COLLEGE OF NATURAL RESOURCES
Proposed Catalog Changes

Conservation Social Sciences

1. Add the following course [Effective: Summer 2014]

   CSS 593 PR and Communications in Natural Resource Management (3 cr)
   Key concepts, principles and practices of good public relations, clear communications, and proactive social marketing in the context of natural resource management; practical applications and skills development for increased effectiveness of resource management professionals through case studies and related exercises focused on communication skills, IT tools, media relations, social marketing, and public involvement.

   Recommended Short Course Title: PR/Communication in Res Mgt

   Rationale: This course is an online course that provides a needed addition to online courses for CNR’s MNR online-degree program. It is one of the few online courses offered for that program, and helps students meet requirements for coursework in several of the MNR program’s required-course bins. The course has been taught for several years by a current faculty-member, whose teaching and advising responsibilities have largely been focused on meeting the needs of the MNR program (one of the largest graduate programs in CNR), and it does not require additional faculty responsibility.

2. Change the curricular requirements of Natural Resource Conservation (B.S.Nat.Resc.Consv.) [Effective: Summer 2014]

   Required Course work includes the university requirements (see regulation J-3) and:
   CSS 235 Society and Natural Resources (3 cr)
   CSS 287 Foundations of Conservation Leadership and Management (taken simultaneously with NR 101) (3 cr)
   CSS 383 Natural Resource and Ecosystem Service Economics (3 cr)
   CSS 387 Environmental Communication Skills (3 cr)
   Econ 202 Principles of Microeconomics (3 cr)
   For 375 Introduction to Spatial Analysis for Natural Resource Management (3 cr)
   NR 101 Exploring Natural Resources (taken simultaneously with CSS 287) (1 cr)
   Stat 251 Statistical Methods (3 cr)
   One writing course, such as Engl 207, Engl 208, Engl 313, Engl 316, Engl 317 (3 cr)
   One of the following (3 cr):
   For 221 Ecology (3 cr)
   REM 221 Ecology (3 cr)
   One of the following (3-4 cr):
   Math 143 Pre-calculus Algebra and Analytic Geometry (3 cr)
   Math 160 Survey of Calculus (4r)
   Math 170 Analytic Geometry and Calculus I (4 cr)
   And one of the following emphases:

   A. Conservation Planning and Management Emphasis
   Students must attend one, two-week long field studies course during summer session. Special fees are required for this and a few other courses. To graduate a student must earn an average GPA 2.30 or higher in all CSS courses.
   CSS 304 Conservation Social Sciences Field Studies (3 cr)
   CSS 310 Social Research Methods in Conservation (4 cr)
   CSS 364 Politics of the Environment (3 cr)
   CSS 385 Conservation Management and Planning I (4 cr)
   CSS 475 Conservation Management and Planning II (4 cr)
   CSS 486 Public Involvement in Natural Resource Management (3 cr)
   CSS 489 Personalities and Philosophies in Conservation (3 cr)
   One of the following (4 cr):
   Biol 102, Biol 102L Biology and Society and Lab (4 cr)
   Biol 115 Cells and the Evolution of Life (4 cr)
   One of the following (2-4 cr):
   Comm 101 Fundamentals of Public Speaking (2 cr)
   One semester of a foreign language course
One of the following (3 cr):
PoIS 101  Intro to Political Science and American Government (3 cr)
PoIS 275  American State and Local Government (3 cr)

One of the following (4 cr):
Chem 101  Introduction to Chem I (4 cr)
Chem 111  Principles of Chem I (4 cr)
Geol 101,  Physical Geology and Lab (4 cr)
Geol 101L

One of the following (3 cr):
For 326  Fire Ecology and Management (3 cr)
For 436  Global Fire Ecology and Management (3 cr)
REM 459,  Rangeland Ecology (2 cr); and Rangeland Ecology
REM 460  Integrating GIS and Field Studies in Rangelands (4-2
or Current Topics and Field Studies (1 cr)
WLF 314  Wildlife Ecology I (3 cr)

Two of the following (6 cr):
CSS 490  Wilderness and Protected Area Management (3 cr)
CSS 493  International Land Preservation and Conservation Systems (3 cr)
LArc 480  The Emerging Landscape (3 cr)
WLF 440  Conservation Biology (3 cr)

Two of the following (6 cr):
Anth 100  Introduction to Anthropology (3 cr)
Psyc 101  Introduction to Psychology (3 cr)
Soc 101  Introduction to Sociology (3 cr)

12 credits (if not chosen above) from the following, in at least 2 disciplines with at least 2 courses in one discipline:
AgEc 477  Law, Ethics, and the Environment (3 cr)
Anth 428  Social and Political Organization (3 cr)
Bus 321  Marketing (3 cr)
Comm 410  Conflict Management (3 cr)
CSS 462  Natural Resource Policy (3 cr)
CSS 487  Environmental Education (3 cr)
CSS 490  Wilderness and Protected Area Management (3 cr)
CSS 492  Ecotourism Principles and Issues (3 cr)
CSS 493  International Land Preservation and Conservation Systems (3 cr)
CSS 496  Monitoring Impacts in Protected Areas and Wilderness (3 cr)
CSS 498  Internship (3-6 cr)
Geog 360  Population Dynamics and Distribution (3-4 cr)
Hist 423  Idaho and the Pacific Northwest (3 cr)
Hist 424  American Environmental History (3 cr)
JAMM 350  Public Relations Writing and Production (3 cr)
JAMM 444  Mass Media and Public Opinion (3 cr)
Phil 452  Environmental Philosophy (3 cr)
PoIS 451  Public Administration (3 cr)
PoIS 453  Public Management Techniques (3 cr)
PoIS 454  Public Organization Theory (3 cr)
PoIS 473  Sustainable Community Development Planning (3 cr)
PoIS 480  Politics of Development (3 cr)
Psyc 320  Introduction to Social Psychology (3 cr)
Psyc 325  Cognitive Psychology (3 cr)
Soc 313  Collective Behavior (3 cr)
Soc 343  Political Sociology (3 cr)

Courses to total 120 credits for this degree

B. Conservation Science Emphasis
To graduate a student must earn an average GPA of 2.00 or higher in all courses taught in the College of Natural Resources and complete an approved professional work experience in natural resources.

One of the following (4 cr):
Biol 115  Cells and the Evolution of Life (4 cr)
Biol 116  Organisms and Environments (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 (4 cr):
CSS 364  Politics of the Environment (3 cr)
CSS 462  Natural Resource Policy (3 cr)

One of the following (4 cr):
CSS 385  Conservation Management and Planning I (4 cr)
CSS 490  Wilderness and Protected Area Management (3 cr)

Natural Resource Science Restricted Electives (33 cr), at least 15 cr must be at the 400-level:

Fishery Science (6 cr):
Fish 314  Fish Ecology (3 cr)
Fish 315  Fish Ecology Lab (1 cr)
Fish 316  Principles of Population Dynamics (2 cr)
Fish 415  Limnology (4 cr)
Fish 418  Fisheries Management (4 cr)
Fish 422  Concepts in Aquaculture (3 cr)
Fish 424  Fish Health Management (4 cr)
Fish 430  Riparian Ecology and Management (3 cr)

Fire Ecology and Management (3 cr):
For 326  Fire Ecology and Management (3 cr)
For 426  Global Fire Ecology and Management (3 cr)
For 433  Fire and Fuel Modeling (2 cr)
For 450  Fire Behavior (2 cr)
For 454  Air Quality and Smoke Management (3 cr)

Forestry (6 cr):
For 320  Dendrology (4 cr)
For 324  Forest Regeneration (3 cr)
For 330  Forest Soil and Canopy Processes (4 cr)
For 373  Forestry Sampling Methods (2 cr)
For 424  Forest Dynamics and Management (4 cr)
For 425  Forest and Soil Nutrient Cycling (3 cr)
For 430  Forest Operations (3 cr)
For 431  Low Volume Forest Roads (2 cr)
For 436  Cable Systems (2 cr)
For 462  Watershed Science and Management (3 cr)
For 468  Forest and Plant Pathology (2 cr)
For 472  Remote Sensing of the Environment (4 cr)

