

# SOIL SCIENCE (SOIL)

## SOIL 1113 Land, Life and the Environment (N)

**Description:** Provide information about soils at local, regional, national, and global scales as well as basic soil properties and how they are influenced by human activity. Discussion topics include soil's importance to world food security and human health, agricultural production, environmental quality, and sustainable ecosystems. Students will gain practical knowledge of sustainable soil management in support of the production and ecological regulator functions of the soils.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**General Education and other Course Attributes:** Natural Sciences

## SOIL 2124 Fundamentals of Soil Science (N)

**Prerequisites:** CHEM 1215 or CHEM 1314 or CHEM 1414.

**Description:** Introduction to soil physical, chemical and biological properties and processes necessary in formulating land use decisions related to agricultural, engineering and environmental concerns. Soil formation, classification and conservation. Analysis/evaluation of soils in field and laboratory settings. Course previously offered as AGRN 2124.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**General Education and other Course Attributes:** Natural Sciences

## SOIL 3033 Soils and Societies (S)

**Description:** Influence of the soil in shaping human decisions that affect food supply, cultural practices, economic growth, and establishment of societies. Survey of past and current land uses and land use changes that lead to the demise of societies or advancement of people's lives. Themes include key human utilization of the soil in Oklahoma and in the United States, roles of soil in waste treatment, and advances in assessment and utilization of soil that affect human lives. Soils in art, mythology, pop culture, healthcare, and warfare.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**General Education and other Course Attributes:** Social & Behavioral Sciences

## SOIL 3433 Soil Genesis, Morphology, and Classification

**Prerequisites:** SOIL 2124.

**Description:** Basic principles dealing with how and why soils differ, their descriptions, geographic distributions and modern classification of soils. Soil genesis and classification a prerequisite to sound land use planning and land management. Course previously offered as AGRN 3433. May not be used for Degree Credit with SOIL 5353.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**Additional Fees:** PSS or SOIL Course Field Trip fee of \$40 applies.

## SOIL 4210 Describing and Interpreting Soils

**Prerequisites:** SOIL 2124.

**Description:** Describe and classify soil properties in the field and interpret for suitable agriculture, urban, and other land uses. Course previously offered as AGRN 4210. May not be used for Degree Credit with SOIL 5210. Offered for fixed 1 credit hour, maximum of 3 credit hours.

**Credit hours:** 1

**Contact hours:** Contact: 1 Other: 1

**Levels:** Undergraduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

## SOIL 4213 Precision Agriculture

**Prerequisites:** MATH 1513, senior standing.

**Description:** Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. Same course as BAE 4213. May not be used for Degree Credit with SOIL 5213.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

## SOIL 4234 Soil Nutrient Management

**Prerequisites:** SOIL 2124.

**Description:** Soil fertility and use of fertilizer materials for conservation, maintenance, and improvement of soil productivity and to minimize environmental concerns. Course previously offered as AGRN 4234. May not be used for Degree Credit with SOIL 5234.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

