

# Agricultural Sciences



## OREGON STATE UNIVERSITY AGRICULTURE AT EASTERN OREGON UNIVERSITY

The Agriculture Program at Eastern is a cooperative effort between Oregon State University and Eastern Oregon University. The College of Agricultural Sciences offers educational programs to serve the needs of individuals interested in pursuing careers in agribusiness; agriculture; animal, plant and food systems; fisheries and wildlife; range and natural resources management; and more. The faculty realizes the importance of individual aims and abilities and through course work, internships, advising, and extracurricular activities, tries to help each student discover and develop social, aesthetic, and ethical values as well as professional competence. Undergraduate students may pursue the following bachelor of science degree programs through the OSU Agriculture Program at EOU:

Agricultural Business Management  
Crop and Soil Science  
Natural Resources  
Rangeland Ecology & Management.

All degrees are conferred by Oregon State University.

All freshmen and transfer students are admitted to Eastern and declare one of the agricultural majors. At the end of the sophomore year with completion of 90 credits of coursework and a satisfactory grade point average students are admitted to Oregon State University. Transfer students will be admitted to the program when their previous college work, plus additional coursework at Eastern, fulfill the 90-credit and

GPA requirements. Students must complete a minimum of 45 credits after admission to the program.

Each student is considered an important individual. His or her study program is developed in personal consultation with an on-site OSU faculty adviser in the area of his or her major interest.

### Internships

College of Agricultural Science departments and programs offer academic credit for learning achieved during supervised work experience. Internships are available in all facets of agriculture and natural resources through individual departmental offerings. Applications for internships must be approved prior to placement. Details are available from departmental advisers.

### Scholarships

Students in the OSU Agriculture Program at EOU are eligible to apply for scholarships from both institutions. The College of Agricultural Sciences and its departments offer a variety of scholarships to deserving students. Several are reserved for incoming high school or transfer students. Additional information and application forms for college-level scholarships are available online at <http://agsci.oregonstate.edu/student/schol.html> or from the Ag Office, Badgley Hall 205. For information about departmental scholarships contact the ag faculty advisers.

### Minors

The following minors are offered by the OSU Agriculture Program:

Agricultural Business Management  
Animal Science  
Crop Science  
Fish and Wildlife  
Rangeland Ecology and Management  
Resource Economics  
Soil Science

These minors are available to all EOU students. Students interested in pursuing a minor must first contact the advisor in the area of interest and meet the following requirements:

1. The minor must consist of a minimum of 27 designated credits of related course work, including 12 in upper division courses.
2. Courses required for the student's major may not count toward a minor.
3. An individual course may not count toward more than one minor.

## BACCALAUREATE CORE (48)\* AS OF 2005

### Skills (15)

Writing I (3)  
Writing II (3)  
Writing III (3)  
Mathematics (3)  
Fitness (3)

### Writing Intensive Course (WIC) (3)

AREC 461 Agricultural and Food Policy (4)  
CSS 315 Nutrient Management and Cycling (4)

### Perspectives (24)

Physical Science (with lab) (4 or 8)  
Biological Science (with lab) (4 or 8)  
Western Culture (3)  
Cultural Diversity (3)  
Literature and Arts (3)  
Social Processes and Institutions (3)  
Difference, Power and Discrimination (3)

**Synthesis (6)** Two courses used to fulfill the syntheses requirement may not be in the same department.

Contemporary Global Issues (3)  
Science, Technology, and Society (3)

A list of courses and specific departmental requirements of the Baccalaureate Core is available in the Agriculture Program Office.

## GRADUATION REQUIREMENTS

To be eligible for a Bachelor of Science (BS) degree, a student must complete:

Total Hours	180
Total Upper Division Hours	60
Total Agriculture Hours	36
Total Upper Division Agriculture Hours	24

At least 45 resident credits after admission to OSU

## ACADEMIC PROGRAMS IN AGRICULTURAL SCIENCES

### AGRICULTURAL AND RESOURCE ECONOMICS

The Department of Agricultural and Resource Economics offers a Bachelor of Science degree; in agricultural business management.

This degree opens doors to exciting careers in traditional areas of commercial agriculture, agricultural business management, agricultural policy, and in the newer career areas of natural resource and environmental management, international trade and development, rural growth and change, and environmental and resource law.

The Agricultural Business Management (ABM) degree prepares students for unique challenges and opportunities in agricultural business careers. The degree combines economics and business principles and their application to farms and ranches, companies processing and marketing farm products, and companies supplying goods and services to farmers and other businesses. The curriculum combines skills in

marketing, business management, accounting, and economic analysis with a minor appropriate to a student's professional goals and interests.

### AGRICULTURAL BUSINESS MANAGEMENT (ABM)

The BS in Agricultural Business Management degree curriculum blends course work in agricultural economics, business, and agricultural sciences to prepare graduates for the unique challenges and opportunities in agribusiness vocations.

All ABM students must select a minor (minimum of 27 credits) appropriate to their professional goals and interests. An internship or project is required to integrate course work with business-oriented experiences.

**Please note:** students must receive a "C-" or above in the courses listed below. If a student receives below a "C-" they must retake the course.

**AREC 211** Management in Agriculture (4)

**AREC 221** Marketing in Agriculture (3)

**ECON 201** Intro to Microeconomics (5)

**AREC 311** Microeconomic Theory (4)

**BA 211** Financial Accounting (4)

**BA 213** Managerial Accounting (4)

**ECON 202** Intro Macroeconomics (5)

**MATH 111** College Algebra (4)

**MATH 241** Survey of Calculus (4)

**STAT 243** Elementary Statistics (4)

**WR 121** English Composition (4)

**WR 217** Science Writing (3) or

**WR 320** Professional Writing (3)

### BS Degree Requirements (180)

#### Baccalaureate Core (~48)

-All courses marked with an asterisk (\*) must be passed with a "C-" or better.

-All courses with this symbol (†) are only available through OSU Ecampus – distance education.

### Agricultural and Resource Economics Core Courses

**AREC 121** Discovering Agricultural and Resource Economics (2)

**AREC 211** \*Management in Agriculture (4)

**AREC 221** \*Marketing in Agriculture (3)

**AREC 311** \*Intermediate Microeconomics Theory I (4)

**AREC 370** Agricultural Markets & Trade (3)

**AREC 407** Projects (6) or

**AREC 410** Internship (6)

**AREC 442** Agricultural Business Management (4)

**AREC 461** Agricultural & Food Policy Issues (4)

### Quantitative Courses

**AREC 447** Agricultural Price & Market Analysis (4)

### Upper Division Business Courses

Choose 2 courses of 3 credits or more as approved by adviser.

### Upper Division AREC or ECON Courses

Choose 12 credits or more as approved by adviser.