Renewable Materials (6 cr):
RMat 321  Properties of Renewable Materials (3 cr)
RMat 365  Wood Building Technology (3 cr)
RMat 436  Biocomposites (3 cr)
RMat 438  Introduction to Lignocellulosic Chemistry (1 cr)
RMat 444  Primary Products Manufacturing (3 cr)
RMat 450  Biomaterials Deterioration and Protection (2 cr)
RMat 491  Biomaterial Product and Process Development Lab (2 cr)
RMat 495  Product Development and Brand Management (3 cr)

Rangeland Ecology and Management (6 cr):
REM 341  Systematic Botany (3 cr)
REM 410  Principles of Vegetation Measurement and Assessment (2 cr)
REM 411  Rangeland Ecology Current Topics and Field Studies (1 cr)
REM 440  Wildland Restoration Ecology (3 cr)
REM 452  Western Wildland Landscapes (2 cr)
REM 456  Integrated Rangeland Management (3 cr)
REM 459  Rangeland Ecology (2 cr)
REM 460  Integrating GIS and Field Studies in Rangelands (4 cr)
REM 472  Remote Sensing of the Environment (3-4 cr)

Wildlife Science (6 cr):
WLF 314  Wildlife Ecology I (3 cr)
WLF 315  Wildlife Ecology I Laboratory (1 cr)
WLF 316  Wildlife Ecology II (4 cr)
WLF 440  Conservation Biology (3 cr)
WLF 448  Fish and Wildlife Population Ecology (4 cr)
WLF 482  Ornithology (4 cr)
WLF 492  Wildlife Management (4 cr)

Courses to total 120 credits for this degree
Rationale: Changes are being made because the department of Forest, Rangeland and Fire Sciences changed For 426 to be used exclusively for online students working on the Fire Academic Certificate and other fire certification. For 326 is for on-campus students.

3. Change the curricular requirements of Environmental Education (GR Academic Certificate) [Effective: Summer 2014]

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CSS 481</td>
<td>Conservation Leadership</td>
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<tr>
<td>CSS 599</td>
<td>Writing Research and Project Proposals (1 cr)</td>
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<tr>
<td>CSS 560</td>
<td>Community Ecology for Env. Educators (3 cr)</td>
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<td>CSS 561</td>
<td>Ecological Inquiry for Environmental Educators (2 cr)</td>
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<td>CSS 562</td>
<td>Field Science Teaching (2 cr)</td>
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<td>CSS 563</td>
<td>Place Based Env. Education (3 cr)</td>
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<td>CSS 566</td>
<td>Adv. Field Ecology Course Design (5 cr)</td>
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<td>CSS 567</td>
<td>Environmental Education Teaching Practicum I (2 cr)</td>
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<td>CSS 568</td>
<td>Environmental Education Teaching Practicum II (1 cr)</td>
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<td>CSS 569</td>
<td>Environmental Education Teaching Practicum III (2 cr)</td>
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<tr>
<td>CSS 575</td>
<td>Leadership for the Environmental Educator (2 cr)</td>
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</tbody>
</table>

Courses to total 12 credits for this certificate

Rationale: Evaluation interviews conducted with EE Certificate students in spring of 2011 indicated a new curriculum including existing courses CSS 566 (5 credits) & CSS 599 (1 credit) and without CSS 561 & 575 would better provide needed synthesis of ecological content, communication and curriculum design. This new curriculum better supports the overall learning objectives of the EE Certificate.

Fish and Wildlife Sciences

1. Change the following courses [Effective: Summer 2014]

**WLF 561 Landscape Genetics (2 cr)**
Landscape genetics is an interdisciplinary field of study that evaluates how landscape and environmental features influence gene flow, population structure and local adaptation by integrating landscape ecology, population genetics and spatial statistics. This course covers applications of landscape genetics that can improve our understanding of ecology, evolution, and management of wild populations. Recommended Preparation: Population genetics or conservation genetics, and multivariate or spatial statistics.

**Cooperative:** open to WSU degree-seeking students. (Spring, alt/even yrs)

Rationale: This spring will be the 4th time that the course has been taught. In past years, 2 – 4 WSU students have attended.

**WLF 562 Landscape Genetics Lab (1-2 cr)**
This optional lab course is a complement to WLF561 Landscape genetics and should be taken concurrently. Students will learn to analyze and interpret landscape genetic datasets using a variety of methods. If taken for two credits, students will do a project analyzing landscape genetic data. Recommended Preparation: Population genetics or conservation genetics, and multivariate or spatial statistics. **Cooperative:** open to WSU degree-seeking students. (Spring, alt/even yrs)

**Coreq:** WLF 561

Rationale: This spring will be the 4th time that the course has been taught. In past years, 2 – 4 WSU students have attended.

Forest, Rangeland, and Fire Sciences

1. Add the following courses [Effective: Summer 2014]

**For 255 Nursery Irrigation and Fertilization (1 cr)**
An introduction to nursery irrigation and fertilization practices commonly found in forest tree seedling and native plant nurseries. This course aims to provide some of the important theory behind the practices used every day in successful crop production. The course will be taught by faculty and staff at the UI Pitkin Forest Nursery and managed as part of the annual Position Description process. The course is developed and is presently offered online.

Recommended Short Course Title: Nursery Irrigation/Fertilizatn

Rationale: This course fills a need that has been identified through discussions with stakeholders to provide undergraduates with the background needed to successfully grow plants in a nursery setting. Undergraduate students in the Forest Resources degree will benefit from additional preparation for upper division plant-biology related courses. By extension, university-wide students will be able to broaden their understanding of the science behind nursery production.
For 310 Indigenous Culture and Ecology (3 cr, max 9)

Students will explore how both endemic plant and animal species and native culture have been impacted by non-native species. A roughly 10 day field trip to remote communities requires active and effective participation, hands-on projects are conducted in those communities based on preparatory materials, and there is a major presentation for Idaho stakeholders upon completion of the field trip.

Rationale: This course, offered in 2012 and 2013 as a Special Topics option, provides students with a hands-on opportunity to explore cross-cutting issues relating to culture and ecology. Within the context of the shared challenges faced by indigenous people across the world, this course uses service-based experiential-learning, communication, sciences, and interdisciplinary work as integral components of education to further grow the relationship between Native American students within the university and both their own communities and across cultural divides. This unique course provides a form of counseling, necessary resources, guidance, and support services to advance education of Native American students at the University of Idaho. The class includes in-class discussions/lectures and about a 10-day field trip that occurs over spring breaks. The course fee is $2,000. This has been covered by donations/scholarships for the past two years and will be for the next two also. Anthony Davis (CNR), Art Taylor (provost’s office), and Jeremiah Pinto (USDA Forest Service/Adjunct Faculty) have taught the class as a 204/404. The roster of instructors is fluid and can change depending on interest from others. Through multiple instructors, this course is a relatively small time commitment and will be managed through the annual PD process. This is not a required course, but offered to all students and in particular would be an asset to American Indian Studies and CNR degree seeking students.

