

PLANT AND LANDSCAPE SYSTEMS (PLAS)

PLAS 100 Plants, Landscapes, & the Environment

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 explored within the context of these systems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

ACE: ACE 4 Science

PLAS 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 their impacts on ecosystems from local to global scales.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL/SPR

ACE: ACE 9 Global/Diversity

PLAS 127 Survey of Turfgrass and Landscape Management

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

Grading Option: Graded with Option

PLAS 131 Plant Science

Description: The biology of plants grown for food, feed, fuel, fiber and fun! Starting with natural and managed ecosystems and their interactions, the course then introduces how plants obtain and manage water and nutrients before giving a big picture view of carbon assimilation, metabolism and storage in terms of plant productivity and growth in variable environments. The way plants respond to endogenous and applied growth regulators as well as genetic signals is described, before considering the role of genetics in plant pest interactions and management.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: BIOS 369, PLPT 369; ENTO 308; NRES 220; NRES 302, PLAS 302; NRES 310; PLAS 132; PLAS 133; PLAS 134; PLAS 204; PLAS 221; PLAS 227; PLAS 228; PLAS 240, RNGE 240, GRAS 240; PLAS 278; PLAS 325; PLAS 352; PLAS 353; PLAS 354; PLAS 355; PLAS 362; PLPT 210

ACE: ACE 4 Science

Course and Laboratory Fee: \$5

PLAS 132 Agronomic Plant Science Laboratory

Prerequisites: PLAS 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

Grading Option: Graded with Option

Prerequisite for: ENTO 308; PLAS 306; PLAS 307

Course and Laboratory Fee: \$10

PLAS 133 Horticultural Plant Science Laboratory

Prerequisites: PLAS 131 or parallel

Description: Horticulture plant morphology, physiology, cell anatomy and plant growth are explored through application of practices used in industry. Emphasis on intensive production systems appropriate to specialty and greenhouse grown horticultural plants

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: PLAS 306; PLAS 307

PLAS 134 Plant Sciences Laboratory

Prerequisites: Prior or concurrent enrollment in PLAS 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

Grading Option: Graded

Prerequisite for: ENTO 308; PLAS 306; PLAS 307

Course and Laboratory Fee: \$20

PLAS 153 Soil Resources

Crosslisted with: SOIL 153

Description: Investigation into the physical, chemical and biological properties of soils, in relation to their appropriate uses, protection, and vital roles or functions in broader plant-soil systems. Apply exercises such as discussion, evidence-based writing, assessment, planning, problem-solving, and presentations in relation to principles and practices involving all aspects of soils.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: AGEN 431, PLAS 431, MSYM 431; LARC 487, NRES 487; MSYM 354, SOIL 354, WATS 354; NRES 245, PLAS 245; NRES 319; PLAS 204; PLAS 269, SOIL 269; PLAS 327; PLAS 361, GEOL 361, NRES 361, SOIL 361, WATS 361; PLAS 366, SOIL 366; PLAS 453, LARC 453, SOIL 453; PLAS 455, AGRO 855, NRES 455, NRES 855, SOIL 455; PLAS 472, AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472

Course and Laboratory Fee: \$5

PLAS 170 Residential Landscape Design

Description: Introductory course in home landscaping focusing on basic design elements and processes. Students prepare a program, analyze a dwelling and site, determine a phased budget, conceptualize a layout, and select detailed elements and techniques to implement a design for an actual residence.

Credit Hours: 2

Max credits per semester: 2

Max credits per degree: 2

Grading Option: Graded with Option

PLAS 200 Landscape and Environmental Appreciation

Crosslisted with: GEOG 200, LARC 200

Description: Values and processes in human landscapes and natural environments. Concepts and tools to understand the context of local and global environments and significant historical landscapes. Landscape as an indicator of aesthetic quality, design principles and processes as integrators of humans and nature, and the garden as a model for creating sustainable landscapes.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

ACE: ACE 7 Arts ACE 9 Global/Diversity

PLAS 201 Dendrology: Study and Identification of Trees and Shrubs

Crosslisted with: NRES 201, LARC 201

Description: An introduction to the naming, identification, and natural history of woody trees and shrubs in North American with emphasis on trees common to Nebraska. Covers morphology, natural site conditions, wildlife and human uses of woody trees and shrubs.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

PLAS 204 Resource-Efficient Crop Management

Prerequisites: PLAS 131 and PLAS/SOIL 153

Description: The integration of crop and soil science, plant breeding, climatology and integrated pest management disciplines to develop and evaluate crop management strategies that make the most efficient use of natural resources such as solar radiation, water, and soil, as well as other external inputs utilized for field crop management.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

