Materials linked from the June 12, 2018 Curriculum Council agenda.

Attached is a list of all the ANS and RNG courses; the red numbers (shaded in yellow) indicate what the numbers will be changed to, per Dodi Reesman.

ANRS 121 INTRODUCTION TO ANIMAL SCIENCES (4)
Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production. Lec/lab. (Bacc Core Course)

ANRS 121H INTRODUCTION TO ANIMAL SCIENCES (4)
Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production. Lec/lab. (Bacc Core Course) **PREREQS:** Honors College approval required.

ANRS 207 SOPHOMORE SEMINAR (2)
Examination of career opportunities in animal sciences. **PREREQS:** Sophomore standing.

ANRS 215 BEEF/DAIRY INDUSTRIES (3)
Introduction to beef and dairy industries; history, current industry status, and demonstration and practice of basic husbandry skills. **PREREQS:** ANRS 121

ANRS 216 SHEEP/SWINE INDUSTRIES (3)
Introduction to the sheep and swine industries including history, current status and production practices, with demonstration and hands-on experience of basic husbandry practices. **PREREQS:** ANRS 121

ANRS 217 POULTRY INDUSTRIES (3)
Familiarization of the organizational structure and marketing arrangement of poultry industries; hands-on managerial techniques, practices and procedures carried out by the poultry industries.

ANRS 220 INTRODUCTORY HORSE SCIENCE (3)
Introduction to horses, their history, breeds, form and function, performance evaluation, current industry status, and general management. **PREREQS:** ANRS 121

ANRS 223 EQUINE MARKETING (2)
Course covers practical concepts of equine marketing. Emphasis on market assessment, targeting buyers, marketing and advertising strategies, hands-on experience in product preparation and presentation, marketing legalities. **PREREQS:** ANRS 121 and ANRS 220 and ANRS 192 or instructor approval required.

ANRS 231 LIVESTOCK EVALUATION (3)
Focuses on an individual animal's economic merit as compared to a sample group. Visual appraisal, performance data, and carcass merit are stressed. Includes the evaluation of both market and breeding animals. The livestock species of concentration include beef cattle, swine, sheep, and meat goats. Lec/lab. **PREREQS:** Recommended: ANRS 121

ANRS 251 PRINCIPLES OF ANIMAL FOODS TECHNOLOGY (3)
Processing of meat, milk and eggs into human food products. Lec/lab. **PREREQS:** ANRS 121

ANRS 280 COMPANION ANIMAL MANAGEMENT (4)
An introduction to the challenges, responsibilities, and benefits of interaction with selected companion animals. Topics covered will provide an overview of the human-animal bond, the position of companion animals in society, ethical issues of pet ownership and potential career opportunities. In addition, the course will serve as an introduction to preventive care and normal behavior of dogs, cats, and selected exotic pets.

As the Department of Animal and Rangeland Sciences curriculum offers courses addressing equine care and husbandry, horses will not be discussed in this class.

ANRS 302 COMMON DISEASES OF COMPANION ANIMALS (4)
An introduction to common diseases of selected companion animals. Emphasis will be placed on identifying predisposing factors, clinical signs, common diagnostic procedures and potential implications for human health. A $10 course fee will be required. Lec/rec. **PREREQS:** (BI 211 [D-] or BI 211H [D-]) and (BI 212 [D-] or BI 212H [D-]) and (BI 213 [D-] or BI 213H [D-]) and CH 121 [D-] and CH 122 [D-] and CH 123 [D-] and ANRS 280 is recommended.

ANRS 311 PRINCIPLES OF ANIMAL NUTRITION (3)
Classification, digestion, absorption, and metabolism of nutrients in animals; consequences of nutritional deficiencies and toxicities. **PREREQS:** ((BI 211 [D-] or BI 211H [D-]) and (BI 212 [D-] or BI 212H [D-]))

ANRS 312 FEEDSTUFFS AND RATION FORMULATION (4)
Presents the feedstuffs utilized by domestic animals including their characteristics and processing. Provides instruction in ration formulation and evaluation leading to development of the basic skills required to formulate and evaluate rations for domestic animals. Taught as a distance education course. **PREREQS:** ANRS 121 and MTH 111 or equivalent or instructor approval.