REM 152 Rangeland Ecosystem Exploration (1 cr)

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)

Recommended Short Course Title: Rangeland Ecosystem Explrtn

Rationale: An internet exploration site called the World Rangeland Learning Exchange (www.wrangle.org) is in the final stages of development. This creates an opportunity for students to explore rangelands of the world in a new way. Furthermore, REM 151 (Rangeland Principles) is a two credit class that currently is completed in November of each fall semester. This creates an opportunity for the students to continue their understanding of rangelands in a class that would meet 3 hours per week for five weeks in November and December after REM 151 is complete. We considered adding a third credit to REM 151, however REM 151 is a Dual-Credit course that is currently taught in collaboration with high schools across Idaho. Therefore, it would be difficult to make REM 151 a 3-credit class. The instructor of this course is currently a member of the multi-university group (the Range Science Education Council) that is creating www.wrangle.org. This group will continue to develop and maintain the World Rangeland Learning Exchange. Therefore, little additional work will be necessary to maintain this course after the initial assignments and class protocol are developed. This initial development is underway in fall 2013 under and REM 204, Special Topics title. In addition, the course that usually covers rangeland ecosystems in the Rangeland Ecology and Management degree (REM 452-Western Rangeland Landscapes) is being dropped from the curriculum. Therefore, students in the REM degree will need a basic understanding of rangeland ecosystems throughout North America and the world.

REM 280 Introduction to Wildland Restoration (2 cr)

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.

Recommended Short Course Title: Intro to Wildland Restoration

Rationale: This course will further expand the s of courses focusing on restoration of wildland ecosystems. The course will be initially developed by extracting information from the more introductory aspects of REM 440. Some additional information will be added to prepare students for higher-level classes in ecology and restoration. This class will be developed by a team of professors in the FRFS Department including Beth Newingham, Karen Launchbaugh, and Anthony Davis. A graduate assistant will help in the development and instruction of this course. The course is important to build a growing emphasis on restoration ecology in the Forest, Rangeland, and Fire Sciences Department.

REM J480/J580 Ecological Restoration (3 cr)

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

Rationale: This course will further expand the s of courses focusing on restoration of wildland ecosystems. Dr. Newingham will establish this course as her graduate course to fulfill expectations outlined in her initial offer to join the faculty of the University of Idaho a few years ago. The course is important to build a growing emphasis on restoration ecology in the Forest, Rangeland, and Fire Sciences Department.

REM J495/J595 Teaching Practicum (1-3 cr, max arr)

Provides students with peer teaching experience and assisting an instructor. May include classroom 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

Rationale: These teaching practicums have previously been offered as Rem 402 and REM 597. Thus, these courses are already taught by faculty in the Rangeland Ecology and Management program. No additional resources are needed. The goal of adding this course is to provide students the opportunity to show coursework designed to build knowledge and skill in teaching on their transcripts.

2. Change the following courses [Effective: Summer 2014]

**For 274 Forest Measurement and Inventory (3 cr)**

Practical techniques for the design and execution of vegetation measurements for the inventory of forests, shrublands, and fire-fuels. Three one-hour lectures and one three-hour lab per week. (Fall only)

Prereq: Math 143; or SAT math score of 610 or above, or ACT math score of 27 or above.

Prereq or Coreq: Math 144

Coreq: Stat 251

Rationale: 7 years ago this course was combined with a sampling / statistics of forestry course. At that time, STAT251 was a logical co-req/preq. Currently, the sampling / statistics course is taught separately as FOR 373. As such, we request that the STAT251 coreq be dropped and that students seeking to enter this course focus rather on algebra and trig. This further opens the course to receiving first year students in addition to sophomores as many entering students will test out of the algebra and trig requirements.

**For 426 Global Fire Ecology and Management (3 cr)**

Credit may only be earned in For 326 or For 426, but not both. This course is only available to distance education students. Integrated fire-related ecological effects of fire on vegetation, soils, and air quality; natural and changing role of fire in forests, woodlands, shrublands and rangelands; influence of global change including climate and invasive species; fire as a management tool; application to current issues. One-day field trip. (Fall only)

Prereq: For 221 or REM 221; and Instructor Permission

Rationale: Students’ on-campus should either take FOR326 as undergraduate students or FOR526 as graduate students. This course is designed specifically for distance education students. As it is an online class there will no longer be a field trip.

**For 427 Prescribed Burning Lab (3 cr)**

Planning, conducting and evaluating prescribed burns designed to accomplish natural resource management objectives. Sampling, models and analysis used in writing required fire use plan. 5 days of field trips; some on Saturdays. (Fall only)

Prereq: For 426, REM 244, and Senior standing; and Permission

Prereq or Coreq: For 426

Rationale: The prerequisite FOR 426 changed its course number to FOR 326.

**For 430 Forest Operations (3 cr)**

Overview of the primary equipment and harvesting systems used in modern forest operations, including field design, layout, and administration of timber sales, logging production and cost estimation, laws, and certification. A brief introduction to quantitative forest planning methods is also provided. There are 2-3 early morning trips and one Saturday field lab. (Fall only)

Prereq: Math 144; and Phys 100/100L or Phys 111/111L

Prereq or Coreq: Math 144

Rationale: This allows students to take Math 144 simultaneously, rather than waiting an additional year to enroll in FOR 430. It had been faculty member’s intention to add Math 144 as either pre-requisite or co-requisite in 2012; it was added as pre-requisite only.

**For 431 Low Volume Forest Roads (2 cr)**

Design and field layout of access roads for forest management, through a combination of field labs and use of modern, GIS-based forest road engineering software. Field study includes design of at least one current industry or agency forest road design project. There are 2-3 early morning trips and one Saturday field lab. (Fall, Alt/yrs)

Prereq or Coreq: Math 144

Coreq: For 430 or Permission

Rationale: This allows students to take Math 144 simultaneously, rather than waiting an additional 1-2 years to enroll in FOR 431, which is offered in alternate years. It had been faculty member’s intention to add Math 144 as either pre-requisite or co-requisite in 2012; it was added as pre-requisite only.

**For 436 Cable Systems (2 cr)**

Overview of the major cable logging systems. Trigonometry and physical mechanics of cable systems, including analysis of forces, tensions, and payload capacity. Field layout and analysis of cable corridors using small yarders on the UI Experimental Forest using integrated field planning and GIS-based cable system design software. There are 2-3 early morning trips and one Saturday field lab. (Fall, Alt/yrs)
Prereq or Coreq: Math 144  
Coreq: For 430 or Permission

Rationale: This allows students to take Math 144 simultaneously, rather than waiting an additional 1-2 years to enroll in FOR 436, which is offered in alternate years. It had been faculty member’s intention to add Math 144 as either pre-requisite or co-requisite in 2012; it was added as pre-requisite only.

For 450  Fire Behavior (2 cr)
Understand the physical and chemical processes controlling combustion and fire behavior. Gain in-depth knowledge of commonly-used, point-scale fire behavior models and tools, including key assumptions and limitations. Critically review and discuss scientific literature, current topics, and case studies. Lab sessions include designing and undertaking small-scale fire behavior experiments, developing simple quantitative models, and a field trip.
Prereq: For 426 or 426; and Phys 100/100L or Phys 111/111L 
Coreq: For 433

Rationale: The previous prerequisite, FOR 426, has changed in course number and content to FOR 326. The content of FOR 326 is a more appropriate prerequisite for FOR 450.

For 451  Fuels Inventory and Management (3 cr)
Tools, quantitative analysis, and approaches for inventory and management of fuels for wildland fires over large, diverse areas in forests, woodlands, shrubland, and grasslands. Critically review and synthesize relevant scientific literature. Field trips.
Prereq: For 375, REM 244 and For 274 or REM 411 
Coreq: For 450

Rationale: This course is currently taught online and should not have any required field trips. This course is part of the Certificate in Fire Ecology and Management and directed at off-campus students.

For J454/J554  Air Quality and Smoke Management (3 cr)
Assessment of the controls and drivers of emission processes and impacts on air quality from agricultural, prescribed, and wildfires. Overview of the combustion and emission process, how these emissions impact the ‘quality of air’, and what models exist to monitor the emission. Other topics to include: recent EPA and other guidelines for smoke management planning, attainment issues, collaborative process for implementing smoke management plans. Additional work required for graduate credit.
Prereq: For 426 or 426

Rationale: The previous prerequisite, FOR 426, has changed in course number and content to FOR 326. The content of FOR 326 is a more appropriate prerequisite for FOR 450.

