

# SOIL SCIENCE (SOIL)

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## 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

**Format:** LEC

**Offered:** SPRING

**Prerequisite for:** NRES 438, NRES 838

**ACE:** ACE 5 Humanities

## SOIL 153 Soil Resources

**Crosslisted with:** AGRO 153, HORT 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

## SOIL 269 Principles of Soil Management

**Crosslisted with:** AGRO 269

**Prerequisites:** AGRO 153.

**Description:** Principles of soil management under dryland and irrigated conditions. Relationships of soil and climate resources to soil erosion, movement and storage of soil water, soil organic matter, and irrigation practice. Special problem topics such as acidity, alkali, drainage, and soil testing.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** LEC

**Prerequisite for:** AGRO 405

## SOIL 279 Soil Evaluation

**Crosslisted with:** AGRO 279, NRES 279

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 3

**Format:** LEC

## SOIL 295 Internship in Agronomy

**Crosslisted with:** AGRO 295, RNGE 295

**Prerequisites:** Sophomore standing and completion of internship approval form. The internship proposal is subject to approval by the department.

**Description:** Participation in agronomic applications and in agronomy-related areas of agribusiness; agronomic research in lab, greenhouse, or field; participation in farming practices other than those in which the student has had previous experience; or preparation of teaching materials.

**Credit Hours:** 1-3

**Min credits per semester:** 1

**Max credits per semester:** 3

**Max credits per degree:** 5

**Format:** FLD

## SOIL 354 Soil Conservation and Watershed Management

**Crosslisted with:** MSYM 354, WATS 354

**Prerequisites:** AGRO/SOIL 153; and MSYM 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

**Format:** LEC

**Offered:** FALL

## SOIL 361 Soils, Environment and Water Quality

**Crosslisted with:** AGRO 361, GEOL 361, NRES 361, WATS 361

**Prerequisites:** AGRO/HORT/SOIL 153; MATH 102 or 103; two semesters chemistry (CHEM 105, 106 or CHEM 109,110) and WATS/GEOG/NRES 281

**Description:** Chemical and physical processes that influence the fate and transport of contaminants (inorganic, organic, microbial) in soil-water environments. Extent, fate, mitigation and impact of various sources of pollution. Remedial technologies used for environmental restoration of contaminated environments.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** LEC

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

## SOIL 366 Soil Nutrient Relationships

**Crosslisted with:** AGRO 366

**Prerequisites:** AGRO 153.

**Description:** Use of fertilizers as plant nutrient sources to produce healthy and nutritious plants, improve profit, insure enterprise sustainability, fulfill legal requirements, and protect soil and water quality. Addresses issues from production agriculture, natural resource utilization and preservation, and ornamental plant culture.