ANRS 313 APPLIED ANIMAL NUTRITION: FEEDS AND RATION FORMULATION (4)
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.
PREREQS: MTH 111 [D] and junior standing

ANRS 314 ANIMAL PHYSIOLOGY (4)
Biological basis of animal performance; describes how networks of cells act cooperatively to enable locomotion, provide a stable internal environment, allocate resources, remove metabolic end-products, and counteract microorganisms. **PREREQS:** General principles of biology equivalent to BI 211, BI 212, BI 213; junior standing or higher or instructor permission.

ANRS 315 CONTENTIOUS SOCIAL ISSUES IN ANIMAL AGRICULTURE (3)
Discussion of contentious issues including role of animal products and human health; use of hormones and antibiotics; new animal biotechnologies; animal rights/welfare; livestock grazing on public lands. (Bacc Core Course).

ANRS 316 REPRODUCTION IN DOMESTIC ANIMALS (4)
Anatomy and physiology of mammalian and avian reproductive systems; fertilization, embryonic and fetal development, placentation and parturition; reproductive technologies. Lec/rec. **PREREQS:** (BI 211 [D-] or BI 211H [D-]) and (CH 121 [D-] or CH 221 [D-] or CH 231 [D-] or CH 231H [D-]) and ANRS 121 and sophomore standing or higher.

ANRS 317 REPRODUCTION IN DOMESTIC ANIMALS LABORATORY (1)
Gross and microscopic anatomy of the reproductive tract; semen collection, evaluation and extension; evaluation of fertilization, embryo and fetal development and placentation. Lec/lab. **PREREQS:** ANRS 316* [D-]

ANRS 320 PRINCIPLES OF COMPANION ANIMAL NUTRITION (3)
Learn about nutrients, the digestive process, and the application of nutritional sciences to the health and

welfare of companion animals. Introduction to the metabolic basis and practical preventative management for nutritional diseases in companion animals. **PREREQS:** (BI 211 [D-] or BI 211H [D-]) and (BI 212 [D-] or BI 212H [D-])

ANRS 321 AVIAN EMBRYO (4)
Discussion and experimentation involving the development and the environmental requirements for the artificial incubation of avian embryos. Lec/lab. Offered even-numbered years. **PREREQS:** ANRS 121 and ANRS 217 and BI 211

ANRS 327 APPLIED PHYSIOLOGY OF REPRODUCTION (5)
Principles, techniques and recent development in semen collection, evaluation, extension and preservation; artificial insemination, estrus detection and synchronization; pregnancy diagnosis and embryo trANRSfer. **PREREQS:** (ANRS 316 [D-] and ANRS 317 [D-])

ANRS 331 ADVANCED LIVESTOCK EVALUATION (4)
Aspects of an individual animal's economic merit are compared to a sample group. Emphasis is placed on beef, swine and sheep. Visual appraisal, performance data and carcass merit are stressed. Designed to prepare students for the intercollegiate livestock judging team. This course is repeatable for a maximum of 12 credits. **PREREQS:** ANRS 231 and sophomore standing or higher.

ANRS 333 EQUINE STABLE MANAGEMENT (3)
Discusses developing a business plan, financial statements, and ratios, budgeting, financial planning, taxation, and employment issues within the current equine industry. **PREREQS:** ANRS 220 [D-] and ANRS 222 or instructor's approval.

ANRS 335 EQUINE HEALTH AND DISEASE (3)
Recognition of common diseases and disorders including their cause, treatment and prevention. Management of internal and external parasites. Recognizing common lameness issues. **PREREQS:** Junior standing.