REM 460  Rangeland Ecology Current Topics Integrating GIS and Field Studies in Rangelands (1-2 cr)
Discussion of topics related to changing knowledge and technology relevant to ecology of grasslands, shrublands and woodlands. Min. five-six integrated GIS labs; discussion classes; one five-day field trip. Required for REM majors. (Fall only)
Coreq: REM 459

Recommended Short Course Title: Rangeland GIS & Field Studies

Rationale: Six GIS labs and associated lab reports are added to the course to replace five discussion periods. The GIS analysis and lab reports will increase the work load by one credit. This change came out of recommendations from the program accreditation team and from student evaluations. We are increasing credits for this course, and we are removing one course (REM 452) from the degree plan, so the faculty workload and total credits required in the degree are not changing.

RMAT 438  Introduction to Lignocellulosic Chemistry (1 cr)
The chemistry of lignocellulosic fiber (natural fiber and wood) formation and structure. Two lectures a week for the first half of the semester. This course meets concurrently with RMAT 538. (Spring only)
Prereq: Chem 101 or Chem 111; and Chem 275 or Chem 277

Rationale: We are adding Chem 275 (Carbon Compounds I) or Chem 277 (Organic Chemistry I) as prerequisites to ensure that students have sufficient background for the course material. Chem 111 has also been added as an alternative prerequisite for CHEM 101, since Chem 111 is a prerequisite for Chem 277. This course meets concurrently with RMAT 538 for the first third of the semester. RMAT 538 (3 credits) continues for the remainder of the semester with more advanced material.

RMAT J436/J536  Biocomposites (3 cr)
Raw material, processes, properties, and their applications for a number of natural fiber and wood composites made of veneers, particles and fibers. Additional projects and assignments reqd for grad cr. Two half day field trips. Two lectures and one 3-hr lab a week. Recommended Preparation: RMAT 321. REM 536 only: Cooperative: open to WSU degree-seeking students. (Fall only)
Prereq: Chem 101 and RMAT 321; and Chem 275 or Chem 277
Rationale: This is a very specialized class for which the pool of students is small. A greater number of students attending the class will increase the efficiency of offering the course.

**RMat 538 Lignocellulosic Biomass Chemistry (3 cr)**
The chemistry of lignocellulosic fiber (natural fiber and wood) formation, agricultural/natural fiber and wood structure and reactions of lignocellulosic compounds. Two lec and one 3-hr lab a wk.  Recommended Preparation: Chem 101, Chem 275, and RMat 321.  
**Cooperative:** open to WSU degree-seeking students.  (Spring only)  
**Prereq:** Chem 101 and RMat 321; and Chem 275 or Chem 277

Rationale: This is a very specialized class for which the pool of students is small. A greater number of students attending the class will increase the efficiency of offering the course.

3. **Change the curricular requirements of Forest Resources (B.S.For.Res.)** [Effective: Summer 2014]

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 forest 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:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>Biol 115</td>
<td>Cells and the Evolution of Life (4 cr)</td>
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<tr>
<td>CSS 383</td>
<td>Natural Resource and Ecosystem Service Economics (3 cr)</td>
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<td>Econ 202</td>
<td>Principles of Microeconomics (3 cr)</td>
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<td>For 102</td>
<td>Introduction to Forest Management (1 cr)</td>
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<td>For 235 cr</td>
<td>Society and Natural Resources (3 cr)</td>
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<td>CSS 235</td>
<td>Introduction to Forest Insects (2 cr)</td>
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<td>For 274</td>
<td>Forest Measurement and Inventory (3 cr)</td>
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<td>For 320</td>
<td>Dendrology (4 cr)</td>
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<td>For 424</td>
<td>Forest Dynamics and Management (4 cr)</td>
<td></td>
</tr>
<tr>
<td>For 430</td>
<td>Forest Operations (3 cr)</td>
<td></td>
</tr>
<tr>
<td>For 462</td>
<td>Watershed Science and Management (3 cr)</td>
<td></td>
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<tr>
<td>For 463</td>
<td>Forest Operations (3 cr)</td>
<td></td>
</tr>
<tr>
<td>For 468</td>
<td>Forest and Plant Pathology (2 cr)</td>
<td></td>
</tr>
<tr>
<td>For 484</td>
<td>Forest Policy and Administration (2 cr)</td>
<td></td>
</tr>
<tr>
<td>Math 143</td>
<td>Pre-calculus Algebra and Analytic Geometry (3 cr)*</td>
<td></td>
</tr>
<tr>
<td>Math 144</td>
<td>Analytic Trigonometry (1 cr)</td>
<td></td>
</tr>
<tr>
<td>NR 101</td>
<td>Exploring Natural Resources (1 cr)</td>
<td></td>
</tr>
<tr>
<td>Soil 205, 206</td>
<td>The Soil Ecosystem and Lab (4 cr)</td>
<td></td>
</tr>
<tr>
<td>Stat 251</td>
<td>Statistical Methods (3 cr)</td>
<td></td>
</tr>
</tbody>
</table>

One of the following (4 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Biol 116</td>
<td>Organisms and Environments (4 cr)</td>
<td></td>
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<tr>
<td>PiSc 205</td>
<td>General Botany (4 cr)</td>
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One of the following (4 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 101</td>
<td>Introduction to Chem I (4 cr)</td>
<td></td>
</tr>
<tr>
<td>Chem 111</td>
<td>Principles of Chem I (4 cr)</td>
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</tr>
</tbody>
</table>

One of the following (3 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl 313</td>
<td>Business Writing (3 cr)</td>
<td></td>
</tr>
<tr>
<td>Engl 317</td>
<td>Technical Writing (3 cr)</td>
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</tr>
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</table>

One of the following (3 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 221</td>
<td>Ecology (3 cr)</td>
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<tr>
<td>REM 221</td>
<td>Ecology (3 cr)</td>
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</table>

One of the following (4 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phys 100,</td>
<td>Fundamentals of Physics and Lab (4 cr)</td>
<td></td>
</tr>
<tr>
<td>Phys 100L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phys 111,</td>
<td>General Physics I and Lab (4 cr)</td>
<td></td>
</tr>
<tr>
<td>Phys 111L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Restricted Electives (11 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgEc 477</td>
<td>Law, Ethics, and the Environment (3 cr)</td>
<td></td>
</tr>
<tr>
<td>Biol 213</td>
<td>Principles of Biological Structure and Function (4 cr)</td>
<td></td>
</tr>
<tr>
<td>Biol 421</td>
<td>Advanced Evolutionary Biology (3 cr)</td>
<td></td>
</tr>
</tbody>
</table>
CSS 486  Public Involvement in Natural Resource Management (3 cr)
CSS 490  Wilderness and Protected Area Management (3 cr)
Fish 314  Fish Ecology (3 cr)
Fish 415  Limnology (4 cr)
Fish 430  Riparian Ecology and Management (3 cr)
For 426  Global Fire Ecology and Management (3 cr)
For 427  Prescribed Burning Lab (3 cr)
For 430  Forest Operations (3 cr)
For 431  Low Volume Forest Roads (2 cr)
For 436  Cable Systems (2 cr)
For 472 or REM 472  Remote Sensing of the Environment (4 cr)
For 497  Senior Thesis (2-4 cr)
Geog 301  Meteorology (3 cr)
Geog 385  GIS Primer (3 cr)
Geol 111, Geol 111L  Physical Geology for Science Majors (4 cr)
Math 160  Survey of Calculus (4 cr)**
Math 170  Analytic Geometry and Calculus I (4 cr)**
PoIS 364 or CSS 364  Politics of the Environment (3 cr)
REM 407  GIS Applications in Fire Ecology and Management (2 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 (2 cr)
REM 459  Rangeland Ecology (2 cr)
REM 460  Integrating GIS and Field Studies in Rangelands (2 cr)
REM 497  Rangeland Ecology Current Topics and Field Studies (2 cr)
RMat 321  Renewable Materials Anatomy and Properties (3 cr)
RMat 444  Primary Products Manufacturing (3 cr)
Soil 446  Soil Fertility (1-3 cr)
Soil 454  Soil Development and Classification (3 cr)
Stat 431  Statistical Analysis (3 cr)
WLF 314  Wildlife Ecology I (3 cr)
WLF 316  Wildlife Ecology II (3 cr)
WLF 440  Conservation Biology (3 cr)

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.

