

# HORTICULTURE (HORT)

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## HORT 100 Plants, Landscapes, & the Environment

**Crosslisted with:** AGRO 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

## HORT 127 Survey of Turfgrass and Landscape Management

**Crosslisted with:** TLMT 127, AGRO 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

## HORT 131 Plant Science

**Crosslisted with:** AGRO 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, RNGE 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

## HORT 133 Horticultural Plant Science Laboratory

**Prerequisites:** AGRO 131 or parallel

**Description:** Growth, anatomy, morphology and physiology of fruits, vegetables, woody plants, ornamentals and turf. Emphasis on both field and greenhouse grown horticultural plants.

**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; HORT 325; HORT 355

## HORT 134 Plant Sciences Laboratory

**Crosslisted with:** AGRO 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

## HORT 153 Soil Resources

**Crosslisted with:** AGRO 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

## HORT 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

**Format:** LEC

## HORT 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

**Format:** LEC

**Prerequisite for:** HORT 265; HORT 267

**ACE:** ACE 7 Arts ACE 9 Global/Diversity

**Groups:** Human-Economic Geography

**HORT 201 Dendrology: Study and Identification of Trees and Shrubs**

**Crosslisted with:** NRES 201

**Description:** An introduction to the naming, identification, and natural history of woody trees and shrubs in North America 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

**Format:** LEC

**Offered:** FALL

**HORT 212 Landscape Plants I**

**Crosslisted with:** NRES 212, LARC 212

**Prerequisites:** HORT 131

**Notes:** Requires Saturday off-campus field trips.

**Description:** Identification using botanical and common names for herbaceous annuals, perennials, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes is stressed through field visits.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** LEC

**Prerequisite for:** ARCH 467, ARCH 567, ARCH 867, LARC 467, HORT 467; HORT 213, NRES 213, LARC 213

**HORT 213 Landscape Plants II**

**Crosslisted with:** NRES 213, LARC 213

**Prerequisites:** HORT/LARC/NRES 212.

**Notes:** Continuation of HORT/LARC/NRES 212.

**Description:** Site requirements, landscape use, natural history, and specific needs of herbaceous ornamentals, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes. Common cultivars and additional species not covered in HORT/LARC/NRES 212.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** LEC

**HORT 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

**Format:** LEC

**HORT 215 Genetics**

**Crosslisted with:** AGRO 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

**HORT 216 Plant Breeding Principles and Practice**

**Crosslisted with:** AGRO 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

**HORT 221 Plant Propagation**

**Prerequisites:** AGRO/HORT 278 taken previously or concurrently

**Description:** Principles and practices involved in sexual and asexual propagation of herbaceous and woody plants. Laboratory work includes actual practice to gain skill and experience on the different methods of propagating plants.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** LEC

**Offered:** SPRING

**Prerequisite for:** HORT 325; HORT 462

**HORT 227 Introductory Turfgrass Management**

**Crosslisted with:** AGRO 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

**HORT 228 Introduction to Landscape Management****Crosslisted with:** AGRO 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**HORT 229 Introductory Turfgrass Management Laboratory****Crosslisted with:** TLMT 229, AGRO 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**HORT 242 North American Wildland Plants****Crosslisted with:** AGRO 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**HORT 261 Floral Design I****Description:** Principles of floral design and retail florist shop management, while offering practical experience in all aspects of flower arranging. Includes identification, care and handling, marketing and critiquing of floral designs.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**Prerequisite for:** HORT 262**ACE:** ACE 7 Arts**HORT 262 Floral Design II****Prerequisites:** HORT 261 or permission.**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**Format:** LEC**HORT 265 Visual Communication for Landscape Design****Prerequisites:** HORT 200.**Description:** Graphic and oral presentation techniques for landscape design; sketching; introduction to use of various media and computers for visual communication and landscape analysis.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LAB**Prerequisite for:** HORT 267**HORT 267 Introduction to Landscape Design Studio****Prerequisites:** HORT 200, HORT 265 or permission**Notes:** Requires individual and team projects, studio critiques, presentations, and may require off-campus site visits outside of scheduled class time.**Description:** Introduction to the process and elements of landscape design.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** SDO**Prerequisite for:** HORT 300; HORT 301**Groups:** Techniques**HORT 270 Biological Invaders****Crosslisted with:** AGRO 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**HORT 275 Agribusiness Entrepreneurial Finance****Crosslisted with:** AECN 275, EAEP 275, ENTR 275, AGRO 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**HORT 278 Botany****Crosslisted with:** AGRO 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

