AGRONOMY (AGRO)

AGRO 92 Plant Biology Portfolio and Assessment
Crosslisted with: HORT 92, NRES 92
Prerequisites: Junior standing in Plant Biology degree program
Notes: Required for graduation. Offered every Fall during the first 5 weeks. Pass/No Pass only.
Description: Development of an experiential portfolio and completion of an online survey as part of assessment activities.
Credit Hours: 0
Max credits per semester: 0
Max credits per degree: 0
Format: LEC

AGRO 107 Invasive Plant Species: Impacts on Ecosystems
Crosslisted with: NRES 107
Description: The flora of the earth is constantly being re-distributed by natural and human forces. As plant species change locations, they affect ecosystems, but how? In this course, students will learn how invasive plants establish and spread in ecosystems and develop an understanding of the importance of invasive plants and their impacts on ecosystems from local to global scales.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 127 Survey of Turfgrass and Landscape Management
Crosslisted with: TLMT 127, HORT 127
Description: Introduction to careers, internships and co-curricular activities in turfgrass and landscape management.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 131 Plant Science
Crosslisted with: HORT 131
Description: Biology of plants grown for food, fiber, fun, or fuel. Plant life cycles in managed ecosystems and their role in global carbon and water cycles. Mechanisms plants use to drive and control their growth, propagate, and change to compete with other organisms in their environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO 227, HORT 227, PGAM 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; AGRO 240, RNGE 240; HORT 212, NRES 212, LARC 212; HORT 353; HORT 355
ACE: ACE 4 Science

AGRO 132 Agronomic Plant Science Laboratory
Prerequisites: AGRO 131 or parallel
Description: Growth, development, morphology and staging of annual and perennial monocot and dicot plants produced for grain, forage and grazing. Evaluation of seed, grain and forage quality for plants of agronomic importance.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LAB

AGRO 153 Soil Resources
Crosslisted with: HORT 153, SOIL 153
Prerequisites: High school chemistry or one semester college chemistry.
Description: Characteristics of soils in relation to their appropriate uses and protection. Principles and practices using cooperative exercises including discussion, assessment, planning, problem-solving, writing, and presentation involving all aspects of soils.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC
Prerequisite for: AGRO 327, HORT 327, TLMT 327; AGRO 361, GEOL 361, NRES 361, SOIL 361, WATS 361; AGRO 455, AGRO 855, NRES 455, NRES 855, SOIL 455; AGRO 472, AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472; NRES 245, AGRO 245; NRES 319

AGRO 201 Agronomic Internship and Career Preparation
Description: Group activities to help formulate career goals, improve academic success skills, develop a resume and select an appropriate internship.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 204 Resource-Efficient Crop Management
Prerequisites: AGRO 131 and AGRO/SOIL 153, or equivalents.
Description: Integration of principles of crop and soil science, plant breeding, climatology and integrated pest management in the development and evaluation of crop management practices. Efficient use of solar radiation, water, nutrients, heat, carbon dioxide, and other resources in field crop management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO 405

AGRO 215 Genetics
Crosslisted with: HORT 215, TLMT 215
Prerequisites: 3 hrs biological sciences.
Description: Discovery of the biology of genes and the application of genetics principles to understand the control and inheritance of traits in families and populations. Focus is on animals and plants that are important in medicine, agriculture and nature. Learning emphasis is problem solving via online, instant feedback assessments, group discussion, experimental data analysis and context-based exams.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC
Prerequisite for: ASCI 330
AGRO 216 Plant Breeding Principles and Practice
Crosslisted with: BIOS 216, HORT 216
Prerequisites: High school biology and chemistry. BIOS 101 and 101L, or 102 or equivalent recommended.
Description: Plant breeding theory and technique. Application of genetic principles to plant improvement. Experience with breeding agronomic and horticultural plant species to illustrate plant mating systems and breeding principles.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC

AGRO 227 Introductory Turfgrass Management
Crosslisted with: HORT 227, PGAM 227, TLMT 227
Prerequisites: AGRO 131 or HORT 130 or BIOS 109.
Description: Introduction to turfgrasses, their management and use, and to the turfgrass industry.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO 326, HORT 326, TLMT 326; AGRO 327, HORT 327, TLMT 327

AGRO 228 Introduction to Landscape Management
Crosslisted with: HORT 228, TLMT 228
Prerequisites: AGRO 131 or BIOS 109
Notes: TLMT/AGRO/HORT uses a team approach to problem solving, discussion, assessment planning, and oral presentations of applied case studies.
Description: An overview of landscape management and landscape design. Principles and practices.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: AGRO 326, HORT 326, TLMT 326

