AGRONOMY (AGRO)

AGRO 801 Biology of Plant Pathogens
Crosslisted with: PLPT 801, HORT 801
Prerequisites: PLPT 369 or equivalent; an introduction to biochemistry course
Description: Molecular and cellular approach to the study of plant pathological principles.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: PLPT 965, AGRO 965, HORT 965

AGRO 802 Ecology and Management of Plant Pathogens
Crosslisted with: PLPT 802, HORT 802
Prerequisites: PLPT 369 or equivalent; an introduction to biochemistry course
Description: Principles of plant disease epidemiology and disease control through cultural, biological, chemical and host plant resistance strategies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: PLPT 965, AGRO 965, HORT 965

AGRO 803 Scientific Writing and Communication
Crosslisted with: AGRO 403, HORT 403, HORT 803
Prerequisites: Senior standing or higher, an ACE 1 written communication course, an ACE 2 oral communication course, and permission of instructor.
Description: Reading and critiquing, writing, and presenting scientific information. Use research data to compose a manuscript in standard scientific format, and prepare and present a poster to a general audience. Ethical issues in research and writing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 806 Plant Ecophysiology: Theory and Practice
Crosslisted with: HORT 406, HORT 806, NRES 406, NRES 806, AGRO 406
Prerequisites: Junior standing; 4hrs ecology, and/or 4hrs botany or plant physiology.
Description: Principles of plant physiology which underlie the relationship between plants and their physical, chemical and biotic environments. An introduction to the ecological niche, limiting factors and adaptation. An overview of the seed germination and ecology, plant and soil water relations, nutrients, plant energy budgets, photosynthesis, carbon balance and plant-animal interactions. An introduction to various field equipment used in ecophysiological studies.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC

AGRO 807 Plant-Water Relations
Crosslisted with: NRES 807
Prerequisites: AGRO 325 or equivalent; MATH 106 recommended
Description: Quantitative study of water relations in the soil-plant-atmosphere system. Basic physical processes, which describe the movement of water in the soil and the atmosphere, and the physiological processes, which describe water movement inside the plant. Stomata physiology and the effects of internal water deficits on photosynthesis, respiration, nitrogen metabolism, cell division and cell enlargement. Results from integrative models used to study the relative importance of environmental versus physiological factors for several plant-environment systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 808 Microclimate: The Biological Environment
Crosslisted with: AGRO 408, GEOG 408, HORT 408, METR 408, NRES 408, WATS 408, GEOG 808, HORT 808, METR 808, NRES 808
Prerequisites: Junior standing, MATH 106 or equivalent, 5hrs physics, major in any of the physical or biological sciences or engineering.
Description: Physical factors that create the biological environment. Radiation and energy balances of earth's surfaces, terrestrial and marine. Temperature, humidity, and wind regimes near the surface. Control of the physical environment through irrigation, windbreaks, frost protection, manipulation of light, and radiation. Applications to air pollution research. Instruments for measuring environmental conditions and remote sensing of the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO 907, HORT 907, METR 907, NRES 907; BSEN 954, NRES 954
Groups: Physical Geography

AGRO 809A Case studies in plant breeding: Breeding for Disease Resistance
Crosslisted with: AGRO 409A, HORT 409A, HORT 809A
Description: The application of fundamental genetics principles in inheritance, gene mapping and DNA analysis to decision making by plant breeders with the goal of improving disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of plant breeders who will use these discoveries in their work.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC
AGRO 809B Case Studies in plant breeding: Transgenic strategies for disease resistance  
**Crosslisted with:** AGRO 409B, HORT 409B, HORT 809B  
**Description:** The application of basic science and technology by plant genetic engineering experts with the goal of teaming with plant breeders to improve disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of genetic engineers and plant breeders who will use these discoveries in their work.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC

AGRO 810 Plant Molecular Biology  
**Crosslisted with:** BIOC 810, HORT 810  
**Prerequisites:** AGRO 215 or BIOS 206; BIOC 831  
**Description:** Molecular genetic basis of biological function in higher plants. Genome organization, gene structure and function, regulation of gene expression, recombinant DNA, and genetic engineering principles. Material taken primarily from current literature.  
**Credit Hours:** 3  
Max credits per semester: 3  
Max credits per degree: 3  
**Format:** LEC  
**Offered:** SPRING