ANRS ~~341~~ 342 ANIMAL BEHAVIOR AND COGNITION (3)
Survey, discuss, and explore principles of animal behavior and cognition from a comparative perspective, taking into account the interacting influences of biology, environment, and life experience on the individual and group behavior of animals across species. Aspects of animal cognition, including reasoning, perception, memory and personality, that play an important role in animal behavior will also be addressed. **PREREQS:** BI 102 [D] or BI 213 [D]

ANRS ~~351~~ 350 ADVANCED PRINCIPLES OF ANIMAL FOODS TECHNOLOGY (4)
Provides in-depth coverage of both fresh and processed meats and eggs into products suitable for human consumption. **PREREQS:** ANRS 251

ANRS 378 ANIMAL GENETICS (4)
Fundamentals of inheritance, principles of genetic segregation, population and quantitative genetics, response to natural selection and artificial manipulation of populations. **PREREQS:** BI 211 [D-] or BI 212 [D-] or BI 213 [D-] and ANRS 121 or equivalent and ST 351 recommended.

ANRS 380 PRINCIPLES OF ANIMAL ANATOMY AND PHYSIOLOGY (3)
An introductory course in animal anatomy to provide a foundation for advanced courses in the Animal Science curriculum. Emphasis is on acquisition of a basic knowledge of minute and gross anatomical structures, their operation, and integration. Begins with anatomical nomenclature such as body planes and directional terms then covers the following tissues and organ systems: epithelium, connective tissue, blood

and bone marrow, bone/cartilage, muscle tissue, nervous tissue, digestive system, circulatory system, reproductive system, urinary system, and respiratory system. **PREREQS:** (BI 211 [D] or BI 211H [D]) and (BI 212 [D] or BI 212H [D]) and (BI 213 [D] or BI 213H [D])

ANRS 385 FOUNDATIONS OF MAMMALIAN HISTOLOGY (3)
Provides a basic knowledge of mammalian microscopic anatomy. Emphasis will be on the appearance, organization and function of minute anatomical structures that can only be observed with the help of a visual enhancer, such as a microscope. Covers basic histological techniques and histology and related functions of the following tissues and organ systems: epithelium, connective tissue, bone/cartilage, blood, muscle tissue, nervous tissue, circulatory system, digestive system, reproductive system, urinary system, respiratory system, immune system, integument, eye and ear. Also covers gametogenesis, fertilization, and early development of the vertebrate embryo. Lec/rec. **PREREQS:** (BI 211 [C-] or BI 211H [C-]) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-]) and (BI 314 [C-] or BI 314H [C-])

ANRS 390 GROSS ANATOMY OF DOMESTIC ANIMALS (4)
Provides a foundation for advanced courses in the Animal Sciences curriculum. Emphasis on gaining knowledge of mammalian anatomy. Lectures cover anatomical nomenclature, structure, operation, and integration of major organ systems. The dog is used as the general model while comparative domestic animal anatomy is also covered. Lec/lab. **PREREQS:** (BI 211 [D] or BI 211H [D]) and (BI 212 [D] or BI 212H [D]) and (BI 213 [D] or BI 213H [D])

ANRS 403 THESIS (1-16)
This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 405 READING AND CONFERENCE (1-16)
Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 407 SEMINAR (1-16)
Graded P/N. This course is repeatable for a maximum of 16 credits.

ANRS 410 ANIMAL SCIENCE INTERNSHIP (1-12)
On- or off-campus, occupational work experience supervised by the department. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 415 LIVESTOCK JUDGING TEAM (3)
Designed to train students for participation in the intercollegiate livestock judging team. This course is repeatable for a maximum of 9 credits. **PREREQS:** ANRS 331

ANRS 420 ETHICAL ISSUES IN ANIMAL AGRICULTURE (3)
Students are provided with an opportunity to discuss, debate and write extensively about current, relevant, and controversial social issues dealing with modern animal agriculture. (Writing Intensive Course)

ANRS 430 EQUINE SYSTEMS I: EXERCISE SCIENCE (4)
Seniors and graduate students intensively explore and apply science to real-life situations regarding cardiorespiratory, muscle physiology, and bone physiology responses to exercise, climate, and altitude. Lec/lab. **PREREQS:** ANRS 314

ANRS 431 EQUINE SYSTEMS II: NUTRITION (3)
Senior and graduate students intensively explore and apply science to real-life situations regarding starch,

fiber, protein, and fat metabolism in performance horses, breeding stock, and growing horses. **PREREQS:** ANRS 313