AGRO 229 Introductory Turfgrass Management Laboratory
Crosslisted with: TLMT 229, HORT 229
Description: Laboratory covering turfgrass identification and management. Concurrent enrollment with AGRO/HORT/TLMT 227 preferred. Required for Turfgrass Science majors, other students require instructor consent.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LAB

AGRO 240 Forage Crop and Pasture Management
Crosslisted with: RNGE 240
Prerequisites: AGRO 131 or BIOS 109 or equivalent
Description: Principles basic to the establishment, management, and utilization of forage crops and pastures. Plant identification and selection, seeding, fertilization, irrigation, forage quality and utilization, hay and silage preservation, and grazing management. The role of forages and ranges in developing a sustainable agriculture.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 242 North American Wildland Plants
Crosslisted with: HORT 242, RNGE 242
Prerequisites: Permission, AGRO/RNGE 240 recommended.
Description: Identification and description of two-hundred important wildland plants of North America. Characteristics of these plants evaluated in terms of management implications.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 4
Format: LEC

AGRO 245 Introduction to Grassland Ecology and Management
Crosslisted with: NRES 245
Prerequisites: AGRO 153
Description: Grassland ecology and management is relevant to students with education and career goals in managing natural resources in Nebraska and the Great Plains. About 50% of the land area in Nebraska is classified as grassland (or rangeland) and is the land type with the most opportunity for enhancing biodiversity and wildlife habitat. Applying ecological principles and social values to managing rangeland resources, students will develop a knowledge and appreciation for the various grassland management uses and techniques available to resource managers.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 269 Principles of Soil Management
Crosslisted with: SOIL 269
Prerequisites: AGRO 153.
Description: Principles of soil management under dryland and irrigated conditions. Relationships of soil and climate resources to soil erosion, movement and storage of soil water, soil organic matter, and irrigation practice. Special problem topics such as acidity, alkali, drainage, and soil testing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 270 Biological Invaders
Crosslisted with: HORT 270, NRES 270, PLPT 270
Prerequisites: 3 hrs biological sciences.
Description: Impact of exotic species and invasive organisms: agricultural and medical emerging disease; predicting biological invasions; biological control; regulatory, monitoring, and control efforts; ecological impact.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 275 Agribusiness Entrepreneurial Finance
Crosslisted with: AECN 275, EAEP 275, ENTR 275, HORT 275
Description: Overview of financial issues for agribusiness start-ups. Business funding specific to new enterprises. Case studies on financial practices for start-up firms.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
AGRO 279 Soil Evaluation
Crosslisted with: NRES 279, SOIL 279
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 3
Format: LEC

AGRO 295 Internship in Agronomy
Crosslisted with: RNGE 295, SOIL 295
Prerequisites: Sophomore standing and completion of internship approval form. The internship proposal is subject to approval by the department.
Description: Participation in agronomic applications and in agronomy-related areas of agribusiness; agronomic research in lab, greenhouse, or field; participation in farming practices other than those in which the student has had previous experience; or preparation of teaching materials.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 5
Format: LEC

AGRO 325 Introductory Plant Physiology
Prerequisites: Chemistry through organic or higher-level course in cell biology.
Notes: Botany recommended.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC

AGRO 326 Landscape Solutions
Crosslisted with: HORT 326, TLMT 326
Prerequisites: TLMT/AGRO/HORT 227 or 228
Description: Using processes and problem-solving approach to identify and analyze common landscape management situations in commercial, public, and residential landscapes. Integrate design, environment, function, pest and disease, and existing management practices to produce recommendations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 327 Turfgrass Science and Management
Crosslisted with: HORT 327, TLMT 327
Prerequisites: AGRO/HORT/SOIL 153; CHEM 105 or 109; and TLMT 227
Description: Scientific principles of turf species adaptation, turf and/or soil relationships, establishment, fertility, mowing, irrigation, and pest control of turf species.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 330 Pruning Oramentals
Crosslisted with: HORT 330, TLMT 330
Description: Why, when and how to prune ornamental landscape plants. Demonstrations and field opportunities on how to choose and how to use pruning tools correctly.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