AGRO 811 Crop Genetic Engineering  
**Crosslisted with:** AGRO 411  
**Description:** Basic steps required to produce genetically engineered crops. Genetic engineering procedures used to develop current crops and innovations that will lead to future products. Genetic engineering process and predicting how changes in different steps of the process influence the final crop. Application of genetic engineering technology to plan the development of new genetically engineered crops.  
**Credit Hours:** 2  
Max credits per semester: 2  
Max credits per degree: 2  
**Format:** LEC

AGRO 812 Crop and Weed Genetics  
**Crosslisted with:** AGRO 412  
**Notes:** A previous class in Genetics is highly recommended.  
**Description:** Application of classical and molecular genetic principles to the explanation of variation observed in plant families and populations. Interpretation of information gathered from whole plant trait observation and from molecular analysis. Relationships between crops and weeds. Examples from genetic studies on both crop and weed species are the basis of course.  
**Credit Hours:** 2  
Max credits per semester: 2  
Max credits per degree: 2  
**Format:** LEC  
**Offered:** SPRING

AGRO 813 Turfgrass and Landscape Weed Management  
**Crosslisted with:** HORT 813, TLMT 813  
**Description:** Fundamental terminology associated with turfgrass and landscape weed management. Weed identification and the cultural practices and herbicide strategies to limit weed invasion and persistence.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC

AGRO 814 Turfgrass Disease Management  
**Crosslisted with:** AGRO 414, HORT 414, HORT 814, PLPT 814, TLMT 414, TLMT 814  
**Prerequisites:** BIOS/PLPT 369 or one semester of introductory plant pathology.  
**Description:** Pathogens, epidemiology, and control of diseases specific to turfgrass.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC

AGRO 815A Self-pollinated Crop Breeding  
**Crosslisted with:** AGRO 815B  
**Prerequisites:** AGRO 215  
**Description:** Self-pollinated plant breeding theory and methods. Pedigree, bulk, single seed descent, back-crossing methods and inbreeding theory.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC  
**Prerequisite for:** AGRO 816B; AGRO 816E

AGRO 815B Germplasm and Genes  
**Crosslisted with:** AGRO 815C  
**Prerequisites:** AGRO 215  
**Description:** Obtaining germplasm and genes from cultivated plants, wild relatives of cultivated plants, and the biosphere. Origination of crops, mutation genetics, biotechnology as a source of genes, chromosomal engineering and plant reproduction.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC  
**Prerequisite for:** AGRO 816B; AGRO 816E

AGRO 815D Cross-pollinated Crop Breeding  
**Crosslisted with:** AGRO 815E  
**Prerequisites:** AGRO 215  
**Description:** Cross-pollinated breeding theory and methods. Genes in populations, recurrent selection methods, creating populations, hybrid production practices, and population improvement theory.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC  
**Prerequisite for:** AGRO 816B; AGRO 816E

AGRO 816A Heterosis  
**Description:** Classical concepts of heterosis; genetic hypotheses for hybrid vigor; quantitative genetics of heterosis; new tools to study hybrid vigor; structure and function; organization of germplasm into heterotic groups; prediction of heterosis and hybrid performance; mechanisms for making hybrid seed; and breeding methods/concepts for developing hybrids in plants.  
**Credit Hours:** 1  
Max credits per semester: 1  
Max credits per degree: 1  
**Format:** LEC
AGRO 816B Haploids and Doubled Haploids in Plant Breeding
Prerequisites: AGRO 815A, B, and D or permission
Description: Variations in chromosome number, biology and technology of haploids/doubled haploids in higher plants, microspore embryogenesis, wide hybridizations, in vivo mazie parthenogenesis-type, and radiation systems. Use of haploids in genetics research, DH systems in self-pollinated, cross-pollinated, and hybrid crop breeding.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 816E Genotype by Environment Interaction
Prerequisites: AGRO 815A, B, and D, STAT 801A, 802 or equivalent course work
Description: Types and causes of phenotype instability due to impacts of environmental factors. Topics include adaptation, impacts of G x E on selection and testing, selection of evaluation environments. Statistical concepts to describe/model interactions, breeding for reliability across unpredictable environments, precision phenotyping, selection for specific stresses, use of QTL's for abiotic and biotic stress stability.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC
Offered: SPRING