**Business Administration**

**BA 211** \*Financial Accounting (4)  
**BA 213** \*Managerial Accounting (4)  
**BA 254** Business Law (4) or  
**AREC 338** †Agricultural Law (4)  
**BA 313** Principles of Finance (5)

**Computers and Technology**

**BA 131** Business Data Processing (3)  
**BA 114** Spreadsheets (1)

**Social Sciences**

**ECON 201** \*Introduction to Microeconomics (5)  
**ECON 202** \*Introduction to Macroeconomics (5)

**Communications**

**WR 121** \*Expos Prose Writing (4)  
**SPCH 111** Interpersonal Comm (3) or  
**SPCH 112** Public Speaking (3)  
**BA 225** Business Report Writing (4)  
**WR 217** \*Science Writing (3) or  
**WR 320** \*Professional Writing (3)

**Mathematics/Statistics**

**MATH 111** \*College Algebra (4)  
**MATH 241** \*Survey of Calculus (4)

**Statistics**

**STAT 243** \*Elementary Statistics (4)  
**STAT 352** Statistics (4)

**Physical Science**

**CHEM 101** and **CHEM 101L** Intro Chemistry & Lab (4)

**Required Minor (additional 27 credit hours)**

Appropriate to student's professional goals and interests, must be approved by student's major adviser.

**BS Degree Requirements (180)****Baccalaureate Core (~48)**

-All courses marked with an asterisk (\*) must be passed with a "C-" or better.

-All courses with this symbol (†) are only available through OSU Ecampus – distance education.

**AREC MINORS**

Each minor in the AREC department is created to provide students within and outside the discipline the opportunity to study a secondary area. Each minor requires 27 credits of coursework in addition to the student's major. At least 12 of the 27 credits must be upper division. No credits counted toward the minor can be courses also counted toward the student's major.

Course checklists for each minor are updated annually. ABM Majors may not elect to complete an ABM minor.

**AGRICULTURAL BUSINESS MANAGEMENT MINOR**

**AREC 211** Management in Agriculture (4)  
**AREC 221** Marketing in Agriculture (3)

**AREC 311** Intermediate Microeconomic Theory I (4)

Complete a minimum of 10 credits from the following:

**AREC 370** Agricultural Markets & Trade (3)  
**AREC 382** †Farm and Ranch Appraisal (3)  
**AREC 441** Agricultural Financial Management (4)  
**AREC 442** Agricultural Business Management (4)  
**AREC 447** Agricultural Price & Market Analysis (4)  
**AREC 461** Agricultural and Food Policy Issues (4)  
**BA 313** Principles of Finance (5)

Choose additional courses from the list above or approved AREC or BA elective courses to reach 27 credits.

**RESOURCE ECONOMICS MINOR**

**ECON 201** Intro to Microeconomics (5)  
**AREC 311** Intermediate Microeconomic Theory I (4)  
**AREC 351** Natural Resource Economics & Policy (3)  
**ECON 475** Environmental Economics (5) or  
**AREC 352** †Environmental Economics & Policy (3)  
**AREC 461** Agricultural and Food Policy Issues (4)

Electives (including courses not otherwise taken above for a total of 27 or more credits)

**AREC 250** Intro to Environmental & Resource Economics (3)  
**AREC 253** †Evolution of U.S. Environmental & Natural Resource Law (4)  
**AREC 434** Environmental & Resource Economics (4)  
**AREC 454** Rural Development Economics and Policy (3)  
**ECON 202** Macroeconomics (5)  
**ECON 375** Macroeconomic Theory (5)  
**POLS 350** Public Policy (5)

**CROP AND SOIL SCIENCE**

The discipline of crop science provides the knowledge and understanding for technologies that contribute directly to improvements in production and quality of food, feed, fiber, seed, energy, and nutraceutical crops for the world. The art and science of plant improvement are key elements in efforts to feed, clothe and provide energy for the world's ever-growing population. Conventional and molecular tools assist in the development of new genetic strains of food and energy crops. Crop plants play an important role in the future of sustainable food and energy production.

The discipline of soil science provides the basic understanding of the physical, chemical, and biological properties of this important natural resource. Why is soil important? Soil is the fundamental substrate for life on terrestrial landscapes. Soil plays a vital role in sustaining human welfare and assuring future agricultural productivity and environmental stability. An understanding of global and local ecology depends on an awareness of the soil and its properties. Global information and mapping systems are essential tools for characterizing the landscape and its constituent soils.

Agronomists are crop and soil scientists who work to improve crops and agricultural productivity while effectively managing pests and weeds. Students in crop and soil science explore important contemporary issues faced by our society, including water quality and management, sustainability of different types of crop production, organic crop production, erosion and

sedimentation, growing crops for biofuel production, land-use and reclamation, genetic modification of crop plants, and soil quality and sustainability. An array of careers are available in such areas as crop production and management, new crop development, soil management, soil ecology, ecosystem restoration, agricultural business and marketing, etc.

The Crop Management degree option is available at Eastern. Additional degree options are available at Oregon State University's Corvallis campus.

### **CROP MANAGEMENT OPTION REQUIREMENTS:**

#### **Mathematics**

**MATH 111\*** College Algebra (4)  
**MATH 241** Survey Calculus (4)  
**STAT 243** Elementary Statistics (4)

#### **Biological Sciences**

**BIOL 101** Introductory Biology (3)  
**BIOL 102** Introductory Biology (3)  
**BIOL 103/104** Introductory Biology (4)  
**BOT 202** Plant Biology (5)

#### **Physical Sciences**

**CHEM 101** Intro to Chemistry (4)  
**CHEM 102** Intro to Chemistry (4)  
**CHEM 103** Intro to Chemistry (4)

#### **Crop And Soil Science Core**

**CSS 100** Orientation/Career Planning (1)  
**CSS 305** Principles of Soil Sci (4)  
**CSS 306** Problem Solving: Soil Sci Appl. (1)  
**CSS 315** (WIC) Nutrient Management & Cycling (4)  
**CSS 407** Senior Seminar (1)

#### **Crops Core**

**CSS 300** Intro to Crop Production (4)  
**CSS 415** Soil Fertility Management (3)  
**CSS 430** Plant Genetics (3)  
**CSS 480** Case Studies in Cropping Systems Mgmt (4)

#### **Plant Protection**

**BOT 350** Plant Pathology (4)  
**ENT 311** Intro to Insect Pest Mgmt (5)  
**CSS 440** Weed Management (4)

#### **Independent Studies**

Choose at least three credit from the following:  
**CSS 401** Research (1-3)  
**CSS 405** Reading & Conference (Career Plan/Job Search) (1)  
**CSS 410** Internship (1-6)

