

AGRICULTURAL SCIENCE



OREGON STATE UNIVERSITY AGRICULTURE & NATURAL RESOURCE PROGRAM AT EASTERN OREGON UNIVERSITY

The OSU Agriculture and Natural Resource Program (OSU AG & NR) is a cooperative effort between Oregon State University and Eastern Oregon University. The OSU 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 AG & NR at EOU:

Majors

Agricultural Sciences
Crop and Soil Science
Natural Resources
Rangeland Sciences

Minors

Agricultural Science
Animal Science
Crop Science
Fisheries and Wildlife Sciences
Natural Resources
Rangeland Sciences
Soil Science

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

- A minimum of 27 designated credits of related course work, including 12-15 in upper division courses.
- A minimum of 15 credits must be designated OSU courses.
- An individual course may not count toward more than one minor.

All degrees are conferred by Oregon State University.

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.

OSU ADMISSION REQUIREMENTS

Starting spring 2015 registration for OSUAG&NR courses are through the OSU Catalog system. Students must be admitted to OSU prior to registering for courses.

OSU majors: Students pursuing an OSU major must apply to OSU as either a first-year (<36 quarter credits, ≥3.0 GPA) or transfer (≥36 quarter credits, ≥2.25 GPA, completion of Mathematics and Writing I requirements) student. Students must contact the OSU AG Office (Badgley Hall 205) prior to starting the OSU application process.

OSU minors & others: Students wanting to pursue an OSU minor (EOU major) or just wanting to take an OSU course must apply to OSU as a Non-Degree seeking student. Visit the OSU AG Office (Badgley Hall 205) or EOU Registrar's website for assistance.

INTERNSHIPS

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

SCHOLARSHIPS

Students in the OSU AG & NR at EOU are eligible to apply for scholarships from both institutions. The OSU College of Agricultural Sciences and its departments offer a variety of scholarships to OSU admitted students. Additional information and application forms for college-level scholarships are available

online at <http://agsci.oregonstate.edu/scholarships> or from the AG Office, Badgley Hall 205. For information about departmental scholarships contact the OSU AG & NR advisers or email OSU AG & NR (euoag@oregonstate.edu).

BACCALAUREATE CORE (51)* AS OF 2015

Skills (15)

To support students' success in all courses, the following first- year Skills courses are to be taken and completed satisfactorily within the first 45 hours of OSU-generated credits:

Writing I (WR 121, minimum passing grade C-)
Mathematics (minimum of MTH 105 and passing grade of C-)

Speech

To be completed satisfactorily within the first 90 hours of OSU-generated credits:

Writing II (to prepare for upper-division writing intensive courses)

Fitness (3)

For transfer students with sophomore standing or above, Writing II and Speech must be completed within the first 45 hours of OSU-generated credits.

Perspectives (24)

No more than two courses from any one department may be used by a student to satisfy the Perspectives category of the core.

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 synthesis requirement may not be in the same department.

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

Writing Intensive Courses (WIC) (3)

A list of courses and specific departmental requirements of the Baccalaureate Core is available in the OSU AG & NR program Office (Badgley Hall 205).

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 OSU resident credits during the last 75 total credits.

ACADEMIC PROGRAMS IN AGRICULTURAL SCIENCES

Please contact the OSU AG & NR program directly for current major and minor requirements. You can also

see the Oregon State University catalog at www.oregonstate.edu

AGRICULTURAL SCIENCES

The Agricultural Sciences major gives you the freedom to design your own degree. With your choice of credits and electives you can broaden your exposure to all areas of agriculture, specialize with two or more emphasis areas, or tailor a combination of emphases. You can focus on topics like animal science, crop and soil science or business management. Other focus areas can strengthen your leadership and communication skills. And if you're interested in becoming a teacher, an Agricultural Sciences degree is an ideal first step. With a degree in Agricultural Sciences, you can get a broad ranging education that covers agriculture production, agri-business and natural resource issues.

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. The importance of soil as the fundamental substrate for life on terrestrial landscapes 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 various cropping systems, 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.

A grade of C or better is required for all BEE, CSS, CROP, SOIL, and PBG courses within the major.