Rationale: FOR 430 is added as a required course so it is being removed from the “Restricted Electives” list. FOR 326 added to Restricted Electives. Students may receive credit towards Restricted Electives for FOR 326 OR FOR 426, not both. For 326 is the on campus course, FOR 426 is the online course aimed at distance learners. PoIS 364 (Politics of the Environment) is cross listed as CSS 364. The change in the course list clarifies this point. REM 410 is a course that focuses on principles and REM 411 requires REM 410 as a prerequisite. Therefore, it is appropriate that REM 410 be added to the list of restricted electives. Students could therefore get credit for REM 410 or both REM 410 and REM 411.

4. Change the curricular requirements of **Rangeland Ecology and Management (B.S.Rangeland Ecol.-Mgt.)**
   **[Effective: Summer 2014]**

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

First and Second Years
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  Principles of Statistics (3 cr)
One of the following (4 cr):
Biol 213  Principles of Biological Structure and Function (4 cr)
PSc 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 (2-3 cr)
Fish 430  Riparian Ecology and 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 (4-2 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)
REM 460  Rangeland Ecology Current Topics and Field Studies (1 cr)
Soil 454  Pedology (3 cr) Soil Development and Classification (3 cr)
One of the following (3 cr):
AVS 474  Beef Cattle Science (3 cr)
AVS 476  Sheep 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)
One of the following (2-3 cr):
REM 429  Landscape Ecology (3 cr)
REM 452  Western Wildland Landscapes (2 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

Rationale:
1) REM 152  Rangeland Ecosystem Exploration (1 cr)
** New courses added to degree to provide basic information about variation among rangelands of the world with a focus on North America. Information in this course will cover some of the content currently covered in REM 452.

2) For 375  Introduction to Spatial Analysis for Natural Resource Management change from "2-3 cr" to "3 cr"
** This was an apparent error in the 2012-13 Catalog. This course is always been three credits.

3) REM 411  Ecological Monitoring and Analysis (2 cr)
** The number of credits in this course was reduced from 4 to 2 in last year’s catalog.

4) REM 460  Integrating GIS and Field Studies in Rangelands (2 cr)
** Change title and increase credits from 1 to 2 to provide greater depth in geospatial analysis of rangeland ecosystems. Some information offered in REM 429 & 452 will now be covered with this additional credit.

5) Soil 454  Change listing from "Soil Development and Classification” to “Pedology"
** The name of this course changed in last year’s catalog.

6) Add For 462 Watershed Science and Management (3 cr) as an option to Fish 430 Riparian Ecology and Management (3 cr),
** Both courses offer background information about water resources which is relevant to range management. Allowing students to
choose between For 462 or Fish 430 gives students an opportunity to meet personal interests and offers flexibility in scheduling
because For 462 is offered in fall and Fish 430 is a spring class.

7) Remove requirement for taking REM 429 Landscape Ecology (3 cr) or REM 452 Western Wildland Landscapes (2 cr)
** A broad understanding of rangeland ecosystems (covered in REM 452) will now be covered in REM 152 (which is an addition of 1
credit to the REM degree.
** A detailed understanding related to geospatial analysis of range landscapes (covered in REM 425) will now be covered in REM
460.
** The overall change involving the addition or REM 152 (1 cr), increasing credits of REM 460 (by 1 cr), and removing REM 429 or
452 from the degree requirements will result in no change or a reduction in overall required rangeland credits in the degree.

5. Change the curricular requirements of Renewable Materials (B.S.Renew.Mat.) [Effective: Summer 2014]

Required course work includes the university requirements (see regulation J-3 on page Error! Bookmark not defined.) and one of the
following options:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 201</td>
<td>Introduction to Financial Accounting</td>
<td>3 cr</td>
</tr>
<tr>
<td>Acct 202</td>
<td>Introduction to Managerial Accounting</td>
<td>3 cr</td>
</tr>
<tr>
<td>Biol 102, Biol 102L</td>
<td>Biology and Society and Lab (4 cr)</td>
<td>4 cr</td>
</tr>
<tr>
<td>BLaw 265</td>
<td>Legal Environment of Business</td>
<td>3 cr</td>
</tr>
<tr>
<td>Comm 101</td>
<td>Fundamentals of Public Speaking</td>
<td>2 cr</td>
</tr>
<tr>
<td>CSS 383</td>
<td>Natural Resource and Ecosystem Service Economics</td>
<td>3 cr</td>
</tr>
<tr>
<td>Econ 202</td>
<td>Principles of Microeconomics</td>
<td>3 cr</td>
</tr>
<tr>
<td>For 235 or</td>
<td>Society and Natural Resources</td>
<td>3 cr</td>
</tr>
<tr>
<td>CSS 235</td>
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<td></td>
</tr>
<tr>
<td>For 375</td>
<td>Introduction to Spatial Analysis for Natural Resource Management</td>
<td>3 cr</td>
</tr>
<tr>
<td>NR 101</td>
<td>Exploring Natural Resources</td>
<td>1 cr</td>
</tr>
<tr>
<td>Phys 111</td>
<td>General Physics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>Stat 251</td>
<td>Statistical Methods</td>
<td>3 cr</td>
</tr>
<tr>
<td>RMat 100</td>
<td>Introduction to Renewable Materials</td>
<td>2 cr</td>
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<tr>
<td>RMat 321</td>
<td>Properties of Renewable Materials</td>
<td>3 cr</td>
</tr>
<tr>
<td>RMat 436</td>
<td>Biocomposites</td>
<td>3 cr</td>
</tr>
<tr>
<td>RMat 438</td>
<td>Introduction to Lignocellulosic Chemistry</td>
<td>1 cr</td>
</tr>
<tr>
<td>RMat 444</td>
<td>Primary Products Manufacturing</td>
<td>3 cr</td>
</tr>
<tr>
<td>RMat 450</td>
<td>Biomaterials Deterioration and Protection</td>
<td>2 cr</td>
</tr>
<tr>
<td>RMat 491</td>
<td>Biomaterial Product and Process Development Lab</td>
<td>2 cr</td>
</tr>
<tr>
<td>RMat 495</td>
<td>Product Development and Brand Management</td>
<td>3 cr</td>
</tr>
<tr>
<td>RMat 498</td>
<td>Renewable Natural Resources Internship</td>
<td>1 cr</td>
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<tr>
<td>One of the following (4 cr):</td>
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<tr>
<td>Chem 101</td>
<td>Introduction to Chemistry I</td>
<td>4 cr</td>
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<tr>
<td>Chem 111</td>
<td>Principles of Chemistry I</td>
<td>4 cr</td>
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<tr>
<td>One of the following (3 cr):</td>
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<tr>
<td>Chem 275</td>
<td>Carbon Compounds</td>
<td>3 cr</td>
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<tr>
<td>Chem 277</td>
<td>Organic Chemistry I</td>
<td>3 cr</td>
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<td>One of the following (3-4 cr):</td>
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<tr>
<td>Engl 313</td>
<td>Business Writing</td>
<td>3 cr</td>
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<td>Engl 317</td>
<td>Technical Writing</td>
<td>3 cr</td>
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<td>One of the following (3 cr):</td>
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<tr>
<td>For 221</td>
<td>Ecology</td>
<td>3 cr</td>
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<tr>
<td>REM 221</td>
<td>Ecology</td>
<td>3 cr</td>
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<td>One of the following (3-4 cr):</td>
<td></td>
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<tr>
<td>Math 143</td>
<td>Pre-calculus Algebra and Analytic Geometry</td>
<td>3 cr</td>
</tr>
<tr>
<td>Math 160</td>
<td>Survey of Calculus</td>
<td>3-4 cr</td>
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<tr>
<td>Math 170</td>
<td>Analytic Geometry and Calculus</td>
<td>4 cr</td>
</tr>
<tr>
<td>Restricted Electives (24-21 cr):</td>
<td></td>
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<tr>
<td>Acct 482</td>
<td>Enterprise Accounting</td>
<td>3 cr</td>
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<tr>
<td>Arch 154</td>
<td>Introduction to Architectural Graphics</td>
<td>3 cr</td>
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<tr>
<td>Arch 266</td>
<td>Materials and Methods</td>
<td>3 cr</td>
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<tr>
<td>Arch 462</td>
<td>Building Technology II - Concrete</td>
<td>2 cr</td>
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<tr>
<td>Arch 463</td>
<td>Environmental Control Systems</td>
<td>3 cr</td>
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</table>
Arch 464     Environmental Control Systems II (3 cr)
BAE 485     Fundamentals of Bioenergy and Bioproducts (3 cr)
BAE 492     Biofuels (3 cr)
BAE 494     Thermochemical Technologies for Biomass Conversion (3 cr)
Bus 101     Introduction to Business Enterprises (3 cr)
Bus 190     Integrated Business and Value Creation (3 cr)
Bus 301     Financial Resources Management (3 cr)
Bus 311     Introduction to Management (3 cr)
Bus 321     Marketing (3 cr)
Bus 340     Team Building and Group Dynamics (2 cr)
Bus 341     Business Systems (4 cr)
Bus 342     Product and Process Planning (3 cr)
Bus 343     Planning and Decision Making in Organizations (2 cr)
Bus 344     Managing the Firm's Resources (3 cr)
Bus 345     Business Operating Decisions (3 cr)
Bus 350     Managing Information Systems Management (3 cr)
Bus 351     Introduction to Electronic Commerce (3 cr)
Bus 370     Process Management (3 cr)
Bus 378     Project Management (3 cr)
Bus 414     Entrepreneurship (3 cr)
Bus 415     New Venture Creation (3 cr)
Bus 424     Pricing Strategy and Tactics (3 cr)
Bus 456 or  Quality Management (3 cr)
Stat 301     Probability and Statistics (3 cr)
Chem 275     Carbon Compounds (3 cr)
Chem 277     Organic Chemistry I (3 cr)
Chem 278     Organic Chemistry I: Lab (1 cr)
Econ 272     Foundations of Economic Analysis (4 cr)
For 430     Forest Operations (3 cr)
For 431     Low Volume Forest Roads (2 cr)
For 436     Cable Systems (2 cr)
LArc 251     Introduction to Principles of Site Design (3 cr)
MSE 434     Fundamentals of Polymeric Materials (3 cr)
RMat 365     Wood Building Technology (3 cr)
RMat 538     Lignocellulosic Biomass Chemistry (3 cr)
Stat 301     Probability and Statistics (3 cr)