#### **Crop Management Electives**

Choose at least 12 credits from the following:  
**CSS 310** Forage Production (4)  
**CSS 321** Prin of Cereal Crop Production (1)  
**CSS 322** Prin of Potato Production (1)  
**CSS 330** World Food Crops (3)  
**CSS 395** World Soil Resources (3)  
**CSS 460** Seed Production (3)  
**CSS 466** Soil Morph & Class (4)

#### **Technology**

**GEOG 201** Cartography I (3) or  
**GEOL 310** Intro to GIS (5)

#### **Business**

**AREC 211** Management in Agriculture (4)  
**AREC 221** Marketing in Agriculture (3)  
**ECON 201** Intro to Microeconomics (4)  
**BA 131** Business Data Process (3)  
**BA 211** Financial Acct I (4)  
**BA 254** Business Law (4)

#### **Ecology** (choose one of the following)

**BIOL 357** General Ecology (4)  
**RNG 341** Rangeland Ecology & Management (3)

### **GRADUATION REQUIREMENTS**

Baccalaureate Core	48
<b>Total Required</b>	<b>180</b>

### **CSS MINORS**

Each minor in the CSS department is created to provide students within and outside the discipline the opportunity to study a secondary area. A total of 27 credits are required for completion of these minors, 12 of those credits must be upper division and at least 15 credits must be OSU courses.

### **CROP SCIENCE MINOR**

**CSS 300** Intro to Crop Production (4)  
**CSS 305** Principles of Soil Sci (4)  
**CSS 306** Problem Solving: Soil Sci Appl. (1)

#### **Electives**

Select 18 or more credits of the following CSS courses:

**CSS 199** Special Topics (1-16)  
**CSS 310** Forage Production (4)  
**CSS 321** Prin of Cereal Crop Production (1)  
**CSS 322** Prin of Potato Production (1)  
**CSS 330** World Food Crops (3)  
**CSS 407** Senior Seminar (1)  
**CSS 430** Plant Genetics (3)  
**CSS 440** Weed Management (4)  
**CSS 460** Seed Production (3)  
**CSS 480** Case Studies in Cropping Systems Mgmt (4)

### **SOIL SCIENCE MINOR**

**CSS 305** Principles of Soil Science (4)  
**CSS 306** Problem Solving: Soil Sci Appl (1)  
**CSS 315** Nutrient Mgmt & Cycling (4)  
**BIOL 101** Intro to Biology (3)  
**CHEM 101** Intro to Chemistry (4)  
**CHEM 102** Intro to Chemistry (4)

#### **Electives**

Select 7 or more credits of the following CSS courses:

**CSS 395** World Soils (3)  
**CSS 415** Fertility Mgmt (3)  
**CSS 466** Soil Morph & Classification (4)  
**CSS 480** Case Studies in Cropping Systems Mgmt (4)

### **NATURAL RESOURCES**

**(INTERDISCIPLINARY DEGREE)**

The Natural Resources degree program provides a broad-based approach to the study of natural resources. The curriculum is designed to produce graduates who can understand a broad range of natural resource issues, work with experts in a variety of resource fields, and deal with social and political components of resource management.

In addition to the baccalaureate core, the three main areas for coursework include: the Natural Resources Core (46 credits), Breadth Requirements (21 credits), and the Specialty Option (50 credits). Within these areas, students have a number of courses to choose from to fulfill requirements. Students acquire knowledge and background in physical and biological systems, math and statistics, natural resource policy, economics and decision-making. Breadth is acquired in seven key areas of resource management. Finally, students develop depth in the Specialty Option, choosing from a number of pre-approved options or creating an individualized Specialty Option. Not all Specialty Options are available through the Agriculture Program at Eastern Oregon University. The Arid Land Ecology Option is mostly supported by on-campus courses.

Only two courses used to complete the Natural Resources major requirement may be taken S/U. Grades of "C" or better are required in upper division Natural Resources Core courses, plus all Breadth requirements.

At EOU this degree is advised by the Rangeland Ecology & Management Department in conjunction with OSU College of Forestry, Natural Resources adviser.

\*-All courses marked with an asterisk (\*) must be passed with a "C-" or better.

†-All courses with this symbol (†) are only available through OSU Ecampus – distance education.

### **NATURAL RESOURCES CORE (46)**

#### **Mathematics**

**MATH 112** Pre-Calculus (4) or

**MATH 241** Survey of Calculus (4)

#### **Atmospheric Science**

**GEOG 106** Physical Geography (5) or

**GEO 323** †Climatology (4)

#### **Biology Series**

**BIOL 101** Intro to Biology (3)

**BOT 202** Plant Biology (5)

**BIOL 103** Intro to Biology (3)

**BIOL 104** Intro to Biology Lab (1) or

**BIOL 211** Principles of Biology (5)

**BIOL 212** Principles of Biology (5)

**BIOL 213** Principles of Biology (5)

#### **Earth Science**

**GEOG 201** Physical Geology (5) or

**CSS 205** †Sustainable Ecosystems (4)

#### **General Ecology**

**BIOL 357** \*General Ecology (4)

### **Natural Resources Decision Making**

**NR 455** †\*Natural Resource Decision Making (3)

### **Natural Resource Policy**

**RNG 490** \*Rangeland Management Planning (4)

### **Resource Economics**

**AREC 351** \*Natural Resources Economics and Policy (3) or

**AREC 352** †\*Environmental Economics and Policy (3)

### **Seminars (1) + (1)**

**CSS 407** Senior Seminar in Crops and Soils (1)

**AREC 121** Discovering Agricultural and Resource Economics (2) or

**CSS 100** Orientation and Career Planning in Crops and Soil Science (1) or

**RNG 101** Orientation to Careers in Rangeland Ecology and Management (1)

### **Statistics**

**STAT 243** Elementary Statistics (4)

### **Water Science**

**RNG 355** \*Desert Watershed Management (3)

Note: particular Specialty Option programs may specify additional core courses to assure that students meet prerequisites for option courses, or develop background in fields important for the option. Students should not assume that the core courses listed above include all of the necessary background in science or math for every option.