## SOIL 4363 Environmental Soil Science

**Prerequisites:** BIOL 1114 or (BIOL 1113 and BIOL 1111) and SOIL 2124.

**Description:** Re-emphasis of soil science concepts vital in the understanding of processes that are within the realms of the ecological regulator function of the soil; discussions on the role of soil as the foundation of forest, rangeland/pastureland, agricultural, urban and suburban, as well as wetland ecosystems; impact of soil processes on global environmental concerns; soil as the ultimate recipient of waste; impact of soil processes on groundwater and surface water quality. Same course as ENVR 4363. Course previously offered as AGRN 4363. May not be used for Degree Credit with SOIL 5363.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 4463 Soil and Water Conservation****Prerequisites:** SOIL 2124.**Description:** Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of hydrology cycle to improve water use efficiency of precipitation and irrigation resources. Examine resource mismanagement that have resulted in desertification, salinization and deforestation. Course previously offered as AGRN 4463. May not be used for Degree Credit with SOIL 5463.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 4470 Problems and Special Study****Prerequisites:** Consent of the instructor.**Description:** Problems in soil science selected from topics in soil chemistry and fertility, soil physics, soil biology, soil conservation, and soil morphology. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.**Credit hours:** 1-3**Contact hours:** Contact: 1-3 Other: 1-3**Levels:** Undergraduate**Schedule types:** Independent Study**Department/School:** Plant & Soil Sciences**SOIL 4483 Soil Microbiology****Prerequisites:** SOIL 2124 and BIOL 1114 or (BIOL 1113 and BIOL 1111) or consent of instructor.**Description:** An overview of microorganisms living in the soil and their activities which are significant to agricultural practices and the environment. No credit for both SOIL 4483 and SOIL 5383. Course previously offered as AGRN 4483. May not be used for Degree Credit with SOIL 5383.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 4571 Professional Preparation in Plant and Soil Sciences****Prerequisites:** Senior standing in plant and soil sciences.**Description:** Preparation for professional certification exams and career opportunities in plant and soil sciences. Same course as PLNT 4571.**Credit hours:** 1**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 4683 Soil, Water, and Weather****Prerequisites:** SOIL 2124 and PHYS 1114.**Description:** Introduction to the physics of the soil-plant-atmosphere continuum. A focus on physical properties of soil and interactions with water and weather in terrestrial ecosystems. Course previously offered as AGRN 4683. May not be used for Degree Credit with SOIL 5683.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 4893 Environmental Soil Chemistry****Prerequisites:** SOIL 2124 and CHEM 1225 or CHEM 1515.**Description:** Chemical of soil systems with an emphasis on environmental health and quality. Topics include organic matter dynamics, the role of plant and microbial inputs, ion exchange processes, sorption phenomena, properties of clay minerals, and soil acidity. Same course as ENVR 4893. Previously offered as SOIL 3893 and AGRN 3893.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 5000 Master's Thesis****Prerequisites:** Consent of adviser.**Description:** Research planned, conducted and reported in consultation with a major professor. 1-6 credits, 6 max total credits under Plan I, and 2 max total credits under Plan II. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.**Credit hours:** 1-6**Contact hours:** Contact: 1-6 Other: 1-6**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Plant & Soil Sciences**SOIL 5020 Graduate Seminar****Prerequisites:** Graduate standing.**Description:** Discussion of research philosophy, methods, interpretation, and presentations. Profession development and contributions to the scientific community. Same course as PLNT 5020. Offered for fixed 1 credit hour, maximum of 3 credit hours.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**SOIL 5110 Problems and Special Study****Prerequisites:** Consent of instructor.**Description:** Supervised study of special problems and topics not covered in other graduate courses. Offered for variable credit, 1-4 credit hours, maximum of 12 credit hours.**Credit hours:** 1-4**Contact hours:** Contact: 1-4 Other: 1-4**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Plant & Soil Sciences**SOIL 5112 Research Methods in Plant and Soil Sciences****Prerequisites:** Graduate standing.**Description:** Exploration of various methodologies helpful in field scale research. Application and understanding biometry as it relates to research result interpretation. Course previously offered as SOIL 5111.**Credit hours:** 2**Contact hours:** Lecture: 2 Contact: 2**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences

**SOIL 5120 Teaching Practicum in Plant and Soil Sciences**

**Description:** College-level teaching experience under the mentorship of a faculty member who assists in planning of class activities, provides guidance in teaching-related projects, observes classes and provides feedback regarding course delivery and classroom management. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

**SOIL 5131 Professional Development Colloquium in Plant and Soil Sciences**

**Description:** Professional preparation of graduate students for future careers. Discussions on topics related to the application process and successful careers in the academic, private industry and government sectors. Concerns of international students, career-life balance and other post-graduate school career issues are discussed.

**Credit hours:** 1

**Contact hours:** Contact: 1 Other: 1

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Plant & Soil Sciences

**SOIL 5210 Describing and Interpreting Soils**

**Prerequisites:** SOIL 2124.

**Description:** Describe and classify soil properties in the field and interpret for suitable agriculture, urban, and other land uses. May not be used for degree credit with SOIL 4210. Offered for fixed 1 credit hour, maximum of 3 credit hours.

