** Major global environmental changes addressed using an interdisciplinary approach. Topics may include processes and principles of ecosystems, biogeochemical cycles,
impacts and mitigation of climatic change, atmospheric chemistry, feedbacks between climate and various earth system processes, and trends in global biodiversity.

**Prereq:** Math 143 or Stat 251

**Available via distance:** No  
**Geographical Area Availability:** Moscow  
**Rationale:** Faculty members in the Natural Resources and Society (NRS) department have expressed interest in teaching this course (Global Environmental Change). The Rangeland Ecology and Management (REM) faculty welcomes this collaboration and believes the course should be cross-listed.

Added workload associated with offering this class in the NRS department will be handled through changes in annual position descriptions of faculty as needed.

**REM 498 (s) Internship (cr arr)**  
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.

**Available via distance:** Yes  
**Geographical Area Availability:** Course will be available through the internet to anywhere the internet is available.  
**Rationale:** REM 498 has long been listed in the UI catalog only as “Internship” with no course description. This curriculum change is requested to clarify requirements and intent of the course.

Several UI students each year engage in internships (REM 498) and the REM program has a syllabus for the course which outlines the requirements for the student, on-site supervisor, and faculty mentor. The student defines their intended learning outcomes for the course and the supervisor and mentor assess the quality of the student’s work and project outcomes.

These changes will not require additional faculty or staff effort because the course already exists.

4. Create the following undergraduate academic certificate

**Remote Sensing of the Environment**  
The objective of the certificate is to provide students with the scientific background and technical skills required for using Remote Sensing as an analytical tool for environmental investigation. These skills are increasingly demanded by employers - both in the private and public sector - in fields such as natural resources management, land planning, sustainable development, disaster preparedness and mitigation. The students will become familiar with the sources of remotely sensed data (both aerial and satellite systems), with the state of the art processing techniques needed to generate thematic datasets, and will be able to integrate remotely sensed datasets into Geographic Information Systems (GIS). The required and optional courses have a strong emphasis on practical applications, and the students will have the opportunity of gaining proficiency in the use of some software packages most widely used in professional settings.

**Required:**

Requirement A: **One of the two** below courses:  
FOR375 Intro to Spatial Analysis in Natural Resources (3 cr.)  
or  
GEOG 483 (Remote Sensing/GIS integration – 3 cr.)
Requirement B: The **two following courses**:
FOR435 Remote Sensing of Fire (3 cr.)
FOR472 Remote Sensing of the Environment (4 cr.)

Requirement C: **One** of the following:
LARC 395 (GIS Applications in Land Planning – 3 cr.),
REM 407 (GIS Applications in Fire Ecology and Management – 2 cr.),
REM 429 (Landscape Ecology – 3 cr.),
REM 460 (Integrating GIS and Field Studies in Rangelands – 2 cr.)
GEOG 424 (Hyrdologic Applications in GIS and Remote Sensing – 3 cr)

**Financial Impact:** Limited if any financial impact. Required courses for this certificate already exist, with corresponding faculty resources

**Distance Education:** Less than 50% of the requirements can be completed via distance.

**Geographical Area Availability:** Moscow

**Rationale:** CNR currently requires an introductory natural resources focused geospatial course as part of the college core. This certificate would build upon our strengths in geospatial education to offer students further opportunities to develop expertise in the area of remote sensing, a rapidly developing tool for natural resource management and problem solving. Information from students, industry, and interested external stakeholders has indicated a strong preferences for this type of focused, technical skill oriented certificate. Currently NRS has strong faculty expertise in remote sensing education and when combined with additional resources available outside of the department, there will be limited added workload. Additionally, all courses for the certificate currently exist, thus limiting additional resource needs.

5. Change the name of the Forest Resources Major (B.S.For.Res.)

**Forest Resources Forestry**
B.S.For.Res **B.S.For.**

**Financial Impact:** Less than $250,000 per FY. Change of marketing materials to accommodate revised name. Change of web and registrars information.