Prerequisite for: AGEN 431, PLAS 431, MSYM 431; PLAS 395A; PLAS 405

PLAS 212 Woody Plants for Landscapes: Identification, Management, and Use

Crosslisted with: NRES 212, LARC 212

Description: Identification, basic management and design uses of trees and shrubs for sustainable landscapes, with an emphasis on native plants and plants adapted to the Plains states. Emphasis is on live specimens in outdoor environments, supported by online resources.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

PLAS 213 Cultivars and Varieties of Woody Plants for Landscapes

Crosslisted with: NRES 213, LARC 213

Description: Characteristics of commercially available trees and shrubs used in urban landscapes. Compares differences among cultivars, design uses, and management issues using a combination of live specimens in outdoor environments and online resources.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

PLAS 214 Herbaceous Landscape Plants

Crosslisted with: NRES 214

Description: Identification of herbaceous plants with ornamental value in the landscape including native and introduced annuals, perennials, grasses and cultivars. Typical ecological associations, environmental tolerances and/or intolerance, cultural requirements, and design characteristics.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

PLAS 215 Genetics

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

Grading Option: Graded with Option

Prerequisite for: ASCI 330; ASCI 486; PLPT 418, PLPT 818, MBIO 418

Course and Laboratory Fee: \$20

PLAS 216 Plant Breeding Principles and Practice

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

Grading Option: Graded with Option

PLAS 221 Plant Propagation

Prerequisites: PLAS 131

Notes: Recommend PLAS 278 taken previously or concurrently

Description: Practice different methods of plant propagation and explore the effects of environmental management on propagation success using the scientific method.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

Prerequisite for: PLAS 395B

Course and Laboratory Fee: \$35

PLAS 227 Introductory Turfgrass Management

Prerequisites: PLAS 131 or PLAS 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
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: PLAS 327; PLAS 395T

PLAS 228 Introduction to Landscape Management

Prerequisites: PLAS 131 or PLAS 278 or either concurrently.
Description: An overview of landscape systems for human intent. Includes seasonal and materials-specific BMPs for assessment, soil work, irrigation, plants and hardscapes, pests and diseases, using a combination of site visits, collaborations, and applied case studies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: PLAS 395L; PLAS 470

PLAS 229 Introductory Turfgrass Management Laboratory

Description: Laboratory covering turfgrass identification and management.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Offered: FALL
Course and Laboratory Fee: \$40

PLAS 230 Technical Reporting in Plant and Landscape Systems

Notes: This course is intended for first or second year students.
Description: Learn introductory data science skills necessary to collect, manage, and analyze data. Gain the necessary skills to interpret and effectively communicate information derived from data.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR

PLAS 240 Forage Crop and Pasture Management

Crosslisted with: RNGE 240, GRAS 240
Prerequisites: PLAS 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
Grading Option: Graded with Option
Offered: FALL/SPR
Prerequisite for: PLAS 340, RNGE 340, GRAS 340; PLAS 395A; PLAS 445, AGRO 845, ASCI 451, ASCI 851, RNGE 445, GRAS 445

PLAS 242 North American Wildland Plants

Crosslisted with: RNGE 242, GRAS 242
Prerequisites: Permission.
Notes: PLAS/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
Grading Option: Graded with Option
Offered: FALL/SPR

PLAS 245 Introduction to Grassland Ecology and Management

Crosslisted with: NRES 245
Prerequisites: PLAS 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
Grading Option: Graded with Option
Prerequisite for: PLAS 340, RNGE 340, GRAS 340

PLAS 261 Floral Design I

Description: Principles, interpretation, and emotional responses of floral design. Explored and practical experience in all aspects of flower arranging. Includes floral product identification, care, handling, marketing and critiquing of floral designs.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
ACE: ACE 7 Arts

PLAS 262 Floral Design II

Prerequisites: PLAS 261
Description: Advanced styles of floral design, foliage plant care and retail shop layout, as well as practical business knowledge in managing a small business. Topics include personnel, advertising, sales and floral marketing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Course and Laboratory Fee: \$100

PLAS 265 Visual Communication for Landscape Design

Description: Graphic and oral presentation techniques for landscape design. Introduction to use of various media and technologies, including hand graphics and computer programs.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

Prerequisite for: PLAS 267

Course and Laboratory Fee: \$10

PLAS 267 Introduction to Landscape Design Studio

Prerequisites: PLAS 265

Notes: Individual and team projects, in-class exercises and presentations. Includes site visits to urban landscapes.