ANRS 432 EQUINE SYSTEMS III: REPRODUCTION (4)
Senior and graduate students explore the fundamentals of equine reproduction and their application in horse breeding. Includes practical training of laboratory techniques. Lec/lab. **PREREQS:** (ANRS 220 [D-] and ANRS 316 [D-]) and ANRS 327

ANRS 433 POULTRY MEAT PRODUCTION SYSTEMS (3)
Fundamental applications and the analysis of management principles applied to brooding, rearing, feeding and housing meat-type chickens and turkeys and their respective breeders. Decision case studies and practical management problems are incorporated into the course. Offered odd number years. **PREREQS:** ANRS 217 and ANRS 313 and ANRS 316 and ANRS 378 or instructor's approval

ANRS 434 EGG PRODUCTION SYSTEMS (3)
Applications and analyses of egg production systems for brooding, rearing, feeding and housing egg producing chickens. Decision case studies and practical management problems are incorporated into the course. Offered even-numbered years. **PREREQS:** ANRS 217 and ANRS 313 and ANRS 316 and ANRS 378 or instructor's approval

ANRS 435 APPLIED ANIMAL BEHAVIOR (3)
Exploration of the fundamental processes of animal behavior and implications for animal management, production, housing and welfare. Examples provided in class will cover a range of species, with emphasis on domestic animals. Lec/lab. **PREREQS:** ANRS 314 and BI 350 or Z 350 or equivalent.

ANRS 436 SHEEP PRODUCTION SYSTEMS (3)
Integration of nutrition, genetics, reproduction, behavior, and health principles into management systems for production and marketing of lamb and wool. **PREREQS:** ANRS 216 and ANRS 311 and ANRS 316 and ANRS 378

ANRS 439 DAIRY PRODUCTION SYSTEMS (4)
Fundamentals of nutrition, breeding, reproductive physiology and health programs and their applications in the care and management of dairy cattle. **PREREQS:** ANRS 215 and ANRS 313 and ANRS 316 and ANRS 378

ANRS 440 DAIRY PRODUCTION SYSTEMS (3)
Decision case analysis or special topics in application of dairy management principles. **PREREQS:** ANRS 439 [D-]

ANRS ~~441~~ 447 TOPICS IN ANIMAL LEARNING (3)
Explore when and how the behavior of animals can be shaped by the environment, individual experiences, and interactions with other animals (including humans). **PREREQS:** BI 211 [D-] and BI 212 [D-] and junior standing. Recommended: ANRS 435 or ANRS 535 and (BI 350 or Z 350) and BI 213

ANRS 443 BEEF PRODUCTION SYSTEMS: COW/CALF (3)
Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle. Overnight field trip with extra fee charged. Lec/lab. Taught at EOU La Grande campus only. **PREREQS:** ANRS 313 and ANRS 315 and ANRS 316 and ANRS 378

ANRS 444 BEEF PRODUCTION SYSTEMS: STOCKER/FEEDLOT (3)
Continuation of the study of beef cattle management. Students will practice decision-making processes using

area beef cattle operations as case studies. Overnight field trip with extra fee charged. Taught at EOU La Grande campus only. **PREREQS:** ANRS 443 or ANRS 543

ANRS 445 BEEF PRODUCTION SYSTEMS (4)
Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of beef cattle from conception through calving, weaning, stocker/back grounding and the feedlot. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANRS 313 and ANRS 316 and ANRS 317 and ANRS 378

ANRS 452 LIVESTOCK HOUSING AND WASTE MANAGEMENT (3)
Basics in where, how, and why one would build, insulate, and ventilate livestock buildings. Manure and wastewater collection, treatment, storage, and utilization.

ANRS 456 COMPANION ANIMAL PRODUCTION SYSTEMS (3)
Fundamentals of dog and cat breeding stock selection, feeding and housing as well as biology and management from estrus through parturition to weaning. Due to the nature of this class, a variety of animals may be present during class session. Questions and interactions are encouraged but, while precautions are taken, any contact with animals carries some risk of injury or illness. **PREREQS:** (ANRS 313 [D-] and ANRS 316* [D-] and ANRS 317* [D-] and ANRS 378 [D-]) and senior standing.

