

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:

Max credits per degree:

Format: LEC

AGRO 100 Plants, Landscapes, & the Environment

Crosslisted with: HORT 100, TLMT 100

Description: Introduction to a diverse range of plant and landscape systems and management strategies for balancing economic and environmental sustainability. Foundational principles of plant biology, landscape ecology, and environmental science using real-world case studies.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Format: LEC

Offered: FALL/SPR

ACE: ACE 4 Science

AGRO 107 Invasive Plant Species: Impacts on Ecosystems

Crosslisted with: NRES 107

Notes: Online only

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

ACE: ACE 9 Global/Diversity

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 134, HORT 134, TLMT 134; AGRO 204; AGRO 227, HORT 227, PGAM 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; AGRO 240, RGE 240, GRAS 240; AGRO 278, HORT 278; BIOS 369, PLPT 369; HORT 212, NRES 212, LARC 212; HORT 325; HORT 352; HORT 353; HORT 354; HORT 355; HORT 462; NRES 220; NRES 302, HORT 302; NRES 310; PGAM 229

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

Prerequisite for: AGRO 278, HORT 278; HORT 306; HORT 307

AGRO 134 Plant Sciences Laboratory

Crosslisted with: HORT 134, TLMT 134

Prerequisites: Prior or concurrent enrollment in AGRO/HORT 131 required.

Notes: Open to all majors and minors, except Agronomy or Horticulture.

Description: An exploration of plant morphology, physiology, and maturation with an emphasis on environmental, biotic, and human interactions within production and landscape systems. Not open to Agronomy or Horticulture majors or minors.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Format: LAB

Prerequisite for: HORT 306; HORT 307

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:** AGEN 431, AGRO 431, MSYM 431; AGRO 204; AGRO 269, SOIL 269; AGRO 327, HORT 327, TLMT 327; AGRO 361, GEOL 361, NRES 361, SOIL 361, WATS 361; AGRO 366, SOIL 366; AGRO 453, HORT 453, LARC 453, SOIL 453; AGRO 455, AGRO 855, NRES 455, NRES 855, SOIL 455; AGRO 472, AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472; LARC 487, NRES 487; MSYM 354, SOIL 354, WATS 354; 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:** AGEN 431, AGRO 431, MSYM 431; 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; ASCI 486**AGRO 216 Plant Breeding Principles and Practice****Crosslisted with:** 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/HORT 131 or AGRO 278 or either concurrently.**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**Offered:** FALL**Prerequisite for:** AGRO 326, HORT 326, TLMT 326; AGRO 327, HORT 327, TLMT 327; TLMT 295; TLMT 395**AGRO 228 Introduction to Landscape Management****Crosslisted with:** HORT 228, TLMT 228**Prerequisites:** AGRO/HORT 131 or AGRO/HORT 278 or either concurrently.**Notes:** 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**Offered:** FALL**Prerequisite for:** AGRO 326, HORT 326, TLMT 326; TLMT 295; TLMT 395**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, GRAS 240**Prerequisites:** AGRO/HORT 131 or BIOS 101 or LIFE 120**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**Offered:** FALL/SPR**Prerequisite for:** AGRO 340, RNGE 340, GRAS 340; AGRO 445, AGRO 845, ASCI 451, ASCI 851, RNGE 445**AGRO 242 North American Wildland Plants****Crosslisted with:** HORT 242, RNGE 242, GRAS 242**Prerequisites:** Permission.**Notes:** 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**Offered:** FALL/SPR**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**Prerequisite for:** AGRO 405**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 278 Botany****Crosslisted with:** HORT 278**Prerequisites:** BIOS 101 and 101L or LIFE 120 and LIFE 120L or AGRO/HORT 131 and AGRO 132 or HORT 133.**Description:** Introduction to the plant kingdom and to plants as biological organisms; structure and function of cells, tissues, and organs with emphasis on seed plants; the important processes and concepts of life cycles, evolution, and physiology.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** LEC**Offered:** SPRING**Prerequisite for:** AGRO 227, HORT 227, PGAM 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; HORT 221**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:** FLD

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

Prerequisite for: AGRO 441, AGRO 841, HORT 441, HORT 841, RNGE 441, GRAS 441

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

Prerequisite for: AGRO 470, HORT 470, TLMT 470

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 Ornamentals

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, GRAS 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

Offered: SPRING

Prerequisite for: AGRO 445, AGRO 845, ASCI 451, ASCI 851, RNGE 445

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

Prerequisite for: AGRO 458, AGRO 858, NRES 458, NRES 858, SOIL 458

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 375 Innovations for Agriculture

Crosslisted with: HORT 375, AGRI 375, EAEP 375, TLMT 375

Description: Explore sustainability challenges in plant and animal agricultural systems, assess current solutions, and identify opportunities for innovation. Research, develop, prototype, test, and pitch an innovative product, service, or technology for agriculture.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Format: LEC