AGRO 817 Plant Pathology Principles and Application
Crosslisted with: PLPT 817, HORT 817
Prerequisites: 12 hours of prior coursework in the plant sciences
Description: Introduction to the biology of plant pathogenic organisms; pathogen-plant interactions; environmental influences; cultural, resistance, and chemical strategies for plant disease management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: SPRING

AGRO 818 Agricultural Biochemistry
Crosslisted with: BIOC 818
Prerequisites: Undergraduate major in life sciences or related area, and a course in biochemistry
Description: A Web-based course. Biochemical underpinnings of agricultural production and processing systems. Agricultural biotechnology; bioenergetics; kinetics and enzyme regulation; interaction of biomolecules with light, photosynthesis and the balance between anabolism and catabolism in microbes, plants and animals.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: IND
Prerequisite for: VBMS 919

AGRO 819 Applications of Remote Sensing in Agriculture and Natural Resources
Crosslisted with: AGRO 419, GEOG 419, GEOL 419, NRES 420, GEOG 819, GEOL 819, NRES 820
Notes: GEOG 418/NRES 418 recommended
Description: Introduction to the practical uses of remote electromagnetic sensing in dealing with agricultural and water-resources issues.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC
Groups: Techniques

AGRO 820 Bioinformatics Applications in Agriculture
Crosslisted with: AGRO 420
Prerequisites: AGRO 215 Genetics or equivalent. Undergraduate students must be at the senior class level standing.
Description: Introduction to applied computational methods to analyze biological data, efficiently manipulate large data sets, and automate workflows using Perl and Shell scripting. Learn strategies for assembling and analyzing data generated by modern high throughput sequencing platforms.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: FALL

AGRO 821 Learning Biotechnology
Crosslisted with: HORT 821
Description: Investigate biotechnology and its application in solving problems and connect biotechnology to basic science concepts in biology and chemistry. Integrate individually-designed biotechnology lessons into learning standards.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 822 Integrated Weed Management
Crosslisted with: HORT 822
Prerequisites: 12 hrs AGRO and/or closely related HORT and/or BIOS
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC
AGRO 824 Plant Nutrition and Nutrient Management
Crosslisted with: HORT 824
Prerequisites: AGRO 325 or basic course in plant physiology. A course in organic chemistry or biochemistry recommended
Notes: Offered spring semesters.
Description: Macro and micro nutrient elements and their function in the growth and development of plants. Role of single elements. Interaction and/or balances between elements and nutrient deficiency and/or toxicity symptoms as they affect the physiology of the whole plant. Relationship between crop nutrition and production and/or environmental considerations (e.g. yield, drought, temperature, pests).
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 826 Invasive Plants
Crosslisted with: AGRO 426, HORT 426, HORT 826, NRES 426, NRES 826
Prerequisites: AGRO/HORT/SOIL 153; BIOS 109.
Description: Identification, biology and ecology of weedy and invasive plants. Principles of invasive plant management by preventative, cultural, biological, mechanical and chemical means using an adaptive management framework. Herbicide terminology and classification, plant-herbicide and soil-herbicide interactions, equipment calibration and dosage calculations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 827 Turfgrass Systems Management
Crosslisted with: AGRO 427, HORT 427, TLMT 427, HORT 827, TLMT 827
Prerequisites: TLMT 227 and TLMT 327.
Description: Critical evaluation of turfgrass settings to create economical and environmentally friendly management systems for professionally managed turf areas.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 828 Scientific Illustration
Crosslisted with: ENTO 828, AGRI 828, HORT 828
Prerequisites: 12 hrs agricultural and/or biological sciences.
Description: Prepare scientifically accurate, high quality illustrations and graphics for the teaching, presentation, and publication of scientific information. Drawing techniques, drafting, copyright, and publication and presentation of scientific art work.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 829A Food Security: A Global Perspective
Prerequisites: Junior standing
Description: Overview of the technical and sociocultural dimensions of global food insecurity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 831 Spatial Variability in Soils
Prerequisites: AGRO/SOIL 366 and STAT 801.
Notes: Offered spring semester of even-numbered years.
Description: Basic concepts of soil variability, its underlying causes. The impact spatial variability has on soil management, primarily for crop production. Geographic and geo-statistical concepts. Use of spatial information for more profitable crop production.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC

AGRO 832 Learning Plant Science
Crosslisted with: HORT 832
Description: The biology of plants grown for food, fiber, fuel and fun. Connect applied plant science to basic science concepts in biology and chemistry. Integrate individually-designed plant science lessons into learning standards.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 834 Plant Biochemistry
Crosslisted with: AGRO 434, BIOC 434, BIOS 434, CHEM 434, BIOC 834, BIOS 834, CHEM 834
Prerequisites: BIOC/BIOS/CHEM 431/831.
Description: Biochemical metabolism unique to plants. Relationships of topics previously acquired in general biochemistry to biochemical processes unique to plants. Biochemical mechanisms behind physiological processes discussed in plant or crop physiology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 835 Agroecology
Crosslisted with: AGRO 435, HORT 435, NRES 435, NRES 835
Prerequisites: For AGRO/HORT/NRES 435: Senior standing. For AGRO/ NRES 835: 12 hrs biological or agricultural sciences.
Description: Integration of principles of ecology, plant and animal sciences, crop protection, and rural landscape planning and management for sustainable agriculture. Includes natural and cultivated ecosystems, population and community ecology, nutrient cycling, pest management, hydrologic cycles, cropping and grazing systems, landscape ecology, biodiversity, and socioeconomic evaluation of systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 836 Agroecosystems Analysis
Crosslisted with: AGRO 436, HORT 436, HORT 836
Prerequisites: Senior standing.
Notes: Cost of travel required. Summer travel course with multi-state faculty. Farm visits to Iowa, Minnesota and Nebraska.
Description: Analysis of production, economics, environmental impacts, and social integration aspects of farms and farming systems
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: FLD
AGRO 837 Animal, Food and Industrial Uses of Grain
Crosslisted with: AGRO 437
Prerequisites: CHEM 105 or 109, and one of the following: AGRO 204 or ASCI 250.
Description: Identification and comparison of grain quality characteristics desired by livestock feeders, human food processors and industrial users, and methods used to measure these characteristics.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC

AGRO 838 Producing Grain for Animal, Food and Industrial Uses
Crosslisted with: AGRO 438
Prerequisites: CHEM 109 and one of the following: AGRO 204 or ASCI 250.
Notes: AGRO 215 and 437/837 recommended.
Description: Genetic development, production practices, and grain handling and storage procedures to deliver quality grain to livestock feeders, human food processors and industrial uses.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 839 Organic Farming and Food Systems
Crosslisted with: AGRO 439, HORT 439, HORT 839
Prerequisites: Admission to the MS or PhD program
Description: History of organic farming and horticultural systems, organic certification, nutrient and pest management in organic systems, planning organic enterprises including production and marketing, resilience of organic systems in ecological, economic, and social terms; future issues and potentials of organic food systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 840 Great Plains Ecosystem
Crosslisted with: AGRO 440, NRES 840, RNGE 440, NRES 440
Prerequisites: Junior standing.
Notes: BIOS 101 and 101L, or equivalent, recommended.
Description: Characteristics of Great Plains ecosystems, interrelationships of ecological factors and processes, and their application in the management of grasslands. Interactions of fire, vegetation, grazing animals and wildlife.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 841 Perennial Plant Function, Growth, and Development
Crosslisted with: AGRO 441, HORT 441, HORT 841, RNGE 441
Prerequisites: AGRO 325 or equivalent.
Description: Principles of crop physiology and developmental morphology in relation to function, growth, development, and survival of perennial forage, range, and turf plants. The relationship of physiology and morphological development on plant use and management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 842 Wildland Plants
Crosslisted with: AGRO 442, NRES 842, RNGE 442, NRES 442
Prerequisites: Junior standing.
Notes: BIOS 101 and 101L, or equivalent, recommended.
Description: Wildland plants that are important to grassland and shrubland ecosystem management and production. Distribution, utilization, classification, identification (including identification by vegetative parts), uses by Native Americans, and recognition of grasses, fords, shrubs, exotic and wetland plants.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 843 Ecology of Invasive Species
Description: Ecological principles and their application to invasive species. Discussion of population level characteristics and community and ecosystem level effects of a wide variety of taxa including invasive microbial, fungal, plant, invertebrate, and vertebrate examples. Current global consequences and governmental policies/programs designed to limit the spread of invasives.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 844 Ecosystem Monitoring and Assessment
Crosslisted with: AGRO 444, NRES 844, RNGE 444, NRES 444
Prerequisites: Junior standing.
Notes: NRES 220 or equivalent, recommended.
Description: Measurement and monitoring of the important vegetation and environmental factors used to develop management guidelines in grasslands, savannas, woodlands, and wetlands. Emphasis on using ecosystem monitoring protocols for assessment of wildlife habitat, fuels management for wild-land fire, livestock production, and watershed function. Requires field sampling and travel to local field sites.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 845 Livestock Management on Range and Pasture
Crosslisted with: AGRO 445, ASCI 451, ASCI 851, RNGE 445
Prerequisites: ASCI 250 and AGRO 240 or 340; AECN 201 recommended.
Notes: AECN 201 recommended. Capstone course. All students required to participate in a one-week field trip in central or western Nebraska prior to beginning of fall semester. Therefore, students must notify instructor at time of early registration (Dates are given in class schedule.)
Description: Analyzing the plant and animal resources and economic aspects of pasturage. Management of pasture and range for continued high production emphasized.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Description</th>
<th>Max credits per degree</th>
<th>Format</th>
<th>Max credits per semester</th>
<th>Crosslisted with</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 846</td>
<td>Forage Quality</td>
<td>AGRO/RNGE 240 and ASCI 320, or equivalents; 3 cr hrs of introductory statistics; and permission</td>
<td>The chemical characteristics of forage components. The interactions with ruminant physiology and digestion that influence forage feeding value. The laboratory procedures used to evaluate forages for grazing livestock. The laboratory procedures used to evaluate forages for grazing livestock.</td>
<td>3</td>
<td>IND</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 847</td>
<td>Grassland Fire Ecology</td>
<td>BIOS 101 and 101L, or equivalent, recommended</td>
<td>Ecological effects of fire on grassland ecosystems. Insight into the history of fires, the people who use them and why, the parts of a fire, how fires behave in relation to fuel and weather, and the conducting and safety of prescribed burns.</td>
<td>3</td>
<td>IND</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 848</td>
<td>Grassland Monitoring and Assessment</td>
<td>BIOS 101 and 101L; and AGRO 240, or their equivalents, recommended</td>
<td>Vegetation sampling theory and plot selection. Quantitative measures used in vegetation analysis, root growth, and utilization. Similarity index, health, and trend for grassland monitoring and assessment. Use of basic statistics and the microcomputer to analyze data sets comparing methods for determination of biomass, basal cover, frequency, and density.</td>
<td>2</td>
<td>LEC</td>
<td>2</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 849</td>
<td>Watershed Management in Grasslands</td>
<td>BIOS 101 and 101L; NRES 220; and AGRO 240, or their equivalents, recommended</td>
<td>Management of physical/biological settings and processes along with human activities on water and watersheds considering preventative and restorative strategies in a natural resource range-land setting.</td>
<td>3</td>
<td>LEC</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 850</td>
<td>Climate and Society</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852</td>
<td>Impact of climate and extreme climatic events on society and societal responses to those events. Global in scope and interdisciplinary.</td>
<td>3</td>
<td>LEC</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 851</td>
<td>Grassland Plant Identification</td>
<td>BIOS 101 and 101L; and AGRO 240, or their equivalents, recommended</td>
<td>Study of plants that have ecological and/or agricultural importance in the Great Plains. Plant identification, grassland ecosystems and plants forage value, palatability, and utilization by both domestic livestock and wildlife. Cultural and historical uses of grassland.</td>
<td>2</td>
<td>LEC</td>
<td>2</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 852</td>
<td>Grazing Ecology and Management</td>
<td>BIOS 101 and 101L, or equivalent, recommended</td>
<td>This course discusses the ecological principles of domesticated livestock grazing and their application to manage grazing lands. Theoretical and applied models of plant/animals interactions will be presented. Grazing systems and their management of ecosystem services will be presented as balance between production and conservation outcomes.</td>
<td>3</td>
<td>LEC</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
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<tr>
<td>AGRO 855</td>
<td>Soil Chemistry and Mineralogy</td>
<td>AGRO/HORT/SOIL 153 or GEOL 101; CHEM 109 and 110; CHEM 221 or 251; or equivalent.</td>
<td>Chemical and mineralogical properties of soil components. Inorganic colloidal fraction. Structures of soil minerals as a means of understanding properties, such as ion exchange and equilibria; release and supply of nutrient and toxic materials; and soil acidity and alkalinity.</td>
<td>3</td>
<td>LEC</td>
<td>3</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
</tr>
<tr>
<td>AGRO 858</td>
<td>Soil Physical Determinations</td>
<td>SOIL/AGRO/GEOL/WATS 361; PHYS 141 or equivalent; MATH 102 or 103.</td>
<td>Survey of measurement techniques and principles used in characterizing the physical properties of soils. Includes analysis of experimental design and sources of experimental error. Techniques include: particle size analysis, soil water content, pore size analysis, field sampling techniques, soil strength, and saturated hydraulic conductivity.</td>
<td>2</td>
<td>LAB</td>
<td>2</td>
<td>AGRO 450, GEOG 450, METR 450, NRES 452, GEOG 850, METR 850, NRES 852.</td>
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**Notes:**
- Spring semester of even-numbered calendar years.
- Junior standing or above.
- Offered spring semester of even-numbered calendar years.
- Introductory statistics; and permission.
AGRO 860 Soil Microbiology
Crosslisted with: AGRO 460, BIOS 460, NRES 460, SOIL 460, BIOS 860, NRES 860
Prerequisites: One semester microbiology; one semester biochemistry or organic chemistry.
Description: Soil from a microbe's perspective-growth, activity and survival strategies; principles governing methods to study microorganisms and biochemical processes in soil; mechanisms controlling organic matter cycling and stabilization with reference to C, N, S, and P; microbial interactions with plants and animals; and agronomic and environmental applications of soil microorganisms.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: SPRING