AGRO 340 Range Management and Improvement
Crosslisted with: RNGE 340
Prerequisites: AGRO 240.
Description: The principles of range management within the ecosystem framework. Range improvement practices and grazing systems; plant control using biological, chemical and mechanical factors; prescribed burning; range seeding; range fertilization; and the integration of range with other forage resources.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 361 Soils, Environment and Water Quality
Crosslisted with: GEOL 361, NRES 361, SOIL 361, WATS 361
Prerequisites: AGRO/HORT/SOIL 153; MATH 102 or 103; two semesters chemistry (CHEM 105, 106 or CHEM 109,110) and WATS/GEOG/NRES 281
Description: Chemical and physical processes that influence the fate and transport of contaminants (inorganic, organic, microbial) in soil-water environments. Extent, fate, mitigation and impact of various sources of pollution. Remedial technologies used for environmental restoration of contaminated environments.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 366 Soil Nutrient Relationships
Crosslisted with: SOIL 366
Prerequisites: AGRO 153.
Description: Use of fertilizers as plant nutrient sources to produce healthy and nutritious plants, improve profit, insure enterprise sustainability, fulfill legal requirements, and protect soil and water quality. Addresses issues from production agriculture, natural resource utilization and preservation, and ornamental plant culture.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC

AGRO 370 Biology of Fungi
Crosslisted with: HORT 370, PLPT 370
Prerequisites: 8 hrs biological sciences.
Description: Survey of fungi in natural and human ecosystems: symbiotic relationships; as disease agents in humans, animals, and plants; applications in food, agricultural, and pharmaceutical industries; historical and current impacts on society.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 388 Agribusiness Entrepreneurship
Crosslisted with: HORT 388, ENTR 388, EAEP 388, ABUS 388
Description: Overview of types of agricultural enterprises. Basic accounting principles as they relate to agricultural businesses. Requires completion of a marketing plan specific to agricultural enterprises based on a business idea. Student team projects with emphasis on marketing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Prerequisite for: HORT 301
AGRO 403 Scientific Writing and Communication
Crosslisted with: AGRO 803, 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
ACE: ACE 10 Integrated Product

AGRO 405 Crop Management Strategies
Prerequisites: Senior standing; AGRO 204, AGRO/SOIL 269; and permission. JGEN 200 and/or 300, and AECN 201 recommended
Notes: Capstone course. Requires participation in a three-day field trip prior to the beginning of the first semester. Students must notify instructor at time of early registration (dates are listed in Schedule of Classes). Cannot be taken “Pass/No Pass.”
Description: Application, expansion, and integration of principles from agricultural, biological, and physical sciences into the development and management of cropping systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ACE: ACE 10 Integrated Product

AGRO 406 Plant Ecophysiology: Theory and Practice
Crosslisted with: AGRO 806, HORT 406, HORT 806, NRES 406, NRES 806
Prerequisites: Junior standing; 4 hrs ecology; and 4 hrs 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 408 Microclimate: The Biological Environment
Crosslisted with: GEOG 408, HORT 408, METR 408, NRES 408, WATS 408, AGRO 808, GEOG 808, HORT 808, METR 808, NRES 808
Prerequisites: Junior standing, MATH 106 or equivalent, 5 hrs physics, major in any of the physical or biological sciences or engineering; or permission.
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. 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

AGRO 409A Case studies in plant breeding: Breeding for Disease Resistance
Crosslisted with: AGRO 809A, 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 409B Case studies in plant breeding: Transgenic strategies for disease resistance
Crosslisted with: AGRO 809B, 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 411 Crop Genetic Engineering
Crosslisted with: AGRO 811
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 412 Crop and Weed Genetics
Crosslisted with: AGRO 812
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 414 Turfgrass Disease Management
Crosslisted with: AGRO 814, HORT 414, HORT 814, PLPT 414, 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 419 Applications of Remote Sensing in Agriculture and Natural Resources
Crosslisted with: GEOG 419, GEOL 419, NRES 420, AGRO 819, GEOG 819, GEOL 819, NRES 820
Prerequisites: GEOG/NRES 418.
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 426 Invasive Plants
Crosslisted with: AGRO 826, 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 427 Turfgrass Systems Management
Crosslisted with: HORT 427, TLMT 427, AGRO 827, 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
ACE: ACE 10 Integrated Product