NATURAL RESOURCES (INTERDISCIPLINARY DEGREE)

Students who graduate with a BS degree in Natural Resources from OSU should be able to integrate technical "field" skills with analytical skills to solve

important natural resource problems. The curriculum is designed to help students acquire knowledge enabling them to understand a range of natural resource issues, work with experts in a variety of resource fields, and deal with social and political components of resource management. This program is an interdisciplinary offering supported by the colleges of Agricultural Sciences, Forestry, Liberal Arts, and Science.

In addition to the baccalaureate core, the three main areas for course work include: the natural resources core (74 credits), breadth requirements (21 credits), and the specialty option (40 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, ecology, economics, and decision making. Breadth is acquired in seven key areas of resource management. Finally, students can choose from the Arid Land Ecology or Fish and Wildlife Conservation options.

Only two courses used to complete the natural resources major requirements may be taken S/U. A minimum GPA of 2.00 must be maintained in the natural resource Core and Breadth classes and a 2.25 GPA must be maintained in the Option classes.

Some of the courses for this degree, especially for the Fish and Wildlife Conservation option are only available online. Please see the AG office for the list of courses for specific Core, Breadth and Option requirements.

RANGELAND SCIENCES

Rangeland resource management is one of the families 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 includes university and departmental requirements for the BS degree and provides emphasis areas specifically tailored to the student's interest. 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 provides 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 Animal and Rangeland Sciences (OSU affiliate department) is accredited by the Society for Range Management. It is recognized throughout the country as one of the leading institutions in rangeland management.

AGRICULTURAL SCIENCES COURSE DESCRIPTIONS

AED 313 - Theory & Pract III: Field (Credits: 4)

Field based experience for students preparing to be agricultural teachers. Focus on teaching models. Prerequisites: Advising and placement by OSU faculty.

AG 301 - Ecosystem Science of Pacific Northwest Indians (Credits: 3)

Institutional Graduation Requirement - DPD
FALL TERM. Designed and presented in partnership with Pacific Northwest Indians and Alaska Natives, focusing on natural ecosystems, differing views, power relationships, policymaking, and gender roles.

AG 401 - Research (Credits: 1 to 16) This course is repeatable for a maximum of 16 credits. Prerequisite: Departmental/Instructor approval.

AG 405 - Reading & Conference (Credits: 1 to 12)
Prerequisite: Departmental/Instructor approval.

AG 410 - Internship (Credits: 1 to 16)

A work internship to give students practical on-the-job preparation in any of the main facets of agriculture or related industries. This course is repeatable for a maximum of 16 credits. Prerequisite: College and instructor approval. Prerequisite: Departmental /Instructor approval.

AG 421 - Agricultural Leadership Devel (Credits: 3) Institutional Graduation Requirement – WIC/UWR

WINTER TERM. Principles of leadership development, leadership analysis and style, record keeping procedures, youth organizations, and activities in leadership for youth. (Writing Intensive Course) Prerequisite: Senior standing.

AGRI 299 – Critical Issues in Oregon Ag & Natural Resources (Credits: 3)

FALL TERM. Targeted courses that focus on specific topics in agriculture and natural resources. Topics may vary from term to term and from year to year. Included are field trips to two OSU research stations. This course is repeatable for a maximum of 8 credits.

AGRI 438 - Exploring World Ag I & II (Credits: 2)

WINTER. Global practices of food production are highly diverse. However, there are also many common global issues related to agriculture, food, and natural resources. Speakers with international backgrounds and experiences will present material, as well as student teams who will research a topic of personal interest. In addition, opportunities for global study, internship, and research will be explored. Not offered every year. Course is repeatable for a maximum of 8 credits.

ANIMAL SCIENCE COURSE DESCRIPTIONS

ANS 121 - Intro To Animal Sci*SMI (Credits: 4)
Gen Ed Core-Natural, Math & Info Sciences
SPRING. Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production.

ANS 311 - Prin of Animal Nutrition (Credits: 3)
FALL ODD. 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)
SPRING EVEN. 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; At least sophomore standing.

ANS 315 - Cont Soc Iss Anim Ag*SSC (Credits: 3)
Gen Ed Core-Social Sciences
FALL EVEN. 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. Prerequisite: At least sophomore standing.

ANS 317 - Reproduction Dmstc Anmls Lab (Credits: 1)
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 401 - Research (Credits: 1 to 16)
Graded P/N. This course is repeatable for a maximum of 16 credits. Prerequisites: Departmental/Instructor approval; At least junior standing.