**Credit Hours:** 4

**Max credits per semester:** 4

**Max credits per degree:** 4

**Format:** LEC

**SOIL 453 Urban Soil Properties and Management****Crosslisted with:** AGRO 453, HORT 453, LARC 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**SOIL 455 Soil Chemistry and Mineralogy****Crosslisted with:** AGRO 455, AGRO 855, NRES 455, NRES 855**Prerequisites:** AGRO/HORT/SOIL 153 or GEOL 101; CHEM 109 and 110; CHEM 221 or 251; or equivalent.**Description:** Chemical and mineralogical properties of soil components. Inorganic colloidal fraction. Structures of soil minerals as a means of understanding properties, such as ion exchange and equilibria; release and supply of nutrient and toxic materials; and soil acidity and alkalinity.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**SOIL 458 Soil Physical Determinations****Crosslisted with:** AGRO 458, AGRO 858, NRES 458, NRES 858**Prerequisites:** SOIL/AGRO/GEOL/WATS 361; PHYS 141 or equivalent; MATH 102 or 103.**Description:** Survey of measurement techniques and principles used in characterizing the physical properties of soils. Includes analysis of experimental design and sources of experimental error. Techniques include: particle size analysis, soil water content, pore size analysis, field sampling techniques, soil strength, and saturated hydraulic conductivity.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Format:** LAB**SOIL 460 Soil Microbiology****Crosslisted with:** AGRO 460, BIOS 460, NRES 460, AGRO 860, BIOS 860, NRES 860**Prerequisites:** One semester microbiology; one semester biochemistry or organic chemistry.**Description:** Soil from a microbe's perspective-growth, activity and survival strategies; principles governing methods to study microorganisms and biochemical processes in soil; mechanisms controlling organic matter cycling and stabilization with reference to C, N, S, and P; microbial interactions with plants and animals; and agronomic and environmental applications of soil microorganisms.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**Offered:** SPRING**SOIL 461 Soil Physics****Crosslisted with:** AGRO 461, GEOL 461, NRES 461, WATS 461, AGRO 861, GEOL 861, NRES 861**Prerequisites:** AGRO/SOIL 153; PHYS 141 or equivalent, one semester of calculus.**Description:** Principles of soil physics. Movement of water, air, heat, and solutes in soils. Water retention and movement, including infiltration and field water regime. Movement of chemicals in soils.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**Prerequisite for:** AGEN 955, AGRO 955, CIVE 955, GEOL 985**SOIL 472 Applied Soil Physics****Crosslisted with:** AGRO 472, AGRO 872, NRES 472, NRES 872, WATS 472**Prerequisites:** AGRO/HORT/SOIL 153 or equivalent; MATH 104 or MATH 106 or equivalent.**Description:** Emphasis on applied soil physics. Discussion of theoretical principles followed by field and laboratory exercises and applications. Fluxes of water, solutes, air, and heat through the soil. Emphasis on water infiltration, water retention, other soil hydraulic properties. Components of soil water balance. Management of soil water.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**SOIL 475 Water Quality Strategy****Crosslisted with:** NRES 475, NRES 875, SOCI 475, SOCI 875, WATS 475, AGRO 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, MSYM 475, MSYM 875, POLS 475, POLS 875**Prerequisites:** Senior standing.**Notes:** Capstone course.**Description:** Holistic approach to the selection and analysis of planning strategies for protecting water quality from nonpoint sources of contamination. Introduction to the use of methods of analyzing the impact of strategies on whole systems and subsystems; for selecting strategies; and for evaluating present strategies.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Format:** LEC**ACE:** ACE 10 Integrated Product**Groups:** American Government&Public Pol**SOIL 477 Great Plains Field Pedology****Crosslisted with:** AGRO 477, GEOG 467, NRES 477, GEOG 867, NRES 877**Prerequisites:** AGRO/SOIL 153.**Description:** Spatial relationship of soil properties on various parts of landscape typical of the Plains, causal factors, and predictions of such relationships on other landscapes. Grouping these properties into classes, naming the classes, and the taxonomy that results from this grouping. Application of a taxonomy to a real situation through making a field soil survey in a region representative of the Plains border, predicting land use response of various mapped units as it affects the ecosystem, and evaluating the effectiveness of the taxonomic system used in the region surveyed.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Format:** LEC**Groups:** Physical Geography

**SOIL 495 Grasslands Seminar**

**Crosslisted with:** AGRO 495, ENTO 495, GRAS 495, HORT 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

**Format:** LEC

**SOIL 496 Independent Study**

**Crosslisted with:** AGRO 496, AGRO 896, RNGE 496

**Credit Hours:** 1-6

**Min credits per semester:** 1

**Max credits per semester:** 6

**Max credits per degree:** 12

**Format:** IND

**SOIL 498 Senior Project**

**Crosslisted with:** AGRO 498

**Prerequisites:** Senior standing.

**Notes:** A two-semester sequence. Students should select one credit hour the first semester and three credits the second semester. The first semester will be used for planning, topic selection, and identifying a project adviser. The second semester will be used to carry out the research project, prepare a written report, and possibly an oral presentation.

**Description:** Carry out and report on a research project.

**Credit Hours:** 1-3

**Min credits per semester:** 1

**Max credits per semester:** 3

**Max credits per degree:** 3

**Format:** IND

**SOIL 499H Honors Thesis**

**Crosslisted with:** AGRO 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

**Format:** IND