AGRO 429A 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 431 Site-specific Crop Management
Crosslisted with: AGEN 431, MSYM 431
Prerequisites: Senior standing; AGRO/SOIL 153; AGRO 204; or permission.
Description: Principles and concepts of site-specific management. Evaluation of geographic information systems for crop production practices. Practical experience with hardware and software necessary for successful application of information affecting crop management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 434 Plant Biochemistry
Crosslisted with: BIOC 434, BIOS 434, CHEM 434, AGRO 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 435 Agroecology
Crosslisted with: AGRO 835, HORT 435, NRES 435, NRES 835
Prerequisites: For AGRO/HORT/NRES 435: Senior standing or permission. For AGRO/NRES 835: 12 hrs biological or agricultural sciences or permission.
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
ACE: ACE 10 Integrated Product
AGRO 436 Agroecosystems Analysis
Crosslisted with: AGRO 836, HORT 436, HORT 836
Prerequisites: Senior standing.
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 437 Animal, Food and Industrial Uses of Grain
Crosslisted with: AGRO 837
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 438 Producing Grain for Animal, Food and Industrial Uses
Crosslisted with: AGRO 838
Prerequisites: CHEM 109 and one of the following: AGRO 204 or ASCI 250.
Notes: AGRO 215 and 437/837 recommended. 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 439 Organic Farming and Food Systems
Crosslisted with: AGRO 839, HORT 439, HORT 839
Prerequisites: 12 credits of agricultural or biological science, economics, or natural resources
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 440 Great Plains Ecosystem
Crosslisted with: AGRO 840, NRES 840, RNGE 440, NRES 440
Prerequisites: Junior standing. 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 441 Perennial Plant Function, Growth, and Development
Crosslisted with: AGRO 841, 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 442 Wildland Plants
Crosslisted with: AGRO 842, NRES 842, RNGE 442, NRES 442
Prerequisites: Junior standing. 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 444 Ecosystem Monitoring and Assessment
Crosslisted with: AGRO 844, NRES 844, RNGE 444, NRES 444
Prerequisites: Junior standing. 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 445 Livestock Management on Range and Pasture
Crosslisted with: AGRO 845, ASCI 451, ASCI 851, RNGE 445
Prerequisites: ASCI 250 and AGRO 240 or 340; AECN 201 recommended.
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

ACE: ACE 10 Integrated Product

AGRO 450 Climate and Society
Crosslisted with: GEOS 450, METR 450, NRES 452, AGRO 850, GEOS 850, METR 850, NRES 852
Prerequisites: METR 100 or NRES 370 or equivalent.
Description: Impact of climate and extreme climatic events on society and societal responses to these events. Global in scope and interdisciplinary.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

Groups: Physical Geography
AGRO 452 Irrigation Systems Management
Crosslisted with: MSYM 452, MSYM 852, WATS 452
Prerequisites: MSYM 109 or PHYS 141 or PHYS 151 or PHYS 211
Notes: AGRO/SOIL 153 recommended.
Description: Irrigation management and the selection, evaluation, and improvement of irrigation systems. Includes soil-water measurement, crop water use, irrigation scheduling, irrigation efficiency, measurement of water flow, irrigation systems, groundwater and wells, pumping systems, applying chemicals with irrigation systems, and environmental and water resource considerations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Offered: FALL

AGRO 453 Urban Soil Properties and Management
Crosslisted with: HORT 453, LARC 453, SOIL 453
Prerequisites: AGRO/HORT/SOIL 153.
Description: Characteristics of soils in urban settings. Evaluation of soils intended for intensive human uses. Manipulation and remediation of soils subject to construction and other stresses.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 455 Soil Chemistry and Mineralogy
Crosslisted with: AGRO 855, NRES 455, NRES 855, SOIL 455
Prerequisites: AGRO/HORT/SOIL 153 or GEOL 101; CHEM 109 and 110; CHEM 221 or 251; or equivalent.
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

AGRO 458 Soil Physical Determinations
Crosslisted with: AGRO 858, NRES 458, NRES 858, SOIL 458
Prerequisites: SOIL/AGRO/GEOL/WATS 361; PHYS 141 or equivalent; MATH 102 or 103.
Description: 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.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LAB

AGRO 460 Soil Microbiology
Crosslisted with: BIOS 447, NRES 460, SOIL 460, AGRO 860, BIOS 847, 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

AGRO 461 Soil Physics
Crosslisted with: GEOL 461, NRES 461, SOIL 461, WATS 461, AGRO 861, 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

AGRO 469 Bio-Atmospheric Instrumentation
Crosslisted with: GEOG 469, HORT 407, METR 469, MSYM 469, NRES 469, AGRO 869, 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