**Distance Education:** Less than 70% of requirements can be completed via distance.

**Geographical Area Availability:** Moscow

**Rationale:** Following discussions with faculty and external stakeholders, the term "resources" seemed to cause considerable confusion on what the degree contains. Importantly, the accreditation organization (The Society of American Foresters) refers to the class of related degrees as "Forestry". Overall, the faculty considered these reasons and agreed that changing the name to the broad discipline title of Forestry is more inclusive of what the curricula contains. This change brings the UI degree in line with peer institutions including Colorado State University, Oregon State University, University of Montana, Michigan Tech, Michigan State University, and Virginia Tech.

6. Make the following curricular changes to the Forest Resources Major (B.S.For.Res.)

**Forest Resources Forestry (B.S.For.Res.)**

**Students pursuing a B.S. degree in forest resources must receive a grade of C or better in the following indicator courses to register for upper-division courses in forest resources and to graduate with a B.S.For.Res.:** Math 143, Stat 251, For 221, and For 274. Students must also have a minimum cumulative grade-point average of 2.00 in forestry resource (For) courses to qualify for the B.S. degree in forest resources.

Required course work includes the university requirements (see regulation J-3) and:
Biol 115 **Cells and the Evolution of Life (4 cr)**

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**UCC-16-026**
| **CSSNRS 383** | Natural Resource and Ecosystem Service Economics (3 cr) |
| **Econ 202** | Principles of Microeconomics (3 cr) |
| **For 102** | Introduction to Forest Management (1 cr) |
| **REM 144** | **Wildland Fire Management (2 cr)** |
| **For 235** or ***CSS 235*** | Society and Natural Resources (3 cr) |
| **Ent 469** | Introduction to Forest Insects (2 cr) |
| **For 273** | Forestry Sampling Methods (2 cr) |
| **For 274** | Forest Measurement and Inventory (3 cr) |
| **For 320** | Dendrology (4 cr) |
| **For 324** | Forest Regeneration (3 cr) |
| **For 330** | Forest Soil and Canopy Processes (4 cr) |
| **For 375** | Introduction to Spatial Analysis for Natural Resource Management (3 cr) |
| **For 424** | *Forest Dynamics and Management Silviculture Principles and Practices* (4 cr) |
| **For 430** | Forest Operations (3 cr) |
| **For 462** | Watershed Science and Management (3 cr) |
| **For 468** | Forest and Plant Pathology (2 cr) |
| **For 484** | Forest Policy and Administration (2 cr) |
| **Math 143** | Pre-calculus Algebra and Analytic Geometry (3 cr)* |
| **Math 144** | Analytic Trigonometry (1 cr) |
| **NR 101** | Exploring Natural Resources (1 cr) |
| **Soil 205, 206** | The Soil Ecosystem and Lab (4 cr) |
| **Stat 251** | Statistical Methods (3 cr) |

One of the following (4 cr):

- **Biol 114** | Organisms and Environments (4 cr) |
- **PlSc 205** | General Botany (4 cr) |
- **Phys 100** | Fundamentals of Physics (3 cr) |

One of the following (4 cr):

- **Chem 101** | Introduction to Chem I (4 cr) |
- **Chem 111** | Principles of Chem I (4 cr) |

One of the following (3 cr):

- **Engl 313** | Business Writing (3 cr) |
- **Engl 317** | Technical Writing (3 cr) |

One of the following (3 cr):

- **For 221** | Ecology (3 cr) |
- **REM 221** | Ecology (3 cr) |

One of the following (4 cr):