### **BREADTH (21)**

#### **Amenity Uses of Natural Resources**

**FOR 352** †Wilderness Management (3)

#### **Fisheries and Wildlife**

Choose one of the following:

**FW 481** †\*Wildlife Ecology (3)

**FW 435** †\*Wildlife in Agricult. Systems (Writing Intensive Course) (3)

**FW 323** †\*Mngt Principles of Pacific Salmon in the Northwest (3)

#### **Forestry**

**FOR 365** †\*Issues in Natural Resource Conservation (OSU Distance Course) (3)

#### **Land and Water**

Choose one of the following:

**CSS 395** \*World Soil Resources (3)

**CSS 305** \*Principles of Soil Science (4)

**RNG 455** †\*Riparian Ecology and Management (3)

**FW 479** †\*Wetlands and Riparian Ecology (3)

#### **Range**

Choose one of the following:

**RNG 341** Rangeland Ecology and Management (3)

**RNG 490** \*Range Management Planning (4)

#### **Resource Values/Philosophy**

Choose one of the following:

- HST 481** †\*Environmental History of the U.S. (3)  
**PHL 443** †\*World Views and Environmental Values (3)  
**FW 340** †\*Multicultural Perspectives in Natural Resources (3)

### Social and Political

Choose one of the following:

- GEOG 317** \*Land Use and the Environment (3)  
**AREC 353** †\*Public Land Statutes and Policy (4)  
**PS 475** †\*Environmental Politics and Policy (4)  
**SOC 480** †\*Environmental Sociology (3)  
**SOC 481** †\*Society and Natural Resources (3)

### Specialty Option (50)

Completion of the Arid Land Ecology Specialty Option may not meet Civil Service requirements for Range Conservationist or other federal job series. Baccalaureate Core courses may double as Natural Resource Core or Specialty Option courses when applicable. However, Natural Resource Core and Breadth Requirements may NOT be doubled up with classes in the Specialty Option. Completion of the Arid Land Ecology Specialty Option requires having prerequisites not shown above.

### Arid Land Ecology Specialty Option

Courses in Rangeland Ecology and Management (24 credits):

- RNG 101** Orientation to Careers in Rangeland Ecology & Management (1)  
**RNG 351** Range Ecology I: Grasslands (3)  
**RNG 352** Range Ecology II: Shrubland (3)  
**RNG 353** Wildland Plant Identification (4)  
**RNG 421** Wildland Restoration Ecology (4)  
**RNG 441** Rangeland Analysis (4)  
**RNG 442** Range Animal Relations (4)  
**RNG 446** †Wildland Fire Ecology (3)

### Courses in Animals, Plants, and Ecology (26 credits):

- ANS 311** Principles of Animal Nutrition (3)  
**BIOL 334** Plant Taxonomy (5)  
**BIOL 421** Agrostology (4)  
**BIOL 433** Plant Physiology (5)  
**CSS 305** Principles of Soil Science (4)  
**CSS 306** Problem Solving: Soil Science Applications (1)  
**CSS 466** Soil Morphology and Classification (4)

### RANGELAND ECOLOGY & MANAGEMENT

Rangeland resource management is one of the family of natural resources professions important to the social, economic, and political development of Oregon, the nation, and the world. It is based upon ecological principles and is concerned with the restoration, improvement, conservation, and use of rangelands. Since range management is practiced on lands producing domestic and wild animals, timber, water, and recreation, concepts of integrated land use are included in the curriculum. A balance among soil, domestic animal, wildlife, ecology, and other biological sciences is realized in the educational program.

The curriculum below includes university and departmental requirements for the BS degree and provides emphasis either in science, management, ecology, or allied disciplines. Facilities for study include classroom and field-oriented

educational environments both on-campus and at locations throughout Oregon. Field trips are taken in conjunction with specific courses.

Summer employment with private industry, government agencies, and on range research projects makes possible learning experiences while earning a salary. Employment opportunities include resource management, research, Extension, ranch management, college and university teaching, business and industrial activities related to rangeland resources, and foreign agricultural and resource development assistance.

The Department of Rangeland Ecology and Management is accredited by the Society for Range Management. It is recognized throughout the country as one of the leading institutions of rangeland management.

### RANGELAND ECOLOGY & MANAGEMENT CORE

- CHEM 101** Intro to Chemistry (4)  
**CHEM 102** Intro to Chemistry (4)  
**CHEM 103** Intro to Chemistry (4)  
**BIOL 101** Intro to Biology (3)  
**BOT 202** Plant Biology (5)  
**BIOL 357** General Ecology (4)  
**BIOL 320** Ornithology (3) or  
**FW 251** Principles of Wildlife (3)  
**BIOL 433** Plant Physiology (5)  
**BIOL 334** Plant Taxonomy (5)  
**BIOL 421** Agrostology (4)  
**CSS 305** Principles of Soil Science (4)  
**CSS 306** Problem Solving Soil Science (1)  
**CSS 466** Soil Morphology and Class (4)  
**ECON 201** Principles of Economics (5)  
**AREC 351** Natural Resource Economics and Policy (3)  
**MATH 241** Survey of Calculus (4)  
**STAT 243** Elementary Statistics (4)  
**ANS 311** Principles of Animal Nutrition (3)  
**ANS 443** Beef Production (3)  
**GEOL 201** Physical Geology (5)  
**FOR 111** Introduction to Forestry (3)  
**CSS 310** Forage Production (4)  
**RNG 101** Orientation to Careers in Rangeland Ecology & Management (1)  
**RNG 341** Rangeland Ecology & Management (3)  
**RNG 351** Range Ecology I – Grasslands (3)  
**RNG 352** Range Ecology II - Shrublands (3)  
**RNG 353** Wildland Plant Identification (4)  
**RNG 355** Desert Watershed Management (3)  
**RNG 421** Wildland Restoration Ecology (4)  
**RNG 441** Range Analysis (4)  
**RNG 442** Rnglnd - Animal Relations (4)  
**RNG 490** Rnglnd Management Planning (4)

Each student will take core coursework plus additional courses in one of the three options available at EOU.

Option coursework must include a minimum of 15 upper division credits. Students must choose one option.

### Range Science Option (27 credits)

- CSS 430** Plant Genetics (3)  
**PHYS 201** Physics (4)

**PHYS 202** Physics (4)  
Electives Science/Natural Resources (16)

**Range Management Option (27 credits)**

**GEOG 201** Cartography (3) or  
**GEOG 310** Intro to GIS (5)  
**CSS 430** Plant Genetics (3)  
**CSS 440** Weed Management (4)  
**AREC 211** Management in Agriculture (4)  
**CSS 315** (WIC) Nutrient Management & Cycling (4)  
Electives Science/Natural Resources (9)

**General Rangeland Ecology & Management (Business) Option (28 credits)**

**CSS 315** (WIC) Nutrient Management & Cycling (4)  
**CSS 440** Weed Management (4)  
**BA 211** Financial Accounting (4)  
**AREC 211** Management in Agriculture (4)  
**AREC 311** Microeconomic Theory I (4)  
**AREC 441** Agricultural Financial Management (4)  
**AREC 442** Agricultural Business Management (4)

**GRADUATION REQUIREMENTS**

<b>Total</b>	<b>(180)</b>
Baccalaureate Core	(48)
Rangeland Resources Core	(105)
Option	(27)

**Rangeland Ecology & Management Minor (27 credits)**

NOTE: Completion of the Rangeland Ecology & Management Minor alone does not qualify students for Rangeland Conservationist positions with the U.S. Office of Personnel Management (OPM).