**HORT 300 Introduction to Landscape Construction**

**Prerequisites:** HORT 267 or concurrent  
**Notes:** Offered Spring Semester of odd years and alternate with HORT 301. Requires field trips to landscape installation sites.  
**Description:** Materials, systems, and methods for constructing landscapes.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC  
**Offered:** SPRING

**HORT 301 Introduction to Landscape Contracting**

**Prerequisites:** HORT 267 and HORT 388 or concurrent  
**Notes:** Offered Spring of even years and alternate with HORT 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  
**Format:** LEC  
**Offered:** SPRING  
**Groups:** Techniques

**HORT 302 Tree Biology**

**Crosslisted with:** NRES 302  
**Prerequisites:** BIOS 101, LIFE 120, HORT 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  
**Format:** LEC  
**Offered:** FALL

**HORT 306 Greenhouse Practices and Management**

**Prerequisites:** AGRO 132 or HORT 133 or AGRO/HORT 134 or LIFE 120  
**Description:** Principles and practices involved in operation and use of greenhouses and other controlled plant growth environments.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC  
**Offered:** SPRING

**HORT 307 Hydroponics for Growing Populations**

**Prerequisites:** AGRO 132 or AGRO 134 or HORT 133 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  
**Format:** LAB  
**Offered:** FALL/SPR  
**ACE:** ACE 9 Global/Diversity

**HORT 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  
**Format:** LEC  
**Offered:** SPRING  
**Groups:** Laboratory and Field Training

**HORT 325 Greenhouse Practices and Management**

**Prerequisites:** HORT 130, 221  
**Description:** Principles underlying the management of the greenhouse.  
**Credit Hours:** 4  
**Max credits per semester:** 4  
**Max credits per degree:** 4  
**Format:** LEC

**HORT 326 Landscape Solutions**

**Crosslisted with:** AGRO 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

**HORT 327 Turfgrass Science and Management**

**Crosslisted with:** AGRO 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

**HORT 330 Pruning Ornamentals**

**Crosslisted with:** AGRO 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

**HORT 352 Production and Physiology of Horticultural Crops****Prerequisites:** AGRO/HORT 131**Notes:** HORT 353 or HORT 354 or HORT 355 parallel enrollment suggested**Description:** Principles underlying the management and production of floricultural, fruit and vegetable crops.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Format:** LEC**Offered:** FALL**HORT 353 Vegetable Crop Production Laboratory****Prerequisites:** AGRO/HORT 131.**Notes:** HORT 133 suggested.**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**Format:** LAB**HORT 354 Fruit Production Laboratory****Prerequisites:** AGRO/HORT 131**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**Format:** LAB**Offered:** FALL**HORT 355 Perennial, Pot and Bedding Plant Production Laboratory****Prerequisites:** AGRO/HORT 131 and HORT 133**Notes:** HORT 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**Format:** LAB**HORT 375 Innovations for Agriculture****Crosslisted with:** AGRI 375, AGRO 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**HORT 388 Business Systems in Entrepreneurship****Crosslisted with:** AGRO 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**HORT 395 Career Experience****Prerequisites:** Sophomore standing; HORT major.**Notes:** Requires advanced permission before registering for the course.**Description:** Participation in a horticulture enterprise (other than in one of those in which the student has had previous experience).**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 5**Format:** FLD**HORT 396 Current Projects and Topics in Horticulture****Prerequisites:** Sophomore standing; 12 hours in subject areas dealing with plant sciences; and permission.**Notes:** A completed and approved study plan contract is required.**Description:** Independent or group projects, readings, or research focusing on current aspects of horticulture.**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 5**Format:** IND**HORT 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**Format:** IND**HORT 403 Scientific Writing and Communication****Crosslisted with:** AGRO 403, 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**Format:** LEC**ACE:** ACE 10 Integrated Product