Description: Process and elements used to design sustainable residential and small urban landscapes.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

Prerequisite for: PLAS 300; PLAS 301; PLAS 395L

Groups: Techniques

Course and Laboratory Fee: \$15

PLAS 269 Principles of Soil Management

Crosslisted with: SOIL 269

Prerequisites: PLAS 153

Description: Current state-of-knowledge of soil and water management; impacts of water and wind erosion on soil productivity, and nutrient dynamics; soil management in response to the increased climate variability; improved management practices such as conservation tillage (i.e., no-till), cropping systems, cover crops, crop residue management, perennial systems, water management and irrigation; nutrient cycling; and soil quality and health.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

Prerequisite for: PLAS 395A; PLAS 405

PLAS 270 Biological Invaders

Crosslisted with: 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

Grading Option: Graded with Option

PLAS 275 Agribusiness Entrepreneurial Finance

Crosslisted with: AECN 275, EAEP 275, ENTR 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

Grading Option: Graded with Option

PLAS 278 Botany

Prerequisites: BIOS 101 or LIFE 120 or PLAS 131

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

Grading Option: Graded with Option

Offered: SPRING

Prerequisite for: PLAS 227; PLAS 228

Course and Laboratory Fee: \$40

PLAS 279 Soil Evaluation

Crosslisted with: NRES 279, SOIL 279

Notes: PLAS/SOIL 153 - Soil Resources recommended, but not required.

This course includes an inter-collegiate Soil Judging contest that takes place in the North Central region of the United States during the course of the class, or a course-based undergraduate research experience.

Description: Apply fundamental knowledge to the description of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.

Credit Hours: 2

Max credits per semester: 2

Max credits per degree: 2

Grading Option: Graded with Option

Offered: FALL

Prerequisite for: NRES 379, PLAS 379, SOIL 379

Course and Laboratory Fee: \$40

PLAS 291 Special Topics in Plant and Landscape Systems

Prerequisites: Permission.

Notes: Requires advanced permission before registering for the course.

Description: Topics vary.

Credit Hours: 1-6

Min credits per semester: 1

Max credits per semester: 6

Max credits per degree: 12

Grading Option: Graded with Option

Offered: FALL/SPR

PLAS 295 Internship

Crosslisted with: RNGE 295, SOIL 295

Prerequisites: Sophomore standing and completion of an internship contract. The internship contract is subject to approval by the department. Internships completed without a signed contract may not qualify for credit.

Notes: Pass/No Pass only; requires advanced permission before registering for the course.

Description: Professional experience in a plant, landscape or soil interest area. Experience may be with a business, government agency, organization, or a university research, extension, or teaching program.

Credit Hours: 1-3

Min credits per semester: 1

Max credits per semester: 3

Max credits per degree: 6

Grading Option: Pass No Pass

Offered: FALL/SPR

PLAS 300 Introduction to Landscape Construction

Prerequisites: PLAS 267 or concurrent

Description: Materials, systems, and methods for constructing sustainable residential and small urban landscapes. Includes site grading, hardscapes, irrigation, lighting, ponds and water features, using a combination of guest speakers, site visits and online resources.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

Course and Laboratory Fee: \$15

PLAS 301 Introduction to Landscape Contracting

Prerequisites: PLAS 267 and PLAS 388 or concurrent

Notes: Offered Spring of even years and alternate with PLAS 300.

Description: Overview of the landscape contracting business and administration of contracts, cost estimation and bidding.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: SPRING

Groups: Techniques

PLAS 302 Tree Biology

Crosslisted with: NRES 302

Prerequisites: BIOS 101 or LIFE 120 or PLAS 131

Description: The study of the structure and function of woody plants, with a focus on trees growing in temperate climates. Covers the basics of wood physiology in terms of the biological, physical, and chemical processes utilized by tree to function. The anatomy and morphology of trees with a focus on the impacts of tree maintenance to the structure and function of landscape trees.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

PLAS 306 Greenhouse Practices and Management

Prerequisites: PLAS 132 or PLAS 133 or PLAS 134 or LIFE 120

Description: Principles and practices involved in the development, operation and use of greenhouses and other protected plant growth environments.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