- **Phys 100, Phys 100L** | Fundamentals of Physics and Lab (4 cr) |
- **Phys 111, Phys 111L** | General Physics I and Lab (4 cr) |
Restricted Electives (11 cr):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgEc 477</td>
<td>Law, Ethics, and the Environment (3 cr)</td>
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<tr>
<td>Biol 213</td>
<td>Principles of Biological Structure and Function (4 cr)</td>
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<tr>
<td>Biol 421</td>
<td>Advanced Evolutionary Biology (3 cr)</td>
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<td>CSS 486</td>
<td>Public Involvement in Natural Resource Management (3 cr)</td>
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<td>CSS 490</td>
<td>Wilderness and Protected Area Management (3 cr)</td>
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<tr>
<td>Fish 314</td>
<td>Fish Ecology (3 cr)</td>
</tr>
<tr>
<td>Fish 415</td>
<td>Limnology (4 cr)</td>
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<tr>
<td>Fish 430</td>
<td>Riparian Ecology and Management (3 cr)</td>
</tr>
<tr>
<td>For 255</td>
<td>Nursery Irrigation and Fertilization (1 cr)</td>
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<tr>
<td>For 326</td>
<td>Fire Ecology and Management (3 cr)</td>
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<tr>
<td>For 427</td>
<td>Prescribed Burning Lab (3 cr)</td>
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<tr>
<td>For 431</td>
<td>Low Volume Forest Roads (2 cr)</td>
</tr>
<tr>
<td>For 436</td>
<td>Cable Systems (2 cr)</td>
</tr>
<tr>
<td>For 472 or REM 472</td>
<td>Remote Sensing of the Environment (4 cr)</td>
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<tr>
<td>For 497</td>
<td>Senior Thesis (2-4 cr)</td>
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<tr>
<td>Geog 301</td>
<td>Meteorology (3 cr)</td>
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<tr>
<td>Geog 385</td>
<td>GIS Primer (3 cr)</td>
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<td>Geol 111</td>
<td>Physical Geology for Science Majors (4 cr)</td>
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<tr>
<td>Math 160</td>
<td>Survey of Calculus (4 cr)**</td>
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<tr>
<td>Math 170</td>
<td>Analytic Geometry and Calculus I (4 cr)**</td>
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<tr>
<td>PolS 364 or CSS 364</td>
<td>Politics of the Environment (3 cr)</td>
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<td>REM 407</td>
<td>GIS Applications in Fire Ecology and Management (2 cr)</td>
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<td>REM 410</td>
<td>Principles of Vegetation Measurement and Assessment (2 cr)</td>
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<tr>
<td>REM 411</td>
<td>Ecological Monitoring and Analysis (2 cr)</td>
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<td>REM 428</td>
<td>Landscape Ecology (3 cr)</td>
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<td>REM 440</td>
<td>Wildland Restoration Ecology (2 cr)</td>
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<td>REM 459</td>
<td>Rangeland Ecology (2 cr)</td>
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<td>REM 460</td>
<td>Integrating GIS and Field Studies in Rangelands (2 cr)</td>
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<tr>
<td>RMat 321</td>
<td>Renewable Materials Anatomy and Properties (3 cr)</td>
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<td>RMat 444</td>
<td>Primary Products Manufacturing (3 cr)</td>
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<td>Soil 446</td>
<td>Soil Fertility (1-3 cr)</td>
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<td>Soil 454</td>
<td>Soil Development and Classification (3 cr)</td>
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<td>Stat 431</td>
<td>Statistical Analysis (3 cr)</td>
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<td>WLF 314</td>
<td>Wildlife Ecology I (3 cr)</td>
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<td>WLF 316</td>
<td>Wildlife Ecology II (3 cr)</td>
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<td>WLF 440</td>
<td>Conservation Biology (3 cr)</td>
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Complete 18 credits of Advisor Approved Electives OR one of the following Minors:

- Climate Change Minor (Geography)
- Conservation Social Sciences Minor (CNR)
Environmental Communication Minor (CNR)
Fishery Resources Minor (NCR)
Forest Operations Minor (CNR)
Fire Ecology and Management Minor (CNR)
Natural Resources Economics Minor (CNR)
Rangeland Ecology and Management Minor (CNR)
Renewable Materials Minor (CNR)
Soil Science Minor (CALS)
Wildlife Resources Minor (CNR)
Business Minor (Business)
Ecology Minor (CNR) (pending)

Courses to total 120 credits for this degree

*Note: A SAT math score of 610 or above, or ACT math score of 27 or above can be used to satisfy the Math 143 and Math 144 requirements.
**Note: Either Math 160 or Math 170 may be used as a restricted elective, but not both.

Distance Education: Less than 50% of requirements can be completed via distance
Geographical Area Availability: Moscow
Rationale: Following program and curricula review by an employer’s summit and other stakeholder meetings, we are seeking to make the BS degree in Forest Resources (pending name change to Forestry) more accessible to students seeking a holistic understanding of the role of Forestry in the environment.

BIOL 114, BIOL 115: The faculty believes that only content from one of Biol 114 in addition to PLSC 205 is needed for students in this degree. This change also brings the degree in line with the Fire Ecology and Management and Rangeland Ecology and Management degrees offered within the department.