ANRS 460 SWINE PRODUCTION SYSTEMS (4)
Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of swine from conception through farrowing, weaning, and the growing/finishing phases. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANRS 121 and ANRS 216 and ANRS 311 and ANRS 316 and ANRS 378

ANRS 499 SPECIAL TOPICS (0-16)
This course is repeatable for a maximum of 16 credits.

ANRS 501 RESEARCH (1-16)
Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 503 THESIS (1-16)
Graded P/N. This course is repeatable for a maximum of 999 credits.

ANRS 505 READING AND CONFERENCE (1-16)
Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 507 GRADUATE SEMINAR (1)
Section 1: Seminar/general for all graduate students. Preparation of effective visual aids. Practice explaining the validity or significance of experimental results to an informed audience. Section 2: Seminar/endocrinology, for graduate students interested in physiology. This course is repeatable for a maximum of 99 credits.

ANRS 508 WORKSHOP (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 509 TEACHING PRACTICUM (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 511 DIGESTIVE PHYSIOLOGY AND NUTRITION OF RUMINANT ANIMALS (4)
Anatomy and physiology of the ruminant digestive tract including rumen microbiology and digestive processes. Nutritional biochemistry and physiology of ruminants. Feed chemistry, feed intake and principles of ration balancing. Theory of energy and protein metabolism. **PREREQS:** ANRS 311 or ANRS 313

ANRS 512 MONOGASTRIC AND POULTRY NUTRITION (3)
Anatomical differences in digestive tracts of monogastrics; nutritional biochemistry of poultry; practical feeding of avian species; least-cost ration techniques; techniques for determining nutrient needs of monogastrics. **PREREQS:** ANRS 311 and ANRS 313

ANRS 515 REVIEW OF APPLIED RUMINANT NUTRITION RESEARCH TECHNIQUES (3)
Review and discussion and applied techniques and methodology used for ruminant nutrition research.

ANRS 530 EQUINE SYSTEMS I: EXERCISE SCIENCE (4)
Senior and graduate students intensively explore and apply science to real-life situations regarding cardiorespiratory, muscle physiology, and bone physiology responses to exercise, climate, and altitude. Lec/lab. **PREREQS:** ANRS 314

ANRS 531 EQUINE SYSTEMS II: NUTRITION (3)
Senior and graduate students intensively explore and apply science to real-life situations regarding starch, fiber, protein, and fat metabolism in performance horses, breeding stock, and growing horses. **PREREQS:** ANRS 313

ANRS 532 EQUINE SYSTEMS III: REPRODUCTION (4)
Designed for seniors and graduate students to explore the fundamentals of equine reproduction and their application in horse breeding. Includes practical training in laboratory techniques. Lec/lab. **PREREQS:** ANRS 220 and ANRS 316 and ANRS 327

ANRS 533 POULTRY MEAT PRODUCTION SYSTEMS (3)
Fundamental applications and the analysis of management principles applied to brooding, rearing, feeding and housing meat-type chickens and turkeys and their respective breeders. Decision case studies and practical management problems are incorporated into the course. Offered odd number years. **PREREQS:** ANRS 217 and ANRS 313 and ANRS 316 and ANRS 378 or instructor's approval

ANRS 534 EGG PRODUCTION SYSTEMS (3)
Applications and analyses of egg production systems for brooding, rearing, feeding and housing egg producing chickens. Decision case studies and practical management problems are incorporated into the course. Offered even-numbered years. **PREREQS:** ANRS 217 and ANRS 313 and ANRS 316 and ANRS 378 or instructor's approval

ANRS 535 APPLIED ANIMAL BEHAVIOR (3)
Exploration of the fundamental processes of animal behavior and implications for animal management, production, housing and welfare. Examples provided in class will cover a range of species, with emphasis on domestic animals. Lec/lab. **PREREQS:** ANRS 314 and BI 350 or Z 350 or equivalent.