PLAS 307 Hydroponics for Growing Populations

Prerequisites: PLAS 132 or PLAS 133 or PLAS 134 or LIFE 120

Description: Globally diverse peoples are explored through culture, diets, food production systems, and environment with emphasis on the application of hydroponic plant production systems to address food needs that are culturally conscious. Hydroponic methodologies are investigated and prototypes are designed, built, and tested for proof of concept.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL/SPR

ACE: ACE 9 Global/Diversity

PLAS 319 Edible Landscapes

Prerequisites: Junior Standing or permission

Description: Identification, environmental requirements, and sustainable care and management of herbaceous perennial and woody plants with both edible and aesthetic landscape value. Historical and human cultural ties or ethnobotanical traditions associated with the plants will be utilized for appropriate plant selection and use.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

ACE: ACE 9 Global/Diversity

PLAS 321 Arboriculture: Maintenance & Selection of Landscape Trees

Crosslisted with: NRES 321

Prerequisites: Junior standing

Description: Covers practical application of the science of tree growth, development, and management in human dominated landscapes. Tree selection for varying landscapes and objectives, proper planting and pruning, identification and correction of tree defects, and working with tree pest issues.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

Offered: SPRING

Groups: Laboratory and Field Training

PLAS 325 Introductory Plant Physiology**Prerequisites:** PLAS 131 or LIFE 120**Description:** Introduction to physiological and developmental processes in plants. Topics include plant-water relations, photosynthesis, carbon metabolism and source-sink translocation, light responses, hormonal regulation during growth, development and environmental stresses such as drought, heat, salinity, flooding stress among others. Emphasizes the development of a broader knowledge of how crops respond to abiotic factors associated with changing climate through conceptual integration of physiological and molecular processes. Science communication skills and teamwork experience are developed through oral presentations and poster sessions.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** PLAS 441, AGRO 841, HORT 841, RNGE 441, GRAS 441**PLAS 326 Landscape Solutions****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**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 327 Turfgrass Science and Management****Prerequisites:** PLAS/SOIL 153; CHEM 105A and 105L or CHEM 109A and 109L; and PLAS 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**Grading Option:** Graded with Option**PLAS 330 Pruning Ornamentals****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**Grading Option:** Graded with Option**PLAS 340 Range Management and Improvement****Crosslisted with:** RNGE 340, GRAS 340**Prerequisites:** PLAS 240 or NRES 245**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**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** PLAS 445, AGRO 845, ASCI 451, ASCI 851, RNGE 445, GRAS 445**PLAS 352 Production and Physiology of Horticultural Crops****Prerequisites:** PLAS 131**Notes:** PLAS 353 or PLAS 354 or PLAS 355 parallel enrollment suggested**Description:** The physiological principles underlying the management and production of floricultural, fruit, vegetable and specialty crops.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** PLAS 395B**PLAS 353 Vegetable Crop Production Laboratory****Prerequisites:** PLAS 131**Notes:** PLAS 133, PLAS 221, and PLAS 352 recommended.**Description:** Vegetable crop production principles and practices, both locally and from a global perspective. Experience with seeding, transplant production, and growing of vegetables in field and greenhouse.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Course and Laboratory Fee:** \$40**PLAS 354 Fruit Production Laboratory****Prerequisites:** PLAS 131**Notes:** PLAS 133, PLAS 221, and PLAS 352 recommended.**Description:** Fruit crop production principles and practices, both locally and from a global perspective. Experience with planting, pruning and layout of orchard, vineyard and small fruit crops, greenhouse propagation, and production practices.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Course and Laboratory Fee:** \$40