AGRO 470 Critical Thinking in Landscape Management
Crosslisted with: HORT 470, TLMT 470
Prerequisites: AGRO/HORT/PGMP/TLM 326.
Description: Using processes and strategies to identify and compare issues, make recommendations, demonstrate proficiency in field application as skills and techniques, and prepare cost estimates in the development of landscape management plans.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ACE: ACE 10 Integrated Product
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<th>Max credits per semester</th>
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<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 472</td>
<td>Applied Soil Physics</td>
<td>AGRO 872, NRES 472, SOIL 472</td>
<td>AGRO/HORT/SOIL 153 or equivalent; MATH 104 or MATH 106 or equivalent.</td>
<td>Emphasis on applied soil physics. Discussion of theoretical principles followed by field and laboratory exercises and applications. Focuses on 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.</td>
<td>3</td>
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<td>3</td>
<td>LEC</td>
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<tr>
<td>AGRO 475</td>
<td>Water Quality Strategy</td>
<td>AGRO 475, NRES 875, SOCI 475, SOCI 875,</td>
<td>AGRO 475, WATS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 875, CRPL 875,</td>
<td>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.</td>
<td>3</td>
<td>3</td>
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<td>LEC</td>
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<tr>
<td>AGRO 477</td>
<td>Great Plains Field Pedology</td>
<td>GEOG 467, NRES 477, SOIL 477, GEOG 867,</td>
<td>AGRO/SOIL 153.</td>
<td>Spatial relationship of soil properties on various parts of landscape typical of the Plains, causal factors, and predictions of such relationships on other landscapes. Grouping these properties into classes, naming the classes, and the taxonomy that results from this grouping. Application of a taxonomy to a real situation through making a field soil survey in a region representative of the Plains border, predicting land use response of various mapped units as it affects the ecosystem, and evaluating the effectiveness of the taxonomic system used in the region surveyed.</td>
<td>4</td>
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<td>LEC</td>
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<tr>
<td>AGRO 480</td>
<td>Modified Rootzones</td>
<td>HORT 480, TLMT 480, TLMT 880, AGRO 880,</td>
<td>AGRO 880, HORT 880</td>
<td>Modified rootzones and their applications in the turfgrass and landscape management industry. Correct applications and construction techniques. Offered as a five-week course.</td>
<td>1</td>
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<td>LEC</td>
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<tr>
<td>AGRO 484</td>
<td>Water Resources Seminar</td>
<td>GEOG 484, GEOL 484, NRES 484, WATS 484,</td>
<td>AGRO 884, GEEO 884, GEOL 884, WATS 884</td>
<td>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.</td>
<td>1</td>
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<td>LEC</td>
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<tr>
<td>AGRO 488</td>
<td>Business Management for Agricultural Enterprises</td>
<td>HORT 488, HORT 888, EAP 488, EAP 888,</td>
<td>AGRO 888, ENTR 880, ABUS 888</td>
<td>Research a specific agricultural enterprise. Develop and present a business plan using materials from the primary area of interest.</td>
<td>3</td>
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<td>LEC</td>
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<tr>
<td>AGRO 489</td>
<td>Urbanization of Rural Landscapes</td>
<td>AGRO 889, CRPL 849, HORT 889, CRPL 889</td>
<td>AGRO 889, CRPL 889</td>
<td>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.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>LEC</td>
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<tr>
<td>AGRO 495</td>
<td>Grasslands Seminar</td>
<td>ENTO 495, GRAS 495, HORT 495, NRES 495,</td>
<td>AGRO 495, SOIL 495</td>
<td>Topic varies and deals with different aspects of forage and/or range and/or livestock, turf and/or landscape grasses, natural habitats, and wetlands.</td>
<td>1-2</td>
<td>1</td>
<td>1</td>
<td>LEC</td>
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<tr>
<td>AGRO 496</td>
<td>Independent Study</td>
<td>AGRO 496, RNGE 496, SOIL 496</td>
<td>AGRO 496, RNGE 496</td>
<td>Senior standing.</td>
<td>1-6</td>
<td>1</td>
<td>6</td>
<td>IND</td>
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</tbody>
</table>
AGRO 498 Senior Project
Crosslisted with: SOIL 498
Prerequisites: Senior standing.
Notes: A two-semester sequence. Students should select one credit hour the first semester and three credits the second semester. The first semester will be used for planning, topic selection, and identifying a project adviser. The second semester will be used to carry out the research project, prepare a written report, and possibly an oral presentation.
Description: Carry out and report on a research project.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Format: IND

AGRO 499H Honors Thesis
Crosslisted with: RNGE 499H, SOIL 499H
Prerequisites: Admission to the University Honors Program and permission, AGRI 299H recommended.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Format: IND