**HORT 406 Plant Ecophysiology: Theory and Practice****Crosslisted with:** AGRO 806, HORT 806, NRES 406, NRES 806, AGRO 406**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**HORT 407 Bio-Atmospheric Instrumentation****Crosslisted with:** AGRO 469, 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**Format:** LEC**Groups:** Physical Geography**HORT 408 Microclimate: The Biological Environment****Crosslisted with:** AGRO 408, 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**Format:** LEC**Prerequisite for:** AGRO 907, HORT 907, METR 907, NRES 907; BSEN 954, NRES 954**Groups:** Physical Geography**HORT 409A Case studies in plant breeding: Breeding for Disease Resistance****Crosslisted with:** AGRO 409A, AGRO 809A, 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**HORT 409B Case Studies in plant breeding: Transgenic strategies for disease resistance****Crosslisted with:** AGRO 409B, 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**Format:** LEC**HORT 414 Turfgrass Disease Management****Crosslisted with:** AGRO 414, AGRO 814, 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**HORT 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**Format:** LEC

**HORT 426 Invasive Plants****Crosslisted with:** AGRO 426, AGRO 826, 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**HORT 427 Turfgrass Systems Management****Crosslisted with:** AGRO 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**HORT 429A Food Security: A Global Perspective****Crosslisted with:** ANTH 429A, ANTH 829A, AGRO 429A, 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**Format:** LEC**HORT 435 Agroecology****Crosslisted with:** AGRO 435, AGRO 835, 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**HORT 436 Agroecosystems Analysis****Crosslisted with:** AGRO 436, 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**Format:** FLD**HORT 439 Organic Farming and Food Systems****Crosslisted with:** AGRO 839, AGRO 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**HORT 441 Perennial Plant Function, Growth, and Development****Crosslisted with:** AGRO 441, AGRO 841, 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**HORT 453 Urban Soil Properties and Management****Crosslisted with:** AGRO 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

**HORT 457 Green Space and Urban Forestry Management****Crosslisted with:** NRES 457, NRES 857**Prerequisites:** Junior or senior standing, Graduate student.**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**Format:** LEC**Offered:** SPRING**ACE:** ACE 10 Integrated Product**HORT 462 Nursery Management and Crop Production****Prerequisites:** AGRO/HORT 131; HORT 221**Notes:** Offered spring semester of even-numbered calendar years.

Requires a culminating group project creating one of four types of nursery landscape businesses.

**Description:** Principles underlying the production of nursery crops and the profitable management of a nursery. Propagation, crop scheduling, transplanting, handling, and transportation of nursery crops. Cultural considerations such as media, fertilizers, irrigation, and pest control. Economic aspects of running a business include creating income and balance sheets.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** LEC**ACE:** ACE 10 Integrated Product**HORT 467 Planting Design****Crosslisted with:** ARCH 467, ARCH 567, ARCH 867, LARC 467**Prerequisites:** HORT/LARC/NRES 212; ARCH 210 or HORT/LARC 266.**Description:** Design processes, principles, and elements as applied to the use of native and ornamental plant materials. Aesthetic, functional, and micro-climatic arrangements of plant material in parks, on commercial property, on home grounds, along roadways, and in urban open spaces. Develop a palette of plants and graphics for designs.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** LEC**HORT 469 Senior Landscape Design****Crosslisted with:** ARCH 469**Prerequisites:** HORT 341 and/or permission.**Description:** Capstone course for the landscape option. Students work individually on real-world projects with actual clients. They select the project location and scope in consultation with the instructor prior to the semester this course is taken. The project must reflect evidence of a design process, design articulation and communication understandable to the client and provide in depth drawings, details needed to carry out the implementation of the design.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** SDO**ACE:** ACE 10 Integrated Product**HORT 470 Critical Thinking in Landscape Management****Crosslisted with:** AGRO 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**HORT 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**Format:** LEC**HORT 478 Plant Anatomy****Crosslisted with:** BIOS 478, BIOS 878, AGRO 478, 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**Format:** LEC**Prerequisite for:** BIOS 879**HORT 480 Modified Rootzones****Crosslisted with:** AGRO 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



**HORT 488 Entrepreneurship and Enterprise Development**

**Crosslisted with:** HORT 888, EAEP 488, AGRO 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

**HORT 489 Urbanization of Rural Landscapes**

**Crosslisted with:** AGRO 489, 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

**Format:** LEC

**HORT 495 Grasslands Seminar**

**Crosslisted with:** AGRO 495, 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

**Format:** LEC

**HORT 499H Honors Thesis**

**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 undergraduate thesis.

**Credit Hours:** 3-6

**Min credits per semester:** 3

**Max credits per semester:** 6

**Max credits per degree:** 6

**Format:** IND