PLAS 355 Perennial, Pot and Bedding Plant Production Laboratory**Prerequisites:** PLAS 131**Notes:** PLAS 133, PLAS 221, and PLAS 352 recommended.**Description:** Growing conditions of specific perennial, annual, pot plants, cut flowers. How to schedule and cost account plant production. Care of post-production plants. Experience propagating and growing perennial, pot and bedding plants and cut flowers in the greenhouse.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Course and Laboratory Fee:** \$30**PLAS 361 Soils, Environment and Water Quality****Crosslisted with:** GEOL 361, NRES 361, SOIL 361, WATS 361**Prerequisites:** PLAS/SOIL 153; MATH 102 or 103; two semesters chemistry (CHEM 105A and 105L, CHEM 106A and 106L, CHEM 109A and 109L, CHEM 110A and 110L) 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**Grading Option:** Graded with Option**Prerequisite for:** PLAS 458, AGRO 858, NRES 458, NRES 858, SOIL 458**PLAS 362 Nursery Crop Production****Prerequisites:** PLAS 131**Notes:** PLAS 133, 221, and PLAS 352 recommended.**Description:** Principles underlying the production of nursery crops. Propagation, crop scheduling, transplanting, handling, and transportation of nursery crops. Cultural considerations such as media, fertilizers, irrigation, and pest control.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 366 Soil Nutrient Relationships****Crosslisted with:** SOIL 366**Prerequisites:** PLAS 153**Description:** Explores nutrient behaviors in soil and factors affecting nutrient management. Students work on developing fertilizer plans for complex plant production systems that follow the right place, right amount, right source, right time philosophy and ensure production of healthy and nutritious plants, improve profits and enterprise sustainability, fulfill legal requirements, and protect soil and water quality.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** PLAS 405**PLAS 375 Innovations for Agriculture****Crosslisted with:** AGRI 375, EAEP 375**Prerequisites:** Junior or Senior class standing.**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**Grading Option:** Graded**Offered:** FALL**PLAS 379 Advanced Soil Evaluation****Crosslisted with:** NRES 379, SOIL 379**Prerequisites:** PLAS/NRES/SOIL 279**Notes:** This course includes a national- or regional-level inter-collegiate Soil Judging contest that takes place during the course of the class.**Description:** Apply fundamental knowledge and improve field techniques to the description and interpretation of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**PLAS 388 Business Systems in Entrepreneurship****Crosslisted with:** 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**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** PLAS 301**PLAS 391A Special Topics in Agronomy****Prerequisites:** Permission.**Notes:** Requires advanced permission before registering for the course.**Description:** Topics vary.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 12**Grading Option:** Graded with Option**Offered:** FALL/SPR**PLAS 391B Special Topics in Horticulture****Prerequisites:** Permission.**Notes:** Requires advanced permission before registering for the course.**Description:** Topics vary.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 12**Grading Option:** Graded with Option**Offered:** FALL/SPR

PLAS 391L Special Topics in Landscape Design and Management**Prerequisites:** Permission.**Notes:** Requires advanced permission before registering for the course**Description:** Topics vary.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 12**Grading Option:** Graded with Option**Offered:** FALL/SPR**PLAS 391T Special Topics in Turfgrass Science and Management****Prerequisites:** Permission**Notes:** Requires advanced permission before registering for the course**Description:** Topics vary.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 12**Grading Option:** Graded with Option**Offered:** FALL/SPR**PLAS 395A Internship in Agronomy****Prerequisites:** Junior standing; PLAS 204 or 240 or 269; and completion of an internship contract. Internships completed without a signed contract not may qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced internship in an agronomic enterprise. Must be a business, government agency, organization or university research, teaching, or extension program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**PLAS 395B Internship in Horticulture****Prerequisites:** Junior Standing; PLAS 221 or PLAS 352 and completion of an internship contract. Internships completed without a signed contract may not qualify for credit**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced internship experience in a horticulture enterprise. Must be a business, government agency, organization or university research, teaching, or extension program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**PLAS 395L Internship in Landscape Design and Management****Prerequisites:** Junior standing; PLAS 228 or PLAS 267; and completion of an internship contract. Internships completed without a signed contract not may qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced professional experience in a landscape design and/or management enterprise. Experience must be with a business, government agency, organization, or a university research, extension, or teaching program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**PLAS 395T Internship in Turfgrass Science and Management****Prerequisites:** Junior standing; PLAS 227 and completion of an internship contract. Internships completed without a signed contract may not qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced internship experience in a turfgrass enterprise. Must be a business, government agency, organization, or university research, teaching or extension program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**PLAS 399 Independent Study****Prerequisites:** Junior standing; 12 hrs plant science; and permission.**Notes:** Requires advance approval of plan of work and is to be under the supervision and evaluation of a Horticulture departmental faculty member. Oral and written reports are mandatory at the completion of this Independent Study.**Description:** Individual or group projects in research, literature review, or extension of course work.**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 12**Grading Option:** Graded with Option**PLAS 403 Scientific Writing and Communication****Crosslisted with:** AGRO 803, 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**Grading Option:** Graded**ACE:** ACE 10 Integrated Product

PLAS 405 Crop Management Strategies

Prerequisites: Senior standing; PLAS 204, PLAS/SOIL 269 or PLAS/SOIL 366; and permission.

Notes: JGEN 200 and/or JGEN 300, and AECN 201 recommended; a pre-semester trip is required.