**Requirements:**

**RNG 341** Rangeland Ecology & Management (3)  
**RNG 351** Range Ecology I – Grasslands (3)  
**RNG 352** Range Ecology II – Shrublands (3)  
**RNG 421** Wildland Restoration Ecology (4)  
**RNG 442** Rangeland-Animal Relations (4)  
**RNG 490** Rangeland Management & Plan (4)

Select six credits from:  
Any other RNG classes  
**BIOL 357** General Ecology (4)  
**ANS 443** Beef Production Systems: Cow/Calf (3)

**ADDITIONAL MINORS AVAILABLE**

**Animal Science Minor (27 credits)**

Select 15 credits of upper division ANS from the following:

**ANS 311** Principles of Animal Nutrition (3)  
**Ans 313** Applied Animal Nutrition (4)  
**ANS 315** Cont. Soc Iss Animal Ag (3)  
**ANS 317** Reproduction in Domestic Animals (1)  
**ANS 438** Exploring World Agricultural (2)  
**ANS 443** Beef Production Systems: Cow/Calf (3)  
**ANS 444** Beef Production Systems: Stocker/Feedlot (3)  
**ANS 410** Animal Science Internship (1-6)

Select a minimum of 12 credits from the following courses:  
Any additional credit hours above the required course re-

quirements from the list above plus the following courses:

**ANS 121** Intro to Animal Science (4)  
**AREC 211** Management in Agriculture (4)  
**CSS 310** Forage Production (4)  
**FW 251** Prin Fish & Wildlife Conservation (3)  
**RNG 341** Range Ecology & Management (3)  
**RNG 442** Rangelands-Animal Relations (4)

**Fish & Wildlife Minor (27 credits)**

Students may want to earn a minor in Fisheries and Wildlife to compliment their Bachelors degree. The minor offers courses focusing on species biology and identification, ecological principles, and applied sciences that can be used towards the conservation and management of fish and wildlife populations.

**Minor requires completion of 27 credits**

**BIOL 357** General Ecology (4)  
**FW 251** Prin of Fish & Wildlife Conservation (3)

Select minimum of one of the following:

**FW 320** †Intro Population Dynamics (3)  
**FW 321** †Fisheries & Wildlife Res. Ecology (3)

Select minimum of two of the following:

**BIOL 320** Ornithology (2)  
**BIOL 321** Mammology (2)  
**BIOL 322** Herpetology (5)  
**FW 315** †Biology of Fishes (3)

Select minimum of two of the following:

**GEOG 306** Cartography II (5)  
**FW 340** †Multicultural Perspectives in Nat. Res. (3)  
**FW 350** †Endangered Species, Society & Sustainability (3)  
**FW 427** †Principles of Wildlife Diseases (4)  
**FW 446** †Wildland Fire Ecology (3)  
**FW 470** †Ecology & History: Landscapes of the Col. Basin (3)  
**BIOL 350** Animal Behavior (4)  
**RNG 442** Rangeland Animal Relationships (4)  
**RNG 455** †Riparian Management (3)

Select minimum of one of the following:

**FW 323** †Mgmt Princ. Of Pacific Salmon in the NW (3)  
**FW 326** †Integrated Watershed Management (3)  
**FW 435** †Wildlife in Agricultural Ecosystems (3)  
**FW 481** †Wildlife Ecology (3)  
**FW 445** †Ecological Restoration (3)

**AGRICULTURAL AND RESOURCE**

**ECONOMICS COURSE DESCRIPTIONS**

**AG 199 - Special Topics Credits: 1.00 TO 16.00**

WINTER & SPRING Provide perspectives on current issues in the fields of agriculture and natural resources, and insight into career possibilities in the fields of Crops, Range, Animal Science, Fish and Wildlife, Agricultural Business Management and Natural Resource Management. The seminars combine classroom activities, guest lectures, and field trips that will provide students a broader understanding of what is going on in the agriculture and natural resource industry today. Students may enroll in one or both seminars. Topics vary by term. Prerequisite: Freshmen or consent of instructor. Only freshmen may enroll in this class.

**AG 405 - Reading & Conference Credits: 1.00 TO 16.00**

**AREC 121- Dscvrng Agricultural & Resource Econ Credits: 2.00**

FALL Orientation to the land grant university system and explore issues, opportunities, and challenges in the dynamic and diverse employment field of agricultural economics. Case studies and field trips. Emphasizes problem solving skills needed in today's agribusiness industry. Prerequisite: Freshman. Graded S/U.

**AREC 211- Mgmt in Agriculture Credits: 4.00**

WINTER Economics and business principles applied to the management of agribusiness firms, including farms and ranches; goal setting and management information; planning and decision making tools; acquiring, organizing, and managing land, labor, and capital resources. Prerequisite: MATH 111 or equivalent or consent of instructor. Student must have at least sophomore standing to register for this course.

**AREC 221- Marketing in Agriculture Credits: 3.00**

FALL Organization and functions of domestic and international markets; market channels for various agricultural commodities; role of agribusiness, cooperatives, and government in marketing decision. Co-requisite: ECON 201. Students must have a least sophomore standing or consent of instructor to register for this course.

**AREC 250- Intro Environ Econ\*SSC Credits: 3.00**

**Gen Ed Core-Social Sciences**

SPRING Examines how economic forces and social institutions cause environmental degradation and help build management solutions. Explains key economic concepts for valuing environmental resources and evaluating the trade-offs of alternative management approaches from private markets to regulation. Applies the concepts and theories to topical environmental issues such as water pollution and conserving biodiversity.

**AREC 299- Special Topics Credits: 1.00 TO 4.00**

**AREC 311- Intermed Microec Thry I Credits: 4.00**

FALL An examination of the theories of consumer behavior and demand, production costs, the firm, supply, and competitive and monopoly market structures. Prerequisites: ECON 201; MATH 241.

**AREC 312- Microecon Theory II Credits: 4.00**

WINTER ALT YR Examination of the theories of imperfect competition, input markets, general equilibrium and welfare economics. Prerequisite: AREC 311.

**AREC 351- Ntrl Res Econ & Pol\*SSC Credits: 3.00**

**Gen Ed Core-Social Sciences**

WINTER Application of principles of economics to identify the causes, consequences, and ways of dealing with natural resource problems, including problems associated with fisheries, forests, water resources, and land. Conceptual topics and policy applications. Emphasis is on developing students' skills in applying an economic way of thinking about natural resources management. Prerequisites: AREC 250 or ECON 201; MATH 111. Student must have at least

sophomore standing to register for this course.

**AREC 370- Agricult Markets/Trade Credits: 3.00**

SPRING Economics of agricultural markets; price determining forces; price discovery methods; international trade; and agricultural trade policies. Prerequisite: AREC 221 and 311. Student must have at least junior standing to register for this course.