AGRO 861 Soil Physics
Crosslisted with: AGRO 461, GEOL 461, NRES 461, SOIL 461, WATS 461, GEOL 861, NRES 861
Prerequisites: AGRO/SOIL 153; PHYS 141 or equivalent, one semester of calculus.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGEN 955, AGRO 955, CIVE 955, GEOL 985

AGRO 869 Bio-Atmospheric Instrumentation
Crosslisted with: AGRO 469, GEOG 469, HORT 407, METR 469, MSYM 469, NRES 469, GEOG 869, HORT 807, METR 869, MSYM 869, NRES 869
Prerequisites: Junior standing; MATH 106; 4 hrs physics; physical or biological science major.
Description: Discussion and practical application of principles and practices of measuring meteorological and related variables near the earth's surface including temperature, humidity, precipitation, pressure, radiation and wind. Performance characteristics of sensors and modern data collection methods are discussed and evaluated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO/HORT/SOIL 153; PHYS 141 or equivalent, one semester of calculus.

AGRO 870 Applied Soil Physics
Crosslisted with: AGRO 472, NRES 472, NRES 872, SOIL 472, WATS 472
Prerequisites: AGRO/HORT/SOIL 153 or equivalent; MATH 104 or MATH 106 or equivalent.
Description: Emphasis on applied soil physics. Discussion of theoretical principles followed by field and laboratory exercises and applications. Fluxes of water, solutes, air, and heat through the soil. Emphasis on water infiltration, water retention, other soil hydraulic properties. Components of soil water balance. Management of soil water.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 875 Water Quality Strategy
Crosslisted with: NRES 475, NRES 875, SOCI 475, SOCI 875, SOIL 475, WATS 475, AGRO 475, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, MSYM 475, MSYM 875, POLS 475, POLS 875
Prerequisites: Senior standing.
Notes: Capstone course.
Description: Holistic approach to the selection and analysis of planning strategies for protecting water quality from nonpoint sources of contamination. Introduction to the use of methods of analyzing the impact of strategies on whole systems and subsystems; for selecting strategies; and for evaluating present strategies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Groups: American Government&Public Pol