Description: Application, expansion, and integration of principles from agricultural, economic and social sciences into systems-level the development and management of cropping systems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

ACE: ACE 10 Integrated Product

Course and Laboratory Fee: \$60

PLAS 406 Plant Ecophysiology: Theory and Practice

Crosslisted with: AGRO 806, 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

Grading Option: Graded with Option

PLAS 407 Bio-Atmospheric Instrumentation

Crosslisted with: GEOG 469, 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

Grading Option: Graded with Option

PLAS 408 Microclimate: The Biological Environment

Crosslisted with: GEOG 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

Grading Option: Graded with Option

Prerequisite for: BSEN 954, NRES 954

PLAS 409A Case studies in plant breeding: Breeding for Disease Resistance

Crosslisted with: AGRO 809A, HORT 809A

Notes: A previous class in genetics is highly recommended.

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

Grading Option: Graded with Option

Offered: FALL/SPR

PLAS 409B Case Studies in plant breeding: Transgenic strategies for disease resistance

Crosslisted with: AGRO 809B, 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

Grading Option: Graded with Option

Offered: FALL/SPR

PLAS 411 Crop Genetic Engineering

Crosslisted with: AGRO 811

Notes: A previous class in genetics is highly recommended.

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, and 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

Grading Option: Graded with Option

Offered: FALL

PLAS 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**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 414 Turfgrass Disease Management****Crosslisted with:** AGRO 814, HORT 814, PLPT 414, PLPT 814, 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**Grading Option:** Graded with Option**PLAS 418 Agroforestry Systems in Sustainable Agriculture****Crosslisted with:** HORT 818, NRES 417, NRES 817**Prerequisites:** 12 hours biological or agricultural sciences.**Description:** The roles of woody plants in sustainable agricultural systems of temperate regions. Emphasis on the ecological and economic benefits of trees and shrubs in the agricultural landscape. Topics include: habitat diversity and biological control; shelterbelts structure, function, benefits and design; intercropping systems; silvopastoral systems; riparian systems; and production of timber and specialty crops. Comparison of temperate agroforestry systems to those of tropical areas.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**PLAS 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**Grading Option:** Graded with Option**Course and Laboratory Fee:** \$35**PLAS 420 Bioinformatics Applications in Agriculture****Crosslisted with:** AGRO 820**Prerequisites:** PLAS 215 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. 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**Grading Option:** Graded with Option**Offered:** FALL**PLAS 425 Cover Crops in Agroecosystems****Crosslisted with:** AGRO 825**Prerequisites:** PLAS 131 or PLAS 278 ; PLAS/SOIL 153 (or equivalent)**Description:** Explore the management, environmental, economic, and social considerations of cover crops across a diversity of agricultural production systems and regions. Grow cover crops, measure benefits and tradeoffs, and apply knowledge to make management and policy recommendations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL**PLAS 426 Invasive Plants****Crosslisted with:** AGRO 826, HORT 826, NRES 426, NRES 826**Prerequisites:** PLAS/SOIL 153; PLAS 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**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 427 Turfgrass Systems Management****Crosslisted with:** AGRO 827, HORT 827, TLMT 827**Prerequisites:** PLAS 227 and PLAS 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**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**Course and Laboratory Fee:** \$50

PLAS 429 Plant Biotechnology Applications**Crosslisted with:** AGRO 829**Prerequisites:** Faculty Permission**Description:** Application of plant biotechnology to answer biological questions. Development of writing and thinking skills with a working knowledge of plant biology and biotechnology. Learning in a lab focused setting to solidify skills used in molecular biology, biochemistry, cell biology, and computational biology.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SPRING**PLAS 429A Food Security: A Global Perspective****Crosslisted with:** ANTH 429A, ANTH 829A, AGRO 829A, 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**Grading Option:** Graded with Option**PLAS 431 Site-specific Crop Management****Crosslisted with:** AGEN 431, MSYM 431**Prerequisites:** Senior standing; PLAS/SOIL 153; PLAS 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**Grading Option:** Graded with Option**PLAS 433 Permaculture: Sustainable Living****Crosslisted with:** HORT 833**Notes:** This is a Great Plains IDEA course. Restricted to upper level undergraduate, graduate, or matriculated continuing education students.**Description:** Permaculture means "permanent culture," and "...is the conscious design and maintenance of cultivated ecosystems that have the diversity, stability, and resilience of a natural ecosystem." [Bill Mollison] This course will explore a design/thinking methodology that seeks to provide our essential physical needs, food, water, shelter, energy, etc., while doing so in an environmentally friendly, sustainable manner.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**PLAS 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**Grading Option:** Graded with Option**PLAS 435 Agroecology****Crosslisted with:** AGRO 835, NRES 435, NRES 835**Prerequisites:** For PLAS/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**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**PLAS 436 Agroecosystems Analysis****Crosslisted with:** AGRO 836, 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**Grading Option:** Graded with Option**PLAS 437 Animal, Food and Industrial Uses of Grain****Crosslisted with:** AGRO 837**Prerequisites:** CHEM 105A and CHEM 105L or CHEM 109A and 109L, and one of the following: PLAS 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**Grading Option:** Graded with Option**PLAS 438 Producing Grain for Animal, Food and Industrial Uses****Crosslisted with:** AGRO 838**Prerequisites:** CHEM 109A and 109L and one of the following: PLAS 204 or ASCI 250.**Notes:** PLAS 215 and PLAS 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**Grading Option:** Graded with Option