**AREC 382- Farm & Ranch Appraisal Credits: 4.00**

FALL, OSU ECampus. An introduction to appraisal of rural real estate, including methods of valuing property, different types of appraisals, and preparation and interpretation of an appraisal report. Student must have at least sophomore standing to register for this course. Prerequisite: AREC 250 or ECON 201 and AREC 211.

**AREC 388- Agricultural Law Credits: 4.00**

FALL, OSU ECampus. Application of the legal principles to business decision making in farming, ranching, and the agricultural support industry. Consideration of the obligations arising out of contract, tort, property, water, public land, and natural resource law. Prerequisites: AREC 260. Student must have at least sophomore standing to register for this course.

**AREC 401- Research Credits: 1.00 TO 15.00**

Faculty approval required. Student must have at least junior standing to register for this course.

**AREC 402- Independent Study Credits: 1.00 TO 15.00**

Faculty approval required. Student must have at least junior standing to register for this course.

**AREC 403- Thesis Credits: 1.00 TO 15.00**

Prerequisite: Senior standing, faculty approval required. Student must have senior standing to register for this course.

**AREC 405- Reading and Conference Credits: 1.00 TO 15.00**

Faculty approval required. Student must have at least junior standing to register for this course.

**AREC 406- Projects Credits: 1.00 TO 6.00**

Faculty approval required. Student must have at least junior standing to register for this course.

**AREC 407- Seminar Credits: 1.00 TO 15.00**

Faculty approval required. Student must have at least sophomore standing to register for this course.

**AREC 408- Workshop Credits: 1.00 TO 15.00**

Faculty approval required. Student must have at least junior standing to register for this course.

**AREC 410- Internship Credits: 1.00 TO 6.00**

Practical on-the-job training in agricultural business, marketing, commercial agricultural production, or related private or public organizations. Prerequisite: Junior or senior standing. Submission of internship and consent of Internship Program Coordinator. Graded S/U. Student must have at least junior standing to register for this course.

**AREC 432- Environmental Law Credits: 4.00**

OSU ECampus. Legal relationships arising out of rights to air, water, and land. The impact of federal and state regulation on pollution control and on the production, use, and disposal of hazardous materials. Prerequisite: Junior standing. Student must have at least junior standing to register for this course.

**AREC 434- Envir & Rsrce Econ Credits: 3.00**

SPRING ALT YRS Examines economic perspectives on the allocation of natural resources and the management of environmental quality, emphasis on the use of economic concepts in the design and evaluation of public policies. Prerequisite: AREC 351; AREC 311. Student must have at least junior standing to register for this course.

**AREC 438- Exploring World Ag I & II Credits: 2.00**

SPRING/FALL Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. Not offered every year. Student must have at least junior standing to register for this course.

**AREC 441- Agricult Financial Mgmt Credits: 4.00**

FALL Principles of financial management in production agriculture and agribusiness; financial statements, budgets, and capital investment analysis; business organization forms; legal aspects of borrowing; sources and terms of agricultural credit; taxation. Prerequisite: AREC 211, 311 and BA 313 (or concurrent enrollment) Student must have at least junior standing to register for this course.

**AREC 442- Agricult Business Mgmt Credits: 4.00**

SPRING Application of economic principles to agricultural businesses; use of regression and linear programming as management tools; risk management; marketing; forecasting; production management; competitive strategies. Prerequisite: AREC 211, 221, 370, or consent of instructor. Student must have senior standing to register for this course.

**AREC 447- Ag Price & Market Analy Credits: 4.00**

WINTER Price determination for agricultural commodities and factors; quantitative analysis of prices, factors and markets; agricultural market structures, performance and roles of institutions. Prerequisites: AREC 311; STAT 243 and STAT 352. Student must have at least junior standing to register for this course.

**AREC 453- Public Land/Rsrce Law Credits: 4.00**

WEB/VIDEO Constitutional, administrative, and historical foundations of federal natural resources law and related public policy. Applicable case law emphasizing water, range, mineral, wildlife, and recreational resources. Prerequisites: AREC 253. Student must have at least junior standing to register for this course.

**AREC 461- Ag & Food Policy Issues Credits: 4.00**

SPRING Principles of agricultural and food policy formulation; agricultural adjustment processes; agricultural price and income policies in relation to land use, water, and rural development policies; interrelationships among U.S. and foreign agriculture and trade policies. Writing Intensive course. Prerequisite: ECON 201. Student must have at least junior standing to register for this course.

**ANIMAL SCIENCE COURSE DESCRIPTIONS**

**ANS 121 - Intro To Animal Sci\*SMI Credits: 4.00**

**Gen Ed Core-Natural, Math & Info Sciences**

WINTER Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production.

**ANS 311 - Prin of Animal Nutrition Credits: 3.00**

FALL ALT YRS Classification, digestion, absorption, and metabolism of nutrients in animals; consequences of nutritional deficiencies and toxicities. Prerequisite: BIOL 101 and BOT 202 or BIOL 102.

**ANS 313 - Appld Animal Nutri:Fds/Rtn Credits: 4.00**

SPRING ALT YRS. Discusses topics relevant to feedstuff identification and nutrient analysis, feed processing and formulation of balanced animal diets based on nutrient requirements. Provides students hands-on experiences in identifying various feedstuffs and formulating rations based on the nutrient composition of those feedstuffs. Prerequisite: ANS 121, ANS 311. Student must have at least sophomore standing to register for this course.

**ANS 315 - Cont Soc Iss Anim Ag\*SSC Credits: 3.00**

**Gen Ed Core-Social Sciences**

WINTER, EVEN YEARS Discussion of contentious issues including role of animal products and human health; use of hormones and antibodies; new animal biotechnologies; animal rights/welfare; livestock grazing public lands. Student must have at least sophomore standing to register for this course.

**ANS 317 - Reproduction Dmstc Anmls Lab Credits: 1.00**

SPRING. Gross and microscopic anatomy of the reproductive tract; semen collection, evaluation and extension; evaluation of fertilization, embryo and fetal development and placentation. Prerequisite: ANS 121.

**ANS 405 - Reading & Conference Credits: 1.00 TO 16.00**

Student must have at least junior standing to register for this course.

**ANS 406 - Projects Credits: 1.00 TO 6.00**

Prerequisite: Faculty approval required. Student must have at least junior standing to register for this course.

**ANS 410 - Animal Sci Internship Credits: 1.00 TO 12.00**

Student must have at least junior standing to register for this course.

**ANS 438 - Exploring World Ag I & II Credits: 2.00**

SPRING/FALL Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. Not offered every year. Student must have at least junior standing to register for this course.