ANRS 536 SHEEP PRODUCTION SYSTEMS (3)
Integration of nutrition, genetics, reproduction, behavior, and health principles into management systems for

production and marketing of lamb and wool. **PREREQS:** ANRS 216 and ANRS 311 and ANRS 316 and ANRS 378

ANRS 538 BIOLOGY OF LACTATION (3)
Physiological and environmental factors affecting mammary gland development and function. Offered alternate years. **PREREQS:** Z 431 or Z 531

ANRS 539 DAIRY PRODUCTION SYSTEMS (4)
Fundamentals of nutrition, breeding, reproductive physiology and health programs and their applications in the care and management of dairy cattle. **PREREQS:** ANRS 215 and ANRS 313 and ANRS 316 and ANRS 378

ANRS 540 DAIRY PRODUCTION SYSTEMS (3)
Decision case analysis or special topics in application of dairy management principles. **PREREQS:** ANRS 439

ANRS ~~541~~ 547 TOPICS IN ANIMAL LEARNING (3)
Explore when and how the behavior of animals can be shaped by the environment, individual experiences, and interactions with other animals (including humans). **PREREQS:** BI 211 and BI 212 and junior standing. Recommended: ANRS 435 or ANRS 535 and (BI 350 or Z 350) and BI 213

ANRS 543 BEEF PRODUCTION SYSTEMS: COW/CALF (3)
Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle. Overnight field trip with extra fee charged. Lec/lab. Taught at EOU La Grande campus only. **PREREQS:** ANRS 315 and ANRS 313 and ANRS 316 and ANRS 378

ANRS 544 BEEF PRODUCTION SYSTEMS: STOCKER/FEEDLOT (3)
Continuation of the study of beef cattle management. Students will practice decision-making processes using area beef cattle operations as case studies. Overnight field trip with extra fee charged. Taught at EOU La Grande campus only. **PREREQS:** ANRS 443 or ANRS 543

ANRS 545 BEEF PRODUCTION SYSTEMS (4)
Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of beef cattle from conception through calving, weaning, stocker/back grounding and the feedlot. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANRS 313 and ANRS 316 and ANRS 317 and ANRS 378

ANRS 552 LIVESTOCK HOUSING AND WASTE MANAGEMENT (3)
Basics in where, how, and why one would build, insulate, and ventilate livestock buildings. Manure and wastewater collection, treatment, storage, and utilization. Offered alternate years.

ANRS 556 COMPANION ANIMAL PRODUCTION SYSTEMS (3)
Fundamentals of dog and cat breeding stock selection, feeding and housing as well as biology and management from estrus through parturition to weaning. Due to the nature of this class, a variety of animals may be present during class session. Questions and interactions are encouraged but, while precautions are taken, any contact with animals carries some risk of injury or illness. **PREREQS:** (ANRS 313 and ANRS 316* and ANRS 317* and ANRS 378) and senior standing.

ANRS 560 LIPID METABOLISM (3)
Digestion, absorption and metabolism of lipids with emphasis on lipoprotein metabolism, regulation of lipid

metabolism in various tissues and metabolism of eicosanoids. Offered alternate years. **PREREQS:** BB 452 and BB 492 or equivalent

ANRS 599 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 601 RESEARCH (1-16)
Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 603 THESIS (1-16)
This course is repeatable for a maximum of 999 credits.

ANRS 605 READING AND CONFERENCE (1-16)
This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 606 PROJECTS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 607 GRADUATE SEMINAR (1)
This course is repeatable for a maximum of 99 credits.

ANRS 608 WORKSHOP (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 609 TEACHING PRACTICUM (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 662 HORMONE ACTION (3)
Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. Offered every other year, winter term. CROSSLISTED as MCB 662. **PREREQS:** BB 551 [C] or BB 592 [C]

ANRS 673 BIOLOGY OF MAMMALIAN REPRODUCTION (4)
Physiological, neuroendocrine, endocrine and environmental factors that regulate reproduction of mammals. Offered alternate years. **PREREQS:** ANRS 316 or equivalent and BB 350

ANRS 699 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 401 RESEARCH (1-16)