PLAS 439 Organic Farming and Food Systems

Crosslisted with: AGRO 839, 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

Grading Option: Graded with Option

PLAS 440 Great Plains Ecosystem

Crosslisted with: AGRO 840, NRES 840, RNGE 440, NRES 440, GRAS 440

Prerequisites: Junior standing.

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

Grading Option: Graded with Option

Offered: SPRING

PLAS 441 Perennial Plant Function, Growth, and Development

Crosslisted with: AGRO 841, HORT 841, RNGE 441, GRAS 441

Prerequisites: PLAS 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

Grading Option: Graded with Option

Offered: SPRING

PLAS 442 Wildland Plants

Crosslisted with: AGRO 842, NRES 842, RNGE 442, NRES 442, GRAS 442

Prerequisites: Junior standing.

Notes: PLAS 131 or LIFE 121 and 121L 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

Grading Option: Graded with Option

Offered: FALL

PLAS 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

Grading Option: Graded with Option

Offered: FALL

PLAS 445 Livestock Management on Range and Pasture

Crosslisted with: AGRO 845, ASCI 451, ASCI 851, RNGE 445, GRAS 445

Prerequisites: ASCI 250 and PLAS 240 or PLAS 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

Grading Option: Graded with Option

Offered: FALL

ACE: ACE 10 Integrated Product

Course and Laboratory Fee: \$200

PLAS 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

Grading Option: Graded with Option

Offered: SPRING

PLAS 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:** PLAS/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**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGEN 854, MSYM 854; AGEN 955, AGRO 955, CIVE 955, GEOL 985; MSYM 855**PLAS 453 Urban Soil Properties and Management****Crosslisted with:** LARC 453, SOIL 453**Prerequisites:** PLAS/SOIL 153**Description:** Characteristics of soils in urban settings. Evaluation of soils intended for intensive human uses and strategies for their use. Identification of specific issues related to urban soils. Manipulation or remediation of soils subject to construction and other stresses.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 455 Soil Chemistry and Mineralogy****Crosslisted with:** AGRO 855, NRES 455, NRES 855, SOIL 455**Prerequisites:** PLAS/SOIL 153 or GEOL 101; CHEM 109A/L and 110A/L; CHEM 221 or CHEM 221A & CHEM 221L or 251.**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. Forms and functions of organic matter in soil.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 457 Green Space and Urban Forestry Management****Crosslisted with:** NRES 457, NRES 857**Prerequisites:** Junior or senior standing, Graduate student or permission**Description:** A focus on the management of trees, parks, and green infrastructure in rural and urban communities. Perspectives from community planning, landscape architecture, urban forestry, natural resources, horticulture, and environmental policy. Development and implementation of green space and forest management plans encompassing societal needs and biological limitations in rural and urban communities.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**ACE:** ACE 10 Integrated Product**PLAS 458 Soil Physical Determinations****Crosslisted with:** AGRO 858, NRES 458, NRES 858, SOIL 458**Prerequisites:** SOIL/PLAS/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**Grading Option:** Graded with Option**PLAS 460 Soil Microbial Ecology****Crosslisted with:** BIOS 460, NRES 460, SOIL 460, AGRO 860, BIOS 860, NRES 860**Prerequisites:** Senior standing.**Notes:** Recommend having a strong science background, including courses from the agronomic, environmental, microbiology, engineering or medicine disciplines.**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**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 461 Soil Physics****Crosslisted with:** GEOL 461, NRES 461, SOIL 461, WATS 461, AGRO 861, GEOL 861, NRES 861**Prerequisites:** PLAS/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**Grading Option:** Graded with Option**Prerequisite for:** AGEN 955, AGRO 955, CIVE 955, GEOL 985**PLAS 462 Cannabis Growth, Production and Breeding Basics****Crosslisted with:** AGRO 862, HORT 862**Prerequisites:** PLAS 131 or LIFE 121; PLAS 215 or BIOS 206**Notes:** PLAS 221 recommended**Description:** History, breeding and production of cannabis for medicinal marijuana and hemp for fiber use when grown using a growth room, greenhouse, high tunnel and/or field. Clarification between scientific evidence and casual information.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded**Offered:** FALL/SPR