Offered: FALL

AGRO 388 Business Systems in Entrepreneurship

Crosslisted with: HORT 388, ENTR 388, EAEP 388, ABUS 388

Description: Introductory models for a startup business. Ideation, customer segments, value proposition, minimal viable product and market fit.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Format: LEC

Offered: FALL/SPR

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.**Notes:** JGEN 200 and/or JGEN 300, and AECN 201 recommended**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.**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 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

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 420 Bioinformatics Applications in Agriculture

Crosslisted with: AGRO 820

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 426 Invasive Plants

Crosslisted with: AGRO 826, HORT 426, HORT 826, NRES 426, NRES 826

Prerequisites: AGRO/HORT/SOIL 153; AGRO/HORT 131

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

Offered: SPRING

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

Crosslisted with: ANTH 429A, ANTH 829A, AGRO 829A, HORT 429A, HORT 829A, NRES 429A, NRES 829A, NUTR 429A, NUTR 829A

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.

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, 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 435 Agroecology

Crosslisted with: AGRO 835, 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

ACE: ACE 10 Integrated Product

AGRO 436 Agroecosystems Analysis**Crosslisted with:** AGRO 836, 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 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.**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, GRAS 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**Offered:** SPRING**AGRO 441 Perennial Plant Function, Growth, and Development****Crosslisted with:** AGRO 841, HORT 441, HORT 841, RNGE 441, GRAS 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**Offered:** SPRING**AGRO 442 Wildland Plants****Crosslisted with:** AGRO 842, NRES 842, RNGE 442, NRES 442, GRAS 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, forbs, shrubs, exotic and wetland plants.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**Offered:** FALL**AGRO 444 Ecosystem Monitoring and Assessment****Crosslisted with:** AGRO 844, NRES 844, RNGE 444, NRES 444, GRAS 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**Offered:** FALL**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.**Notes:** 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: GEOG 450, METR 450, NRES 452, AGRO 850, GEOG 850, METR 850, NRES 852

Prerequisites: Junior standing or above.

Notes: Offered spring semester of even-numbered calendar years.

Description: Impact of climate and extreme climatic events on society and societal responses to those events. Global in scope and interdisciplinary.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Format: LEC

Offered: SPRING

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

Prerequisite for: AGEN 854, MSYM 854; AGEN 955, AGRO 955, CIVE 955, GEOL 985; MSYM 855

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 460, NRES 460, SOIL 460, AGRO 860, 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 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.

Description: Principles of soil physics. Movement of water, air, heat, and solutes in soils. Water retention and movement, including infiltration and field water regime. Movement of chemicals in soils.

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 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

Groups: Physical Geography

AGRO 470 Critical Thinking in Landscape Management**Crosslisted with:** HORT 470, TLMT 470**Prerequisites:** AGRO/HORT/PGMP/TLMT 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**AGRO 472 Applied Soil Physics****Crosslisted with:** AGRO 872, 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 475 Water Quality Strategy****Crosslisted with:** NRES 475, NRES 875, SOCI 475, SOCI 875, SOIL 475, WATS 475, AGRO 875, 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**ACE:** ACE 10 Integrated Product**Groups:** American Government&Public Pol**AGRO 477 Great Plains Field Pedology****Crosslisted with:** GEOG 467, NRES 477, SOIL 477, GEOG 867, NRES 877**Prerequisites:** AGRO/SOIL 153.**Description:** 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.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** LEC**Groups:** Physical Geography**AGRO 478 Plant Anatomy****Crosslisted with:** BIOS 478, BIOS 878, AGRO 878, 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 480 Modified Rootzones****Crosslisted with:** HORT 480, TLMT 480, TLMT 880, AGRO 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 484 Water Resources Seminar****Crosslisted with:** GEOG 484, GEOL 484, NRES 484, WATS 484, NRES 884, AGRO 884, GEOG 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 488 Entrepreneurship and Enterprise Development****Crosslisted with:** HORT 488, HORT 888, EAEP 488, ENTR 488, EAEP 888, AGRO 888, ENTR 888, ABUS 488**Description:** The process of starting your own enterprise. Competitive environment, risk management, finance for business startups, funding, and business plan writing.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**Offered:** FALL/SPR**ACE:** ACE 10 Integrated Product**AGRO 489 Urbanization of Rural Landscapes****Crosslisted with:** AGRO 889, 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 495 Grasslands Seminar

Crosslisted with: ENTO 495, GRAS 495, HORT 495, NRES 495, RNGE 495, SOIL 495

Prerequisites: Junior standing.

Description: Topic varies and deals with different aspects of forage and/or range and/or livestock, turf and/or landscape grasses, natural habitats, and wetlands.

Credit Hours: 1-2

Min credits per semester: 1

Max credits per semester: 2

Max credits per degree: 4

Format: LEC

AGRO 496 Independent Study

Crosslisted with: AGRO 896, 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 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.

Notes: 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