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS ~~121~~ 122 INTRODUCTION TO WILDLAND ECOLOGY (4)
Ecological principles will be applied to understand contemporary issues related to wildlands, specifically the rangeland biomes that comprises over 50% of the Earth's surface (FAO, SRM, USDA ERS). Topics to be covered fall into the following categories: Fundamentals of Ecology; Animals (wildlife & livestock); Disturbance (e.g., invasive species, fire, mineral extraction, etc.); Ecosystem Goods & Services (e.g., carbon sequestration, watersheds, biodiversity, recreation, etc.). The course will largely focus on U.S. wildlands,

however a portion will examine the ecology and issues of international rangelands in Africa, Eurasia, Australia, and South America. (Bacc Core Course)

ANRS 299 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 299H SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ANRS 341 RANGELAND ECOLOGY AND MANAGEMENT (3)
Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions.

ANRS 351 RANGE ECOLOGY I-GRASSLANDS (3)
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 context of the variable driving forces of climate (drought), herbivory, and fire. **PREREQS:** (BOT 313 [D-] and ANRS 341 [D-])

ANRS 352 RANGE ECOLOGY II-SHRUBLANDS (3)
Introduces the ecology of shrublands using an autecological approach. Explores the effects of stressors such as temperature, drought, fire, and herbivory on plant morphology, physiology, reproduction, and growth. Covers life histories of common shrubs and descriptions of shrubland communities used to promote understanding of autecological principles. **PREREQS:** BOT 313 and ANRS 341

ANRS 353 WILDLAND PLANT IDENTIFICATION (4)
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.

ANRS 355 DESERT WATERSHED MANAGEMENT (4)
A systems-based understanding of hydrologic processes in arid and semiarid landscapes. The class is focused on gaining knowledge of multiple ecological and hydrological interactions occurring in dryland watersheds and on discussing practical methodology aimed to enhance site productivity and ecosystem resilience. Emphasis is placed on land use effects on watershed function; monitoring of soil, water, and vegetation variables; and methods of rehabilitation of degraded landscapes. The course has a strong experiential learning component through a series of ‘hands-on’ practicums and a field trip to a semiarid location in eastern Oregon. Lec/lab.

ANRS 399 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 403 SENIOR THESIS (1-16)
This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 405 READING AND CONFERENCE (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 406 PROJECTS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 411 ADVANCED PLANT ID (2)
Advanced rangeland plant taxonomy. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANRS 421 WILDLAND RESTORATION AND ECOLOGY (4)
Emphasis is placed on understanding the ecology of arid and semi-arid 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 microenvironments for improved ecosystem function. **PREREQS:** Course work in soils and ecology. Field trip required.

ANRS ~~430~~ 437 APPLIED GIS IN RANGELAND SCIENCE (4)
Introducing the use of GIS and geospatial information (remote sensing for GIS, GPS, landscape ecology, and cartography principles) in rangeland sciences problem solving and analysis **PREREQS:** GEO 365 [D-] or GEOG 360 [D-]

ANRS 441 RANGELAND ANALYSIS (4)
Techniques used to describe vegetation in shrub-lands, grasslands, and forests. Use of measurements in resource management. Course is field-oriented, emphasizing both theory and practice of wildland inventory methods. **PREREQS:** ST 351 or ST 351H

ANRS 442 RANGELAND-ANIMAL RELATIONS (4)
Domestic and wild animal use of rangelands as related to environmental factors, palatability, food habits, nutrition, physiography, and their effects on management of rangeland-animal resources.

ANRS 455 RIPARIAN ECOHYDROLOGY AND MANAGEMENT (4)
A systems approach to study ecological and hydrological relationships occurring in riparian ecosystems. The class is focused on gaining knowledge of multiple connections between soil, water, and terrestrial vegetation occurring in riparian systems. Emphasis is placed on land use effects on the riparian ecologic and hydrologic function, 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). **PREREQS:** ANRS 355 [D-]

ANRS 470 PASTORAL SYSTEMS OF THE WORLD (4)
Description and evaluation of ecosystems which support grazing animals and pastoralists. Biology, ecology and management of these landscapes will be explored through climate, soils, and plant communities and human-livestock interactions. The historic role of trade and contemporary challenges to the ecological, social and economic sustainability of pastoral systems will be examined.