ANS 405 - Reading & Conference (Credits: 1 to 16)
Prerequisites: Departmental/Instructor approval; At least junior standing.

ANS 410 - Animal Sci Internship (Credits: 1 to 12)
Prerequisites: Departmental/Instructor approval.

ANS 443 - Beef Prod Syst:Cow/Calf (Credits: 3)
WINTER ODD. 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. Prerequisite: ANS 121; At least junior standing.

ANS 444 - Beef Prod Syst:Stckr/Fdlt (Credits: 3)
SPRING ODD. 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, economic and political policies on these programs will be evaluated and discussed. Field trip fee charged. Prerequisite: ANS 121, ANS 443; At least junior standing.

BIOLOGICAL AND ECOLOGICAL ENGINEERING COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

BEE 439 - Irrigation Principles & Practices (Credits: 4)
SPRING ODD. Survey of irrigation systems, system configurations, factors that influence irrigation

efficiency, crop water requirements, energy requirements, pumps, irrigation scheduling. For non-engineers. Prerequisite: MTH 111.

BOTANY COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

BOT 350 - Intro Plant Path (Credits: 4)
SPRING EVEN. 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: 0)
SPRING EVEN. This is an OSU class. Co-requisite: BOT 350.

CROPS SCIENCE COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, Please contact the OSU AG & NR office for current offerings.

CROP 300 - Intro Crop Production (Credits: 4)

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: CROP 300L.

CROP 300L - Crop Science Lab (Credits: 0)

FALL. Must be taken concurrently with CROP 300.

CROP 310 - Forage Production (Credits: 4)

SPRING. Importance of, and current production practices for, forage crops. Lec/lab. Prerequisite: CROP 300; SOIL 305.

CROP 310L - Forage Production Lab (Credits: 0)

SPRING. Must be taken concurrently with CROP 310.

CSS 315 - Nutrient Management & Cycling Institutional Graduation Requirement – WIC/UWR (Credits: 4)

WINTER. 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: SOIL 305.

CSS 315L- Nutrient Mgt Lab (Credits: 0)

SPRING. Must be taken concurrently with CSS 315.

CSS 320 - Prin Oil and Fiber Crop Prod (Credits: 1)

SPRING EVEN. An overview of production practices and characteristics of oil seed, essential oil, and fiber crops. Prerequisite: CROP 300 or equivalent; SOIL 305.

CSS 321 - Prin Cereal Crop Prod (Credits: 1)

SPRING EVEN. An overview of the principles underlying small grain production practices in the Pacific Northwest. Prerequisite: CROP 300 or equivalent; SOIL 305.

CSS 322 - Prin Potato Prod (Credits: 1)

SPRING EVEN. Principles and practices governing all aspects of potato production, storage and use. Prerequisites: CROP 300 or equivalent; SOIL 305.

CROP 330 - World Food Crops (Credits: 3)

WINTER ODD. 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.

CROP 401 - Research (Credits: 1 to 16)

Terms and credits arranged. Prerequisites: Departmental/Instructor approval; At least junior standing.

CROP 405 - Reading & Conference (Credits: 1 to 16)

Various topics. Terms and credits arranged. Prerequisites: Departmental/Instructor approval; At least junior standing.

CROP 407 - Senior Seminar (Credits: 1)

WINTER. 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, Agricultural Sciences majors and minors only; senior standing.

CROP 410 - Internship (Credits: 1 to 12)

Professional work experience previously approved and supervised by the department. Written report required. Prerequisite: Departmental/Instructor approval; At least junior standing.

CROP 440 - Weed Management (Credits: 4)

FALL ODD. Principles of weed control by cultural biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/Lab. Prerequisite: Introductory botany or biology; at least junior standing. Co-requisite: CROP 440L.

CROP 440L - Weed Management Lab (Credits: 0)

Must be taken concurrently with CROP 440. Student must have at least junior standing to register for this course.

CROP 460 - Seed Production (Credits: 3)

SPRING ODD. 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: CROP 300; at least junior standing.

CROP 480 - Case Std Crop Syst Mgmt (Credits: 4)

WINTER ODD. Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision making process. Multiple field trips required. Prerequisite: CROP 300; at least junior standing.