**ANS 443 - Beef Prod Systm:Cow/Calf Credits: 3.00**

WINTER, ALT YEARS Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle in cow/calf production scenarios. Students will gain background in biological

cycles and fundamental principles of cow/calf management. Prerequisite: ANS 311. Student must have at least junior standing to register for this course.

**ANS 444 - Beef Prod Syst:Stckr/Fdlt Credits: 3.00**

SPRING, ALT YEARS Continuation of the study of beef cattle management. Discussion of various husbandry, nutritional, health and marketing concepts in growing/finishing beef cattle systems. The impact of various environmental, economical and political policies on these programs will also be evaluated and discussed. Overnight field trip with extra fee charged. Prerequisite: ANS 311, ANS 443. Student must have at least junior standing to register for this course.

**BOTANY COURSE DESCRIPTIONS**

**BOT 350 - Intro Plant Path Credits: 4.00**

WINTER, ALT YEARS. This is an OSU class. Symptoms, causal agents, diagnosis, and prevention of plant diseases, with emphasis on fungi, bacteria, nematode, and virus pathogens. Lec/lab. Prerequisite: Introductory botany or biology.

**BOT 350L- Intro Plant Path Lab Credits: .00**

WINTER. ALT YEARS. This is an OSU class.

**CROPS SCIENCE COURSE DESCRIPTIONS**

**CSS 100 - Orient/Career Plan Credits: 1.00**

FALL Introduction to departmental, college and university programs. Individual and group counseling and baccalaureate program planning. Exposure to career opportunities in crop science. Graded P/N. Prerequisite: CSS Major.

**CSS 300 - Intro Crop Production Credits: 4.00**

FALL Principles, practices and issues relating to production, marketing and improvement of horticultural and agronomic crops. Comparison of crop production systems; geography of crop production; cropping calendars. Prerequisite: General biology or botany sequence. Co-requisite: CSS 300L

**CSS 300L- Crop Science Lab Credits: .00**

Corequisite: CSS 300.

**CSS 305 - Prin of Soil Science Credits: 4.00**

SPRING Origin, formation, classification; physical, chemical, and biological characteristics; ecosystem functions of soils; effects of soil management on agricultural and forest crop production. Field trips. Prerequisite: Introductory chemistry. Lec/lab.

**CSS 305L- Soil Sci Lab Credits: .00**

**CSS 306 - Prob Solving Soil Sci Credits: 1.00**

SPRING Problem solving for, and in-depth exploration of, Principles of Soil Science (CSS 305). Real-world problems requiring knowledge of soil physical, chemical, and biological properties. Prerequisite: CSS 305 or concurrent enrollment; MATH 111.

**CSS 310 - Forage Production Credits: 4.00**

SPRING. Importance of, and current production practices for, forage crops. Lec/lab. Prerequisite: CSS 300; CSS 305. Corequisite: CSS 310L.

**CSS 310L- Forage Prod Lab Credits: .00**

Co-requisite: CSS 310 Forage Production.

**CSS 315 - Nutrient Management & Cycling Credits: 4.00**

SPRING Nutrient forms, transformations, and plant availability as influenced by chemical and biological reactions in soils; soil pH and management of acid and alkaline soils; characteristics and use of fertilizers, soil amendments and organic wastes. Labs include routine soil testing procedures, computer applications for soil fertility management, and field trips. Lec/lab. (Writing Intensive Course). Prerequisite: CSS 305. Lab/Lec.

**CSS 315L- Nutrient Mgt Lab Credits: .00**

**CSS 321 - Prin Cereal Crop Prod Credits: 1.00**

SPRING ALT YRS. An overview of the principles underlying small grain production practices in the Pacific Northwest. Prerequisite: CSS 300 or equivalent; CSS 305.

**CSS 322 - Prin Potato Prod Credits: 1.00**

SPRING ALT YRS. Principles and practices governing all aspects of potato production, storage and use. Prerequisites: CSS 300 or equivalent; CSS 305.

**CSS 330 - World Food Crops Credits: 3.00**

SPRING. Origin, production, utilization, and improvement of the world's major food crops. The role of crop production in global economic and social development; food security and worldwide nutritional requirements. (Bacc Core Course) Student must have at least sophomore standing to register for this course.

**CSS 381 - Ag/Pwr/Discrim/Survival Credits: 3.00**

FALL. Study and discussion of the effect of difference, power, and discrimination from an agricultural perspective with particular emphasis on how agriculture has shaped both earth's ecology and human culture by enabling an ever increasing human population.

**CSS 395 - World Soil Resources Credits: 3.00**

WINTER, ALT YRS The properties, global distribution, and agricultural productivity of major world soil groups are described. Potentials for human-accelerated soil degradation are introduced for each soil group, and reasons for conflicting assessments of degradation are discussed. (Bacc Core Course.)

**CSS 401 - Research Credits: 1.00 TO 16.00**

Terms and credits arranged. Student must have at least junior standing to register for this course.

**CSS 405 - Reading & Conference Credits: 1.00 TO 15.00**

Various topics. Terms and credits to be arranged. Student must have at least junior standing to register for this course.

**CSS 407 - Senior Seminar Credits: 1.00**

SPRING Senior seminar is intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar and to submit written documentation supporting that seminar. Graded P/N. Prerequisite: Crop & Soil Science

majors and minors only. Student must have senior standing to register for this course.

**CSS 408 - Workshop Credits: 1.00 TO 16.00**

Various Topics. Terms and credits arranged.

**CSS 410 - Internship Credits: 1.00 TO 15.00**

Professional work experience previously approved and supervised by the department. Written report required. Prerequisite: Junior standing, major students only; instructor consent. Student must have at least junior standing to register for this course.

**CSS 415 - Soil Fertility Management Credits: 3.00**

WINTER ALT YRS. Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. Prerequisite: CSS 315. Student must have at least junior standing to register for this course.

**CSS 430 - Plant Genetics Credits: 3.00**

WINTER Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. Prerequisite: CSS 300, one year of biology or botany. Student must have at least junior standing to register for this course.

**CSS 440 - Weed Management Credits: 4.00**

FALL Principles of weed control by cultural biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Prerequisite: Introductory botany or biology. Lec/Lab. Student must have at least junior standing to register for this course.

**CSS 440L- Weed Management Lab Credits: .00**

Student must have at least junior standing to register for this course.

**CSS 460 - Seed Production Credits: 3.00**

WINTER ALT YRS. An introduction to principles and practices of seed based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. Prerequisite: CSS 300. Student must have at least junior standing to register for this course.

**CSS 466 - Soil Morph & Classifica Credits: 4.00**

FALL Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. Prerequisite: CSS 305. Student must have at least junior standing to register for this course.

**CSS 480 - Case Std Crop Syst Mgmt Credits: 4.00**

WINTER ALT YRS. Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision making process. Multiple field trips required. Student must have at least junior standing to register for this course.