Courses to total 120 credits for this degree

Rationale: A calculus course is required as part of our accreditation standards with the Society of Wood Science and Technology, so either Math 160 or Math 170 satisfies the math requirement. We are adding Chem 275 or Chem 277 as a prerequisite for RMAT 438 (required course). Thus, we have moved these courses out of the restricted elective section into the required section and reduced the number of restricted elective credits from 24 to 21.

6. Change the curricular requirements of Fire Ecology and Management (Minor) [Effective: Summer 2014]

Fire Core (8 cr):
REM 326     Fire Ecology and Management (3 cr)
For 436     Global Fire Ecology and Management (3 cr)
REM 244     Wildland Fire Management (2 cr)

One of the following (3 cr):
For 427     Prescribed Burning Laboratory (3 cr)
For 433     Fire and Fuel Modeling (2 cr)
For 450     Fire Behavior (2 cr)

Ecology (2-3 cr):
For 330     Forest Soil and Canopy Processes (4 cr)
REM 429     Landscape Ecology (3 cr)
REM 440     Wildland Restoration Ecology (3 cr)
REM 459     Rangeland Ecology (2 cr)
REM 460     Integrating GIS and Field Studies in Rangelands (4-2 cr)
WLF 314     Wildlife Ecology I (3 cr)

Applied Tools and Technology (3 cr):
For 435     Remote Sensing of Fire (3 cr)
Geog 301     Meteorology (3 cr)
Courses to total 20 credits for this minor, with at least 12 credits in courses numbered 400 or above.

Rationale: FOR 326 is the on-campus course required for this minor. FOR 326 is more appropriate for this minor than FOR 426, which is directed at online students.

7. Change the curricular requirements of **Rangeland Ecology and Management** (Minor) [Effective: Summer 2014]

**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 (2-2 cr) Rangeland Ecology Current Topics and Field Studies (2 cr)

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

Two of the following courses (6 cr):
**REM 410** Principles of Vegetation Measurement and Assessment (2 cr)^1^
**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) (3 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 426** Global Fire Ecology and Management (3 cr)
**For 462** Watershed Management (3 cr)
**PIsc 338** Weed Control (3 cr)
**PIsc 410** Invasive Plant Biology (3 cr)
**REM 244** Wildland Fire Management (2 cr)
**Soil 454** Pedology (3 cr) Soil Development and Classification (3 cr)
**WLF 314** Wildlife Ecology I (3 cr)

Courses to total 20 credits for this minor

Rationale:
1) REM 410 is a course that focuses on principles and REM 411 requires REM 410 as a prerequisite. Therefore, it is appropriate that REM 410 be added to the minor. Students could therefore get credit for REM 410 or both REM 410 and 411 in the REM minor.
2) FOR 426 is an online class that is designed for students off campus whereas FOR 326 is designed for on campus students. Therefore, FOR 326 is a better option for student seeking a minor in Rangeland Ecology and Management.
3) In the 2013-14 UI Catalog, the name of SOIL 454 was changed to Pedology.

8. Change the curricular requirements of **Fire Ecology, Management and Technology Academic Certificate** (UG Academic Certificate) [Effective: Summer 2014]

**Note:** A grade of 'B' or higher is required in all coursework for this academic certificate.

Fire Ecology Course Group (3 cr):
**For 326** Fire Ecology and Management (3 cr)
For 426       Global Fire Ecology and Management (3 cr)
For 526       Fire Ecology (3 cr)

Ecology Course Group (2-3 cr):
For 330       Forest Soil and Canopy Processes (4 cr)
For 531       Invasion Biology (3 cr)
REM 429       Landscape Ecology (3 cr)
REM 440       Wildland Restoration Ecology (3 cr)
REM 459       Rangeland Ecology (2 cr)
REM 460       Integrating GIS and Field Studies in Rangelands (4-2 cr)

Ecology Course Group Current Topics and Field Studies (2 cr)

Fuels and Fuels Management Course Group (3 cr):
For 427       Prescribed Burning Lab (3 cr)
For 433       Fire and Fuel Modeling (2 cr)
For 450       Fire Behavior (2 cr)
For 451       Fuels Inventory and Management (3 cr)

Applied Tools and Analysis Course Group (2-3 cr):
For 375       Introduction to Spatial Analysis for Natural Resource Management (3 cr)
For 435 or For 535 Remote Sensing of Fire (3 cr)
For 472 or REM 472 Remote Sensing of the Environment (4 cr)
For 570       Advanced Remote Sensing Measurement Methods (3 cr)
For 572       Spatial and Biophysical Modeling (3 cr)
Geog 475      Intermediate GIS (3 cr)
REM 407       GIS Application in Fire Ecology and Management (2 cr)