AGRO 878 Plant Anatomy
Crosslisted with: BIOS 478, BIOS 878, AGRO 478, HORT 478, HORT 878
Prerequisites: 8 hrs biological sciences
Notes: BIOS 109 recommended.
Description: Development, structure, and function of tissues and organs of the higher plants. Relationships of structure to physiology and ecology of plants.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC
Prerequisite for: BIOS 879

AGRO 880 Modified Rootzones
Crosslisted with: AGRO 480, HORT 480, TLMT 480, TLMT 880, HORT 880
Notes: Offered as a five-week course.
Description: Modified rootzones and their applications in the turfgrass and landscape management industry. Correct applications and construction techniques.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 884 Water Resources Seminar
Crosslisted with: AGRO 484, GEOL 484, GEOL 484, NRES 484, WATS 484, NRES 884, GEOL 884, GEOL 884, WATS 884
Prerequisites: Junior or above standing.
Description: Seminar on current water resources research and issues in Nebraska and the region.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 888 Business Management for Agricultural Enterprises
Crosslisted with: HORT 488, HORT 888, EAEP 488, AGRO 488, ENTR 488, EAEP 888, ENTR 888, ABUS 488
Description: Research a specific agricultural enterprise. Develop and present a business plan using materials from the primary area of interest. Requires the completion of a shadowing assignment and the analysis of case studies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
AGRO 889 Urbanization of Rural Landscapes
Crosslisted with: AGRO 489, CRPL 489, HORT 489, HORT 889, CRPL 889
Prerequisites: Senior standing or graduate standing.
Description: Development converts rural landscapes into housing, roads, malls, parks, and commercial uses. This process fragments landscapes and changes ecosystem functions, drives up land prices, and pushes agriculture into more marginal areas. This multi-disciplinary, experiential course guides students in learning about the urbanization process, the impacts on landscapes, people, and the community, and the choices that are available to informed citizens.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 894 Graduate Degree Project Credits
Crosslisted with: HORT 894
Prerequisites: Admission to Master of Agronomy or Horticulture degree program
Notes: Project activity for the nonthesis option II MS degree.
Description: Design, develop and complete a project that requires synthesis of the course topics covered in the primary area of emphasis.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Format: IND

AGRO 896 Independent Study
Crosslisted with: AGRO 496, RNGE 496, SOIL 496
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 12
Format: IND

AGRO 897 Master of Applied Science Project
Crosslisted with: AGRI 897, HORT 897, NRES 897
Prerequisites: Admission to Master of Applied Science degree program
Notes: Project activity for the Master of Applied Science degree.
Description: Design, develop and complete a project that requires synthesis of the course topics covered in the primary area of emphasis.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 12
Format: IND

AGRO 899 Masters Thesis
Prerequisites: Admission to masters degree program and permission of major adviser.
Notes: P/N only.
Credit Hours: 1-10
Min credits per semester: 1
Max credits per semester: 10
Max credits per degree: 99
Format: IND

AGRO 906 Crop Growth and Yield Modeling
Crosslisted with: NRES 906
Prerequisites: AGRO 325/HORT 325 Introductory Plant Physiology or equivalent
Notes: Recommended: AGRO 406/806 NRES 406/806 HORT 406/806 Plant Ecophysiology or equivalent.
Description: Understanding and use of crop simulation models and ability to build crop models. Studying principles and quantitative descriptions of crop production ecology. Offered fall semester of odd-numbered calendar years.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 907 Agricultural Climatology
Crosslisted with: HORT 907, METR 907, NRES 907
Prerequisites: NRES 808; STAT 801A or equivalent
Description: Offered spring semester of odd-numbered calendar years. Analysis and use of climatological data as applied to agricultural activities and the use of climatological information to assist in decision making.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: SPRING