**CSS 499 - Special Topics Credits: 1.00 TO 16.00**

Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. Prerequisite: Instructor approval required. Student must have at least junior standing to register for this course.

**ENTOMOLOGY COURSE DESCRIPTIONS**

**ENT 311 – Intro to Insect Pest Mgmt Credits: 5.00**

FALL ALT YRS. Recognition, biology, and management of injurious and beneficial insects; insects and human welfare. Concurrent laboratory is designed to illustrate principles of insect pest management in agricultural cropping systems. Prerequisite: One year college biology.

**ENT 311L- Insect Pest Mgmt Lab Credits: .00**

This is an OSU class.

**FISH AND WILDLIFE COURSE DESCRIPTIONS**

**FW 251 - Prin Fish/Wldife Conserv Credits: 3.00**

WINTER. History of conservation and natural resource use; ecological principles, and social and economic limitations of conservation; principles and practices of wildlife and fisheries management; role of research in management. Prerequisite: MATH 111 or equivalent.

**FW 405 - Reading & Conference Credits: 1.00 TO 16.00**

Student must have at least junior standing to register for this course.

**FW 481 - Wildlife Ecology Credits: 3.00**

Interrelationships of wildlife, environment and humans. Evaluation of properties and habitats of wildlife populations. Prerequisite: FW 251, BIOL 357 and either STAT 315, STAT 327 or equivalent. Student must have at least sophomore standing to register for this course.

**FORESTRY COURSE DESCRIPTIONS**

**FOR 111 - Intro To Forestry\*SMI Credits: 3.00**

**Gen Ed Core-Natural, Math & Info Sciences**

FALL. Forest resources in the world; forests and human well-being; where and how forests grow; environmental and human values; products, characteristics, and uses; basic elements of use, planning and management. Interpretation of forestry literature; professional origins in the U.S. Field trips required.

**RANGELAND ECOLOGY & MANAGEMENT COURSE DESCRIPTIONS**

**RNG 101 - Orient Careers RE & Mgmt Credits: 1.00**

Orientation to the OSU Department of Rangeland Ecology and Management; and major fields of study in the profession of rangeland resources and related fields of natural resources. Learn about careers in natural resources, writing resumes, government employment, graduate school opportunities.

**RNG 341 - Rngelnd Ecol & Mgmt Credits: 3.00**

FALL. Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions. Required: Field Trips.

**RNG 351 - Rnge Ecol I-Grasslands Credits: 3.00**

FALL ALT YRS. Principles and terminology of grassland ecology. Addresses the spatial temporal dynamics of structure, function, and process in North American grassland ecosystems. Water, nutrient cycles and energy pathways are explored in the context of the variable driving forces of climate (drought), herbivory, and fire. Prerequisite: RNG 241 or RNG 341. Student must have at least sophomore standing to register for this course.

**RNG 352 - Rnge Ecol II:Shrublands Credits: 3.00**

FALL ALT YRS. Examines the primary characteristics of each ecoregion throughout the semiarid and arid areas of North America. Covers basic ecology of each region, including a discussion of important plant species, climate patterns, soil types, and topography. Prerequisite: RNG 241 or RNG 341. Student must have at least sophomore standing to register for this course.

**RNG 353 - Wildland Plant Indent Credits: 4.00**

Students will learn how to identify approximately 100 plant species found in wildlands of North America and Mexico. Individual plant species ecology, basic plant anatomy and identification characteristics observable only through a microscope or dissecting scope, and how to use a dichotomous key for plant ID will also be covered.

**RNG 355 - Desert Watershed Mgmt Credits: 3.00**

WINTER Principles and methods in managing rangeland for optimum production and regulation of water yields as well as maintaining soil stability and on-site productivity. Effects of grazing herbivores and their potential as a land management tool. Concepts of arid land hydrology, with emphasis on the resultant effects on runoff quantity and quality. Student must have at least junior standing to register for this course.

**RNG 403 - Senior Thesis Credits: 1.00 TO 16.00**

BY ARRANGEMENT Designated "writing intensive course". Student must have at least junior standing to register for this course.

**RNG 405 - Reading & Conference Credits: 1.00 TO 16.00**

Student must have at least junior standing to register for this course.

**RNG 406 - Projects Credits: 1.00 TO 16.00**

Student must have at least junior standing to register for this course.

**RNG 407 - RNG 407 Credits: 1.00**

Student must have at least junior standing to register for this course.

**RNG 421 - Wildland Restoration/Ecology Credits: 4.00**

SPRING, ALT YEARS. Emphasis is placed on understanding

the ecology of arid and semiarid ecosystems through the study of ecological processes responsible for ecosystem function. Range improvement practices for stabilizing and repairing degraded wildlands by directing autogenic recovery mechanisms are discussed. This involves manipulating plants, soil, animals, and micro-environments for improved ecosystem functions. Field trips required. Prerequisite: RNG 241 or RNG 341. Student must have at least junior standing to register for this course.

**RNG 441 - Rangeland Analysis Credits: 4.00**

WINTER, ALT YEARS. Techniques used to describe vegetation in shrublands, grasslands, and forests. Use of measurements in resource management. Course is field orientated, emphasizing both theory and practice of wildland inventory methods. Prerequisite: Introductory Statistics course is helpful, RNG 241 or RNG 341. Student must have at least junior standing to register for this course.

**RNG 442 - Rangeland Animal Relationships Credits: 4.00**

WINTER, ALT YEARS. Domestic and wild animal use of rangelands as related to environmental factors; palatability, food habits, nutrition, and their effects on management of rangeland animal resources. Prerequisite: RNG 241 or RNG 341. Student must have at least junior standing to register for this course.

**RNG 455 - Riparian Ecol & Mgmt Credits: 3.00**

Study of the ecology of riparian vegetation, including successional processes in riparian zones, productivity, structure and diversity of riparian ecosystems. The class is focused on the terrestrial vegetation, soils and animals of riparian ecosystems. Emphasis is placed on the past abuse associated with riparian ecosystems, methods of rehabilitation, and theories of the proper use of riparian ecosystems under a multiple-use philosophy (i.e. fish, wildlife, livestock, aesthetics, recreation, and silviculture). Prerequisite: RNG 355. Student must have at least junior standing to register for this course.

**RNG 490 - Rangeland Mgt Planning Credits: 4.00**

SPRING, ALT YEARS. Administration and management of rangelands; planning processes involving goal setting, inventories, personnel management, environment, conflict resolution and other steps necessary for decision making. Use of data collected from field problems to support the execution of class plans. Required: Field trips and lab fee. Prerequisites: RNG 241 or RNG 341. Student must have at least junior standing to register for this course.

**RNG 499 - Special Topics Credits: 1.00 TO 16.00**

Student must have at least junior standing to register for this course.