ANRS 490 RANGELAND MANAGEMENT PLANNING (4)
Administration and management of rangelands; planning processes involving goal setting, inventories, personnel management, environment, conflict resolution, and other constraints necessary for decision-making. Use of data collected from field problems to support the execution of class plans. Field trip required. Lec/lab.

ANRS 499 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 501 RESEARCH AND SCHOLARSHIP (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 503 MASTER'S THESIS (1-16)
This course is repeatable for a maximum of 999 credits.

ANRS 505 READING AND CONFERENCE (1-16) $
This course is repeatable for a maximum of 16 credits.

ANRS 506 PROJECTS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 507 SEMINAR (1-2)
This course is repeatable for a maximum of 16 credits.

ANRS 521 WILDLAND RESTORATION AND ECOLOGY (4)
Emphasis is placed on understanding the ecology of arid and semi-arid 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 microenvironments for improved ecosystem function.

ANRS 541 RANGELAND ANALYSIS (4)
Techniques used to describe vegetation in shrub-lands, grasslands, and forests. Use of measurements in resource management. Course is field-oriented, emphasizing both theory and practice of wildland inventory methods. **PREREQS:** ST 351

ANRS 542 RANGELAND-ANIMAL RELATIONS (4)
Domestic and wild animal use of rangelands as related to environmental factors, palatability, food habits, nutrition, physiography, and their effects on management of rangeland-animal resources. **PREREQS:** ANRS 341

ANRS 555 RIPARIAN ECOHYDROLOGY AND MANAGEMENT (4)
A systems approach to study ecological and hydrological relationships occurring in riparian ecosystems. The class is focused on gaining knowledge of multiple connections between soil, water, and terrestrial vegetation occurring in riparian systems. Emphasis is placed on land use effects on the riparian ecologic and hydrologic function, 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). **PREREQS:** ANRS 355

ANRS 577 AGROFORESTRY (3)
Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. CROSSLISTED as FES 477/FES 577, NR 477. **PREREQS:** Introductory course in biology.

ANRS 590 RANGELAND MANAGEMENT PLANNING (4)
Administration and management of rangelands; planning processes involving goal setting, inventories, personnel management, environment, conflict resolution, and other constraints necessary for decision-making. Use of data collected from field problems to support the execution of class plans. Field trip required. Lec/lab.

ANRS 599 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 601 RESEARCH AND SCHOLARSHIP (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 603 PH.D. THESIS (1-16)
This course is repeatable for a maximum of 999 credits.

ANRS 605 READING AND CONFERENCE (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 606 PROJECTS (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 607 SEMINAR (1-2)
This course is repeatable for a maximum of 16 credits.

ANRS 608 WORKSHOP (1-16)
This course is repeatable for a maximum of 16 credits.

ANRS 643 WILDLAND PLANT ECOPHYSIOLOGY (4)
Emphasizes the physiological ecology of plants living in arid and semi-arid ecosystems. Primary class emphasis will include photosynthesis, respiration, water stress and water use efficiency, stable isotopes, root structure and function, nutrient uptake and stress, and defoliation. Offered every other winter, odd years.

ANRS ~~662~~ 663 RANGELAND ECOLOGY (3)
Studies ecological theory and related resource management implications in rangelands and arid wildlands. Topics include the history and development of rangeland ecology, plant demography, invasive species, plant population dynamics, disturbance theory, succession, vegetation classification and range condition assessments. Offered every other winter, even years. **PREREQS:** A course in basic ecology recommended.

ANRS 670 ECOLOGICAL INVASIVE PLANT MANAGEMENT (2)
Logic of ecologically based invasive plant management. Ecological processes of invasion. Management of plant succession with emphasis on augmentive restoration. Adaptive management of weed invasions into natural ecosystems. Development of ecologically based management plans for natural ecosystems. Offered odd-numbered years only.

ANRS 699 SPECIAL TOPICS (1-16)
This course is repeatable for a maximum of 16 credits.