Management, Planning and Policy Course Group (2-3 cr):
CSS 490       Wilderness and Protected Area Management (3 cr)
CSS 573       Planning & Decision Making for Watershed Management (3 cr)
For 424       Forest Dynamics and Management (4 cr)
For 430       Forest Operations (3 cr)
For 454       Air Quality and Smoke Management (3 cr)
For 462       Watershed Science and Management (3 cr)
For 484       Forest Policy and Administration (2 cr)
For 529       Forest Ecosystem Analysis (3 cr)
For 585       Natural Resources Policy Analysis (2 cr)
REM 456       Integrated Rangeland Management (3 cr)
WLF 492       Wildlife Management (4 cr)

Electives to total 15 for the certificate

Rationale: Add FOR 451 Fuels Inventory and Management (3 cr) into the Fuels and Fuel Management bin, this is one of the only classes taught online in this subject area and is directly applicable to this bin. Change Applied Tools and Analysis Course group from 3 cr to 2-3 cr. To allow students to take only one course in this bin, as only one is taught online.

Natural Resources

1. Add the following course [Effective: Summer 2014]

NR 511 Preparing Scientific Manuscripts (1 cr)
Details the preparation of manuscripts for thesis chapters and submission to peer-reviewed journals. Exercises include identifying scope, unique requirements for manuscript parts, use of graphing and reference database tools, editing and peer reviewing. Two 75 min classes per week, first half of semester. Second half of semester involves weekly writing workshops to finalize projects. Entry into class requires possession of analyzed dataset.
Prereq: Instructor Permission

Recommended Short Course Title: Preparing Science Manuscripts

Rationale: There is large demand for assistance with manuscript preparation among university students. Graduate students are often required to prepare publishable manuscripts to include in their thesis. Faculty repeatedly instruct individual students on the steps to manuscript preparation. This class achieves both objectives by providing graduate students with the information required to draft complete scientific manuscripts. As currently offered it requires little faculty effort because students read and review each other’s manuscripts. The course will be taught by Mark Coleman (FRFS) and Troy Hall (CSS). Because the course is taught by instructors from two departments in Natural Resources, and because the course is likely to have wide appeal across students in CNR
and across campus, it was decided to offer this class with an NR prefix (rather than For or CSS prefix). This also creates the opportunity for us professors from other departments in CNR to offer the course.


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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol 115</td>
<td>Cells and the Evolution of Life</td>
<td>4 cr</td>
</tr>
<tr>
<td>Biol 116</td>
<td>Organisms and Environments</td>
<td>4 cr</td>
</tr>
<tr>
<td>Biol 213</td>
<td>Principles of Biological Structure and Function</td>
<td>4 cr</td>
</tr>
<tr>
<td>Comm 101</td>
<td>Fundamentals of Public Speaking</td>
<td>2 cr</td>
</tr>
<tr>
<td>CSS 383</td>
<td>Natural Resource and Ecosystem Service Economics</td>
<td>3 cr</td>
</tr>
<tr>
<td>Engl 317</td>
<td>Technical Writing</td>
<td>3 cr</td>
</tr>
<tr>
<td>For 235 or</td>
<td>Society and Natural Resources</td>
<td>3 cr</td>
</tr>
<tr>
<td>CSS 235</td>
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</tr>
<tr>
<td>For 375</td>
<td>Introduction to Spatial Analysis for Natural Resource Management</td>
<td>3 cr</td>
</tr>
<tr>
<td>NR 101</td>
<td>Exploring Natural Resources</td>
<td>1 cr</td>
</tr>
<tr>
<td>NR 200</td>
<td>(s) Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>Stat 251</td>
<td>Statistical Methods</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

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

One of the following (3-4 cr):
- Econ 202: Principles of Microeconomics
- Econ 272: Foundations of Economic Analysis

One of the following (3-4 cr):
- For 221: Ecology
- REM 221: Ecology

**Biol 314** Ecology and Population Biology (4 cr)

One of the following (4 cr):
- Math 160: Survey of Calculus
- Math 170: Analytic Geometry and Calculus I

One of the following (3-4 cr):
- For 320: Dendrology
- REM 341: Systematic Botany

Choose one of the following (1 cr):
- CSS 483: Senior Project Presentation
- Fish 483: Senior Project Presentation
- For 483: Senior Project Presentation
- REM 483: Senior Project Presentation
- WLF 483: Senior Project Presentation

Choose one of the following (3 cr):
- CSS 485: Ecology and Conservation Biology Internship
- Fish 485: Ecology and Conservation Biology Internship
- Fish 497: Senior Thesis
- For 485: Ecology and Conservation Biology Internship
- For 497: Senior Thesis
- NR 497: Senior Thesis
- REM 485: Ecology and Conservation Biology Internship
- REM 497: Senior Thesis
- WLF 485: Ecology and Conservation Biology Internship
- WLF 497: Senior Thesis

And one of the following options:

**A. Natural Resources Ecology Option**

The natural resources ecology option combines ecological theory, field experience, and quantitative tools to gain an interdisciplinary understanding of the structure and function of ecosystems. This field covers ecological topics from local, regional, and landscape scales while integrating the social and biophysical worlds.

To graduate in this option, students must achieve a "C" or better in the following six core courses: NR 200, For 330, REM 429, Soil 205/206, and WLF 316 or Fish 316.

For 330: Forest Soil and Canopy Processes
- REM 429: Landscape Ecology
- Soil 205: The Soil Ecosystem
- Soil 206: The Soil Ecosystem Lab
One of the following (3 cr):
Phys 100,   Fundamentals of Physics and Lab (4 cr)
Phys 100L
Phys 111,   General Physics I and Lab (4 cr)
Phys 111L

One of the following (2-4 cr):
WLF 316   Wildlife Ecology II (4 cr)
Fish 316   Principles of Population Dynamics (2 cr)

Quantitative Resource Analysis Restricted Electives (one course from the following):
CSS 310   Social Research Methods in Conservation (4 cr)
For 472 or   Remote Sensing of Environment (4 cr)
REM 472
Geog 385   GIS Primer (3 cr)
REM 410   Principles of Vegetation Measurement and Assessment (2 cr)*
REM 411   Ecological Monitoring and Analysis (2 cr)*
Stat 431   Statistical Analysis (3 cr)
Stat 422   Sample Survey Methods (2 cr)
WLF 448   Fish & Wildlife Population Ecology (4 cr)

Resource Management Restricted Electives (one course from the following):
CSS 385   Conservation Management and Planning I (4 cr)
CSS 490   Wilderness and Protected Area Management (3 cr)
CSS 496   Monitoring Impacts in Protected Areas and Wilderness (3 cr)
Fish 418   Fisheries Management (4 cr)
For 424   Forest Dynamics and Management (4 cr)
For 462   Watershed Science and Management (3 cr)
REM 456   Integrated Rangeland Management (3 cr)
WLF 492   Wildlife Management (4 cr)

Ecology Restricted Electives (at least 2 credits from Fish 315, Fish 415, Fish 430, REM 460, and/or WLF 315) (10 cr):
Biol 421   Advanced Evolutionary Biology (3 cr)
Biol 478   Animal Behavior (3 cr)
Ent 469   Introduction to Forest Insects (2 cr)
Ent 472   Aquatic Entomology (3 cr)
Fish 314   Fish Ecology (3 cr)
Fish 315   Fish Ecology Lab (1 cr)
Fish 415   Limnology (4 cr)
Fish 430   Riparian Ecology and Management (3 cr)
For 326   Fire Ecology and Management (3 cr)
For 426   Global Fire Ecology and Management (3 cr)
For 468   Forest and Plant Pathology (2 cr)
Geog 410   Biogeography (3 cr)
Geog 450 or   Global Environmental Change (3 cr)
REM 450
MMBB 425   Microbial Ecology (3 cr)
PfSc 410   Invasive Plant Biology (3 cr)
REM 440   Wildland Restoration Ecology (3 cr)
REM 459   Rangeland Ecology (2 cr)
REM 460   Integrating GIS and Field Studies in Rangelands (1-2 cr)
WLF 314   Wildlife Ecology I (3 cr)
WLF 315   Wildlife Ecology I Lab (1 cr)
WLF 440   Conservation Biology (3 cr)