AGRO 919 Plant Genetics
Crosslisted with: HORT 919
Prerequisites: AGRO 215
Description: Focus student learning on principles related to mendelian, population, and molecular genetics of plants including allelisms, nonallelic gene interaction, linkage and recombination, mode of inheritance, mutation, epigenetics, DNA-based markers and mapping techniques, inheritance of qualitative and quantitative traits, and plant transformation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 920 Xenobiotics in the Environment
Crosslisted with: ENTO 920, EOHT 920, HORT 920, NRES 920
Prerequisites: Recommend one course each in organic chemistry, soil science, biochemistry, plant physiology, microbiology and ecology
Description: Fate and ecotoxicological impacts of biologically foreign compounds in soil-water-plant environments; uptake, mechanisms of toxicity and metabolism in plants and other biota. Herbicides and other pesticides.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
AGRO 931 Population Genetics
Crosslisted with: ASCI 931, HORT 931
Prerequisites: AGRO 215 and STAT 801A
Description: Structure of populations, forces affecting gene frequency and frequency of genotypes, continuous variation, population values and means, genotypic and environmental variances and covariances.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: SPRING
Prerequisite for: AGRO 932, STAT 847; ASCI 932; ASCI 933; ASCI 944, STAT 844

AGRO 932 Biometrical Genetics and Plant Breeding
Crosslisted with: STAT 847
Prerequisites: AGRO 931
Notes: STAT 802 recommended. Offered odd-numbered calendar years.
Description: Theoretical concepts involved in planning breeding programs for the improvement of measurable morphological, physiological, and biochemical traits that are under polygenic control in crop plants of various types.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 940 Forage Evaluation
Crosslisted with: ASCI 924
Prerequisites: Permission
Description: Offered even-numbered calendar years. Analytic procedures and research methods used in evaluating biochemical components and nutritive value of forages. An evaluation of the impact of forage quality on forage breeding and animal performance.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 955 Solute Movement in Soils
Crosslisted with: AGEN 955, CIVE 955, GEOL 985
Prerequisites: MATH 208; AGRO 861 or GEOL 888 or MSYM 852 or CIVE 858
Description: Examination of the theory and experimental evidence available to characterize the movement of chemicals in soil. Both saturated and unsaturated flow conditions examined. Initial presentation of basic theoretical concepts. Remainder of class a discussion of the literature.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 963 Genetics of Host-Parasite Interaction
Crosslisted with: HORT 963, PLPT 963
Prerequisites: BIOS 820; and permission
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 965 Plant Virology
Crosslisted with: PLPT 965, HORT 965
Prerequisites: PLPT 801 or 802; and permission.
Notes: PLPT 865 is offered odd-numbered calendar years.
Description: Virus molecular biology; virosphere; virus-vector relationships; plant resistance to virus infection economic impact and control of plant diseases by viruses.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: SPRING

AGRO 968 Seminar in Plant Pathology
Crosslisted with: PLPT 968, HORT 968
Prerequisites: Permission.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC
Offered: SPRING

AGRO 991 Seminar Presentation and Evaluation
Crosslisted with: HORT 991
Description: Various topics in horticulture, agronomy or related subjects. Emphasis on techniques.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 2
Format: LEC

AGRO 992 General Seminar
Crosslisted with: HORT 992, NRES 992
Notes: Agronomy and Horticulture PhD students should enroll in this course twice.
Description: Expected of all Agronomy and Horticulture graduate students. Presentation of thesis/dissertation or non-thesis topics in agronomy, horticulture or related subjects. Agronomy and Horticulture PhD students should enroll in this course twice.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 5
Format: LEC

AGRO 996 Research in Crops
Prerequisites: 12 hrs agronomy or closely related sciences and permission
Credit Hours: 2-5
Min credits per semester: 2
Max credits per semester: 5
Max credits per degree: 5
Format: IND

AGRO 996A Research in Soils
Crosslisted with: NRES 996A
Prerequisites: 12 hrs AGRO or closely related sciences, and permission
Credit Hours: 2-5
Min credits per semester: 2
Max credits per semester: 5
Max credits per degree: 5
Format: IND
AGRO 999 Doctoral Dissertation
Crosslisted with: HORT 999
Prerequisites: Admission to doctoral degree program and permission of supervisory committee chair.
Credit Hours: 1-24
Min credits per semester: 1
Max credits per semester: 24
Max credits per degree: 99
Format: IND