PHYS 111 and PHYS 100L: The faculty decided to require PHYS 100 instead of PHYS 111 as PHYS 100 covers all the main concepts of physics they will encounter in their degree, while PHYS111 is principally focused on only a subset of core topics. The faculty also decided to remove the PHYS 100L requirement.

REM 144: A related employer’s summit in the department's Fire Ecology and Management program suggested that all forestry-related majors should take a course in wildland fire. The faculty agreed with this argument.

ENGL 313 / 317: The faculty have been long dissatisfaction with the content of these courses and decided that instead of requiring them that students would be required to instead take 2-3 credits that meet the general education communication requirement in the spring of their sophomore year.

Remove curricula requirement that “Students pursuing a B.S. degree in forest resources must receive a grade of C or better in the f indicator courses to register for upper-division courses in forest resources and to graduate with a B.S.For.Res.: Math 143, Stat 251, For 221, and For 274". The faculty has found these requirements too restrictive and difficult to enforce.

Electives: Replacement of the electives with advisor approved restrictive electives or pre-defined set minors will make advising and scheduling easier while also making it easier to demonstrate to students potential career paths. This change also brings the degree in line with the Fire Ecology and Management and Rangeland Ecology and Management degrees also offered within the department.
7. Make the following curricular changes to the Rangeland Ecology and Management Major (B.S.Rangeland Ecol.-Mgt.)

Required course work includes the university requirements (see regulation J-3) and:

First and Second Years:

**AVS 109 -- The Science of Animals that Serve Humanity (4 cr)**
Biol 115 -- Cells and the Evolution of Life (4 cr)
Chem 275 -- Carbon Compounds (3 cr)
Comm 101 -- Fundamentals of Public Speaking (2 cr)
Econ 202 -- Principles of Microeconomics (3 cr)
For 235 or CSS 235 -- Society and Natural Resources (3 cr)
NR 101 -- Exploring Natural Resources (1 cr)
REM 151 -- Rangeland Principles (2 cr)
REM 152 -- Rangeland Ecosystem Exploration (1 cr)
Soil 205 -- The Soil Ecosystem (3 cr)
Soil 206 -- The Soil Ecosystem Lab (1 cr)
Stat 251 -- Statistical Methods (3 cr)

One of the following (4 cr):
Biol 213 -- Principles of Biological Structure and Function (4 cr)
PISc 205 -- General Botany (4 cr)

One of the following (4 cr):
Chem 101 -- Introduction to Chem I (4 cr)
Chem 111 -- Principles of Chem I (4 cr)

One of the following (3-4 cr):
Math 143 -- Pre-calculus Algebra and Analytic Geometry (3 cr)
Math 160 -- Survey of Calculus (3-4 cr)

One of the following (3 cr):
For 221 -- Ecology (3 cr)
REM 221 -- Ecology (3 cr)

Third and Fourth Years

CSS 383 -- Natural Resource and Ecosystem Service Economics (3 cr)
For 375 -- Introduction to Spatial Analysis for Natural Resource Management (3 cr)
REM 252 -- Wildland Plant Identification Field Studies (3 cr)
REM 341 -- Systematic Botany (3 cr)
REM 410 -- Principles of Vegetation Measurement and Assessment (2 cr)
REM 411 -- Ecological Monitoring and Analysis (2 cr)
REM 440 -- Wildland Restoration Ecology (3 cr)
REM 456 -- Integrated Rangeland Management (3 cr)
REM 459 -- Rangeland Ecology (2 cr)
REM 460 -- Integrating GIS and Field Studies in Rangelands (2 cr)
Soil 454 -- Pedology (3 cr)

One of the following (3 cr):
**AVS 474 -- Beef Cattle Science (3 cr)**

One of the following (3 cr):
Engl 313 -- Business Writing (3 cr)
Engl 317 -- Technical Writing (3 cr)

One of the following (3 cr):
Fish 430  --  Riparian Ecology and Management (3 cr)
For 462  --  Watershed Science and Management (3 cr)

Students must also complete 12 credits of advisor approved electives in emphasis areas that include: Restoration Ecology, Field Botany, Spatial Ecology, Watershed Science, Wildland Fire Management, Invasive Plant Management, Wildlife Habitat Management, Tribal Land Management, Rangeland Economics, Natural Resource Communication, and Environmental Consulting.