CROP 499 - Special Topics (Credits: 1 to 16)

Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary, may be repeated. Prerequisite: Departmental /Instructor approval; At least junior standing.

ENTOMOLOGY COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

ENT 311 - Intro Insect Pest Mngmt (Credits: 4)
FALL EVEN. 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, including medical and veterinary entomology. Prerequisite: One year of college biology. Co-requisite: ENT 311L.

ENT 311L - Intro Insect Pest Mngmnt Lab (Credits: 0)
FALL EVEN. Must be taken concurrently with ENT 311

SOIL SCIENCE COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

CSS 305 - Prin of Soil Science (Credits: 4)
FALL. 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. Fall

CSS 305L- Soil Sci Lab (Credits: 0)
FALL. Must be taken concurrently with SOIL 305.

CSS 306 - Prob Solving Soil Sci (Credits: 1)
FALL. 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: SOIL 305 or concurrent enrollment; MATH 111.

SOIL 395 - World Soil Resources (Credits: 3)
WINTER EVEN. 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.)

SOIL 401 - Research (Credits: 1 to 16)
Terms and credits to be arranged. Prerequisites: Departmental/Instructor approval; at least junior standing.

SOIL 405 - Reading & Conference (Credits: 1 to 15)
Various topics. Terms and credits to be arranged. Prerequisites: Departmental/Instructor approval; at least junior standing.

SOIL 410 - Internship (Credits: 1 to 12)
Professional work experience previously approved and supervised by the department. Written report required. Prerequisite: Departmental/Instructor approval; at least junior standing; major students only.

SOIL 466 - Soil Morph & Classification (Credits: 4)
SPRING ODD. 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: SOIL 305; at least junior standing.

SOIL 499 - Special Topics (Credits: 1 to 16)
Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary, may be repeated. Prerequisite: Departmental /Instructor approval; At least junior standing.

FISH AND WILDLIFE COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

FW 251 - Prin Fish/Wildlfe Conserv (Credits: 3)
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.

FW 325 - Global Crises in Resource Ecology (Credits: 3)
WINTER EVEN. Historical and contemporary implications of the impacts of burgeoning human populations on rates and patterns of global ecological change. Changes in ecosystem processes and crises of species extinction in the context of cultural and political institutions. Bacc Core Course.

PLANT BREEDING AND GENETICS COURSE DESCRIPTIONS

These prefixes and descriptions are subject to possible changes, please contact the OSU AG & NR office for current offerings.

PBG 430 - Plant Genetics (Credits: 3)
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.

FORESTRY COURSE DESCRIPTIONS

FOR 111 - Intro To Forestry*SMI (Credits: 3)
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 SCIENCES COURSE DESCRIPTIONS

RNG 341 - Rngelnd Ecol & Mgmt (Credits: 3)
FALL. Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions. Required: Field Trips.

RNG 406 - Projects (Credits: 1 to 16)
Course is repeatable for a maximum of 16 credits. Prerequisite: Department/Instructor approval.

RNG 351 - Rnge Ecol I-Grasslands (Credits: 3)
FALL ODD. 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.

RNG 421 - Wildland Restoration/Ecology (Credits: 4)
WINTER ODD. 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 341; CSS 305.

RNG 352 - Rnge Ecol II:Shrublands (Credits: 3)
FALL EVEN. 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.

RNG 441 - Rangeland Analysis (Credits: 4)
SPRING ODD. 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 341; CSS 305.

RNG 353 - Wildland Plant Indent (Credits: 4)
SPRING. 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 442 - Rangeland Animal Relationships (Credits: 4)
SPRING EVEN. 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 341, at least junior standing.

RNG 355 - Desert Watershed Mgmt (Credits: 3)
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.

RNG 490 - Rangeland Mgt Planning (Credits: 4)
WINTER. 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 341; at least junior standing.

RNG 403 - Senior Thesis (Credits: 1 to 16)
Course is repeatable for a maximum of 16 credits. Prerequisite: Department/Instructor approval.

RNG 405 - Reading & Conference (Credits: 1 to 16)
Course is repeatable for a maximum of 16 credits. Prerequisite: Department/Instructor approval.

RNG 499 - Special Topics (Credits: 1 to 16)
Course is repeatable for a maximum of 16 credits. Prerequisite: Department/Instructor approval.