Social/Political Restricted Electives (one course from the following):
Comm 410   Conflict Management (3 cr)
CSS 387   Environmental Communication Skills (3 cr)
CSS 481   Conservation Leadership (3 cr)
CSS 486   Public Involvement in Natural Resource Management (3 cr)
CSS 489   Personalities and Philosophies in Conservation (3 cr)
CSS 492   Ecotourism Principles and Issues (3 cr)
CSS 493   International Land Preservation and Conservation Systems (3 cr)
For 484   Forest Policy and Administration (2 cr)
Geog 420   Land, Resources, and Environment (3 cr)
Hist 424   American Environmental History (3 cr)
Phil 452   Environmental Philosophy (3 cr)
PolS 364 or   Politics of the Environment (3 cr)
CSS 364
Courses to total 120 credits for this degree

*Note: Both REM 410 and REM 411 must be completed to satisfy Quantitative Resource Analysis Restricted Elective requirement.

B. Conservation Biology Option

The conservation biology option is centered around a multidisciplinary curriculum that provides students with training to work in jobs aimed at conserving the earth’s biodiversity. This option provides a broad-based education that covers biological diversity from the genetic level to the landscape level, and provides additional training in social sciences and management. In the words of Hunter (1996), “Conservation biology is cross-disciplinary, reaching far beyond biology into subjects such as philosophy, economics, and sociology; disciplines that are concerned with the social environment in which we practice conservation—as well as into subjects such as law and education that determine the ways we implement conservation.”

To graduate in this option, students must achieve a “C” or better in the following seven core courses: Biol 421, NR 200, REM 429, Phil 452, CSS 492 or CSS 493, Fish or WLF 316, and WLF 440.

Biol 421 Advanced Evolutionary Biology (3 cr)
Gene 314 General Genetics (3 cr)
Phil 452 Environmental Philosophy (3 cr)
REM 429 Landscape Ecology (3 cr)
WLF 440 Conservation Biology (3 cr)

One of the following (3-4 cr):
Biol 310 Genetics (4 cr)
Gene 314 General Genetics (3 cr)

One of the following (3 cr):
CSS 492 Ecotourism Principles and Issues (3 cr)
CSS 493 International Land Preservation and Conservation Systems (3 cr)

One of the following (2-4 cr):
WLF 316 Wildlife Ecology II (4 cr)
Fish 316 Principles of Population Dynamics (2 cr)

Quantitative Resource Analysis Restricted Electives (one course from the following):
CSS 310 Social Research Methods in Conservation (4 cr)
For 472 or Remote Sensing of Environment (4 cr)
REM 472
Geog 385 GIS Primer (3 cr)
REM 410 Principles of Vegetation Measurement and Assessment (2 cr)*
REM 411 Ecological Monitoring and Analysis (2 cr)*
Stat 422 Sample Survey Methods (2-3 cr)
Stat 431 Statistical Analysis (3 cr)
WLF 448 Fish & Wildlife Population Ecology (4 cr)

Resource Management Restricted Electives (one course from the following):
CSS 385 Conservation Management and Planning I (4 cr)
CSS 490 Wilderness and Protected Area Management (3 cr)
CSS 496 Monitoring Impacts in Protected Areas and Wilderness (3 cr)
Fish 418 Fisheries Management (4 cr)
For 424 Forest Dynamics and Management (4 cr)
For 462 Watershed Science and Management (3 cr)
REM 456 Integrated Rangeland Management (3 cr)
WLF 492 Wildlife Management (4 cr)

Ecology Restricted Electives (at least 2 credits from Fish 315, Fish 415, Fish 430, REM 460, and/or WLF 315) (6 cr):
Biol 478 Animal Behavior (3 cr)
Ent 469 Introduction to Forest Insects (2 cr)
Ent 472 Aquatic Entomology (3 cr)
Fish 314 Fish Ecology (3 cr)
Fish 315 Fish Ecology Lab (1 cr)
Fish 415 Limnology (4 cr)
Fish 430 Riparian Ecology and Management (3 cr)
For 330 Forest Soil and Canopy Processes (4 cr)
For 326 Fire Ecology and Management (3 cr)
For 426 Global Fire Ecology and Management (3 cr)
For 468 Forest and Plant Pathology (2 cr)
Geog 410 Biogeography (3 cr)
Geog 450 Global Environmental Change (3 cr)
REM 450
MMBB 425 Microbial Ecology (3 cr)
PlSc 410 Invasive Plant Biology (3 cr)
REM 440 Wildland Restoration Ecology (3 cr)
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<tr>
<td>REM 459</td>
<td>Rangeland Ecology (2 cr)</td>
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<tr>
<td>REM 460</td>
<td>Integrating GIS and Field Studies in Rangelands (1-2 cr)</td>
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<tr>
<td>REM 410</td>
<td>Principles of Vegetation Measurement and Assessment (1 cr)</td>
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<td>WLF 314</td>
<td>Wildlife Ecology I (3 cr)</td>
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<td>WLF 315</td>
<td>Wildlife Ecology I Lab (1 cr)</td>
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<td>Organismal Biology Restricted Elective (one course from the following):</td>
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<tr>
<td>Biol 481</td>
<td>Ichthyology (4 cr)</td>
</tr>
<tr>
<td>Biol 483</td>
<td>Mammalogy (3 cr)</td>
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<tr>
<td>Biol 489</td>
<td>Herpetology (4 cr)</td>
</tr>
<tr>
<td>WLF 482</td>
<td>Ornithology (4 cr)</td>
</tr>
<tr>
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<td>Social/Political Restricted Electives (one course from the following):</td>
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<tr>
<td>Comm 410</td>
<td>Conflict Management (3 cr)</td>
</tr>
<tr>
<td>CSS 387</td>
<td>Environmental Communication Skills (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>PoIS 364 or CSS 364</td>
<td>Politics of the Environment (3 cr)</td>
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Courses to total 120 credits for this degree

*Note: Both REM 410 and REM 411 must be completed to satisfy Quantitative Resource Analysis Restricted Elective requirement.

Rationale:
1. Biol 314 – Ecology and Population Biology is already accepted as an acceptable substitute for the basic ecology course required for all students enrolled in this program. The addition of Biol 314 as an option for students acknowledges something that is already in place.
2. In 2012, REM 357 was replaced with REM 410 – Principles of Vegetation Measurement and Assessment and REM 411 – Ecological Monitoring and Analysis. The change proposed for the ECB curriculum is to acknowledge that both these courses are replacements for REM 357, not only REM 411, and students should complete both courses. REM 410 is a co-requisite for REM 411.
3. In 2012 the Forest, Rangeland, and Fire Sciences Department decided to offer FOR 426 – Fire Ecology and Management as a course exclusively to distance students, enrolled in either the Fire Ecology, Management, and Technology certificate, the Restoration Ecology certificate, or the Master of Natural Resources program. For 426 – Fire Ecology and Management is a course developed which includes a required field trip and for on-campus students only. This change acknowledges that change.
4. CSS 481 – Conservation Leadership is not taught on-campus anymore. It is part of the curriculum offered at the McCall Field Campus only.
5. Biol 310 – Genetics has long been accepted as an acceptable substitute for Gene 314 – General Genetics. This proposed change acknowledges something that is already regularly approved by the program as an acceptable choice for students.