

SOIL SCIENCE (SOIL)

SOIL 101 Soil and Society

Description: Basic knowledge of soils. Historical perspectives of the role of soils in human societies. The role of soils in the humanities including art, philosophy and literature. How to address problems of human-accelerated erosion, soil degradation, and water quality.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

ACE: ACE 5 Humanities

SOIL 153 Soil Resources

Crosslisted with: PLAS 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, AGST 431; AGST 354, SOIL 354; LARC 487, NRES 487; NRES 245, PLAS 245; NRES 255, PLAS 255, SOIL 255; NRES 319; PLAS 204; PLAS 269, SOIL 269; PLAS 327; PLAS 361, GEOL 361, NRES 361, SOIL 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

Course and Laboratory Fee: \$15

SOIL 255 Soil Health and Environment

Crosslisted with: NRES 255, PLAS 255

Prerequisites: SOIL 153

Description: Develop a life-long interest in observing and studying soil health and ecosystems. Provide the necessary academic skills to incorporate soil health principles into real-world applications, including natural resource conservation, evaluation of regenerative practices, and promotion of environmental sustainability. Prepare professionals and advocates of soil ecosystems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL

Course and Laboratory Fee: \$50

SOIL 269 Principles of Soil Management

Crosslisted with: PLAS 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 405

SOIL 279 Soil Evaluation

Crosslisted with: PLAS 279, NRES 279

Notes: PLAS/SOIL 153 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: \$100

Experiential Learning: Fieldwork

SOIL 295 Internship

Crosslisted with: PLAS 295, RNGE 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

Experiential Learning: Internship/Co-op

SOIL 354 Soil Conservation and Watershed Management**Crosslisted with:** AGST 354**Prerequisites:** PLAS/SOIL 153; and AGST 109 or PHYS 141 or PHYS 151 or PHYS 211**Description:** Watershed hydrology, soil erosion, erosion control, water management, and land surveying and mapping. Includes rainfall-runoff relationships; determination of watershed characteristics; terraces, waterways, vegetative filters, and residue management; ponds, wetlands, non-point source pollution control, and water conservation; profile and topographic surveying.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**SOIL 361 Soils, Environment and Water Quality****Crosslisted with:** PLAS 361, GEOL 361, NRES 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/GEOL/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**SOIL 366 Soil Nutrient Relationships****Crosslisted with:** PLAS 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**SOIL 379 Advanced Soil Evaluation****Crosslisted with:** NRES 379, PLAS 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:** 7**Grading Option:** Graded with Option**Offered:** FALL/SPR**Course and Laboratory Fee:** \$150**Experiential Learning:** Fieldwork**SOIL 453 Urban Soil Properties and Management****Crosslisted with:** PLAS 453, LARC 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**SOIL 455 Soil Chemistry and Mineralogy****Crosslisted with:** PLAS 455, AGRO 855, NRES 455, NRES 855**Prerequisites:** PLAS/SOIL 153 or GEOL 101; CHEM 109A/L and CHEM 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**SOIL 458 Soil Physical Determinations****Crosslisted with:** PLAS 458, AGRO 858, NRES 458, NRES 858**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

SOIL 460 Soil Microbial Ecology

Crosslisted with: PLAS 460, BIOS 460, NRES 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

SOIL 461 Soil Physics

Crosslisted with: PLAS 461, NRES 461, AGRO 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

SOIL 472 Applied Soil Physics

Crosslisted with: PLAS 472, AGRO 872, NRES 472, NRES 872

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

SOIL 475 Water Quality Strategy

Crosslisted with: NRES 475, NRES 875, PLAS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, AGST 475, AGST 875

Prerequisites: Senior undergraduate or graduate student status.

Notes: Capstone course.

Description: Introduces methods to identify, analyze, strategize, justify and develop planning approaches to protect water quality from nonpoint source contamination. Focuses on identifying present water quality issues and situations, investigating adverse impacts on whole systems and subsystems over time, developing effective planning strategies, and assessing strategy effectiveness.

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

SOIL 477 Great Plains Field Pedology

Crosslisted with: PLAS 477, GEOG 467, NRES 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

Course and Laboratory Fee: \$80

SOIL 495 Grasslands Seminar

Crosslisted with: PLAS 495, ENTO 495, GRAS 495, NRES 495, RNGE 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

SOIL 496 Independent Study

Crosslisted with: PLAS 496, AGRO 896, RNGE 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

SOIL 498 Senior Project

Crosslisted with: PLAS 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

SOIL 499H Honors Thesis

Crosslisted with: PLAS 499H, RNGE 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