PLAS 467 Planting Design**Crosslisted with:** ARCH 467, ARCH 567, ARCH 867, LARC 467**Description:** Processes, principles, and elements using plant materials as a key component of landscapes designed for human intent. Focus is on a systems approach, combining environmental attributes with functional needs to create aesthetic, functional, and sustainable landscapes for parks, commercial property, and residences using a combination of site visits and online resources.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** FALL**Course and Laboratory Fee:** \$25**PLAS 469 Ecological Landscape Design****Crosslisted with:** ARCH 469**Prerequisites:** Permission**Description:** Integration of ecological and environmental assessment, design process and management considerations to create detailed landscape plans for public, private, and commercial clients. Includes dream landscape project. Individuals and collaborative teams will develop concepts and details, conduct client meetings and studio critiques, and communicate graphically and verbally through presentations.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**ACE:** ACE 10 Integrated Product**Course and Laboratory Fee:** \$25**PLAS 470 Critical Thinking in Landscape Management****Prerequisites:** PLAS 228**Description:** Use processes and strategies to develop complete landscape management plans for public and/or private clients. Use data to evaluate and compare issues; make practical, science-based recommendations; and prepare cost estimates. Develop and present a complete landscape management plan for a public client.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**ACE:** ACE 10 Integrated Product**Course and Laboratory Fee:** \$25**PLAS 471 Vines, Wines and You****Crosslisted with:** HORT 871, NUTR 471, NUTR 871, HRTM 471, HRTM 871**Prerequisites:** 6 hrs science or equivalent experience; 21 years of age or older**Notes:** Proof of age is required.**Description:** Origin, botany, historical and cultural significance of the grapevine and related species. Principles and practices of vineyard establishment, management and processing of grape products, importance and/or scope of grape and wine industry; global and local significance. Culinary applications, health, environmental and safety-related issues, business and industry relations and experience.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Course and Laboratory Fee:** \$95**PLAS 472 Applied Soil Physics****Crosslisted with:** AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472**Prerequisites:** PLAS/SOIL 153; MATH 102 or MATH 104 or MATH 106.**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**Grading Option:** Graded with Option**Offered:** FALL**PLAS 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**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**PLAS 477 Great Plains Field Pedology****Crosslisted with:** GEOG 467, NRES 477, SOIL 477, GEOG 867, NRES 877**Prerequisites:** PLAS/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**Grading Option:** Graded with Option**PLAS 478 Plant Anatomy****Crosslisted with:** BIOS 478, BIOS 878, AGRO 878, 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**Grading Option:** Graded with Option**Prerequisite for:** BIOS 879

PLAS 480 Modified Root Zones**Crosslisted with:** TLMT 880, AGRO 880, HORT 880**Prerequisites:** PLAS 153/SOIL 153**Notes:** Recommend CHEM 105A/CHEM 105L or CHEM 109A/CHEM 109L, PLAS 131, PLAS 227, and PLAS 453 or PLAS 472**Description:** Modified root zones 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**Grading Option:** Graded with Option**Offered:** SPRING**PLAS 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**Grading Option:** Graded with Option**PLAS 488 Entrepreneurship and Enterprise Development****Crosslisted with:** 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**Grading Option:** Graded with Option**Offered:** FALL/SPR**ACE:** ACE 10 Integrated Product**PLAS 489 Urbanization of Rural Landscapes****Crosslisted with:** AGRO 889, CRPL 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**Grading Option:** Graded with Option**PLAS 495 Grasslands Seminar****Crosslisted with:** ENTO 495, GRAS 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**Grading Option:** Graded with Option**PLAS 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**Grading Option:** Graded with Option**Course and Laboratory Fee:** \$50**PLAS 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**Grading Option:** Graded with Option**PLAS 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**Grading Option:** Graded