Courses to total 122 credits for this degree

Distance Education:
Geographical Area Availability: Moscow

Rationale: This request is to replace a requirement for AVS 474 Beef Cattle Science with AVAS 109 – The Science of Animals that Serve Humanity. Student majoring in Rangeland Ecology and Management need to have at least 1 Animal Science class to meet GS 454 requirements for Rangeland Conservationist for the Federal Government. However, it has become apparent that most REM students do not have a background to successful complete the AVS 474 Beef Cattle Science class. Therefore, we suggest that students take AVS 109 course. If students believe they can successfully complete AVS 474 rather than AVS 109, they will able to petition for an exception.

8. Make the following curricular changes to the Rangeland Ecology and Management Minor

Note: At least 12 credits in courses numbered 300 or higher are required to satisfy the requirements of this minor.

REM 151  Rangeland Principles (2 cr)
REM 252  Wildland Plant Identification Field Studies (3 cr)
REM 459  Rangeland Ecology (2 cr)
REM 460  Integrating GIS and Field Studies in Rangelands (2 cr)
REM 456  Integrated Rangeland Management (3 cr)

One of the following (3 cr)
REM 252  Wildland Plant Identification Field Studies (3 cr)
REM 342  Systematic Botany (3 cr)

One of the following (3 cr):
For 221  Ecology (3 cr)
REM 221  Ecology (3 cr)

Six to 4 credits from the following courses (3-4 cr):
REM 410  Principles of Vegetation Measurement and Assessment (2 cr)
REM 411  Ecological Monitoring and Analysis (2 cr)
REM 429  Landscape Ecology (3 cr)
REM 440  Wildland Restoration Ecology (3 cr)
REM 452  Western Wildland Landscapes (2 cr)
REM 456  Integrated Rangeland Management (3 cr)

One of the following courses (or a course not chosen above) (2-4 cr):
AVS 474  Beef Cattle Science (3 cr)
AVS 476  Sheep Science (3 cr)
Fish 430  Riparian Ecology and Management (3 cr)
For 326  Fire Ecology and Management (3 cr)
For 462  Watershed Management (3 cr)
PlSc 338  Weed Control (4 cr)
PlSc 410  Invasive Plant Biology (3 cr)
### Courses to total 2018 credits for this minor

- **REM 144** Wildland Fire Management (2 cr)
- **REM 340** Ethnobotany (2 cr)
- **REM 429** Landscape Ecology (3 cr)
- **REM 450** Global Environmental Change (3 cr)
- Soil 454 Pedology (3 cr)
- Soil 438 Pesticides in the Environment (3 cr)
- WLF 314 Wildlife Ecology I (3 cr)
- WLF 440 Conservation Biology (3 cr)

**Distance Education:** Less than 50% of the requirements can be completed via distance learning.

**Geographical Area Availability:** Moscow

**Rationale:** Curriculum changes are requested to revise the Rangeland Ecology and Management minor for several reasons:

1. To more closely match requirements for the GS-0454 Range Management Specialist series with the Federal Government. Students often pursue the REM minor to gain Range Management Specialist credentials.

2. Removed courses no longer offered.

3. Add upper division courses to allow students pursuing majors in agriculture or natural resources to add a Rangeland Ecology and Management minor that will complement their current degree.

The result is a minor that can be completed in 18 to 21 total credits with 13 to 19 credits in upper division courses depending on courses selected.

### NATURAL RESOURCES AND SOCIETY

1. Add the following course

   **NRS 450** Global Environmental Change (3 cr)

   Same as REM 450. Major global environmental changes addressed using an interdisciplinary approach. Topics may include processes and principles of ecosystems, biogeochemical cycles, impacts and mitigation of climatic change, atmospheric chemistry, feedbacks between climate and various earth system processes, and trends in global biodiversity.

   **Prereq:** Math 143 or Stat 251

   **Available via distance:** No

   **Geographical Area Availability:** Moscow

   **Rationale:** Course requires no additional resources. Current instructor is also for cross-listed REM 450.