**Credit hours:** 1

**Contact hours:** Contact: 1 Other: 1

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

**SOIL 5213 Precision Agriculture**

**Prerequisites:** MATH 1513, senior standing.

**Description:** Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. May not be used for degree credit with SOIL 4213.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5223 Soil Chemical Processes and Impact on Environmental Quality**

**Prerequisites:** SOIL 4893 and CHEM 2113 or CHEM 3324 or equivalent.

**Description:** A comprehensive study of chemical processes applied to fate and transport of contaminants and agricultural productivity. Chemical and physical properties of soil minerals as they pertain to solution and surface chemistry. Nutrient and contaminant availability and speciation as dictated by ion exchange, precipitation/dissolution, and adsorption reactions. Review of current research in soil and environmental chemistry literature. Course previously offered as SOIL 5224.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5230 Research**

**Prerequisites:** Consent of a faculty member supervising the research.

**Description:** Supervised independent research on selected topics. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.

**Credit hours:** 1-4

**Contact hours:** Contact: 1-4 Other: 1-4

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

**SOIL 5234 Soil Nutrient Management**

**Prerequisites:** SOIL 2124.

**Description:** Soil fertility and use of fertilizer materials for conservation, maintenance, and improvement of soil productivity and to minimize environmental concerns. May not be used for degree credit with SOIL 4234.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**SOIL 5353 Advanced Soil Genesis and Classification**

**Prerequisites:** SOIL 3433.

**Description:** Processes and factors of soil formation. Comparison of world soil morphology and classification systems. Course previously offered as AGRN 5353.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**SOIL 5363 Environmental Soil Science**

**Prerequisites:** BIOL 1114 or (BIOL 1113 and BIOL 1111) and SOIL 2124.

**Description:** Re-emphasis of soil science concepts vital in the understanding of processes that are within the realms of the ecological regulator function of the soil; discussions on the role of soil as the foundation of forest, rangeland/pastureland, agricultural, urban and suburban, as well as wetland ecosystems; impact of soil processes on global environmental concerns; soil as the ultimate recipient of waste; impact of soil processes on groundwater and surface water quality. May not be used for degree credit with SOIL 4363.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5383 Advanced Soil Microbiology**

**Prerequisites:** SOIL 2124 and BIOL 1114 or (BIOL 1113 and BIOL 1111) or consent of instructor.

**Description:** A comprehensive overview of microorganisms living in the soil and their activities which are of agricultural and environmental significance. Provide experience in analytical skills related to soil microbial processes. No credit for both SOIL 4483 and SOIL 5383.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5463 Soil and Water Conservation**

**Prerequisites:** SOIL 2124.

**Description:** Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of hydrology cycle to improve water use efficiency of precipitation and irrigation resources. Examine resource mismanagement that have resulted in desertification, salinization and deforestation. May not be used for degree credit with SOIL 4463.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5483 Soil Bioremediation and Sustainability**

**Prerequisites:** SOIL 4483.

**Description:** Microbial activities, biodiversity, sustainability, and their interrelationships in soil and the environment. Soil enzymology, environmental sustainability, and bioremediation of agricultural and industrial chemicals, heavy metals, chlorinated organics and explosives. Formulation of strategies that promote soil productivity and environmental sustainability.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5583 Soil Physics Measurement Techniques**

**Prerequisites:** SOIL 4683.

**Description:** Training in field and laboratory techniques for physical analysis of soil properties and processes. Develop research proposal and conduct research project related to soil physics. Course previously offered as AGRN 5583.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**SOIL 5683 Soil, Water, and Weather**

**Prerequisites:** SOIL 2124 and CHEM 1225.

**Description:** Introduction to the physics of the soil-plant-atmosphere continuum. A focus on physical properties of soil and interactions with water and weather in terrestrial ecosystems. May not be used for degree credit with SOIL 4683.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5813 Soil-Plant Nutrient Cycling and Environmental Quality**

**Prerequisites:** SOIL 4234 or equivalent.

**Description:** Theory and application of soil plant relationships in production and non-production environments. Nutrient cycling, mass balance, soil nutrient supply and plant response. Methods to reduce the impact of nutrients on environmental quality, soil-plant buffering and response models. Course previously offered as AGRN 5813.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5893 Environmental Soil Chemistry**

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences

**SOIL 5894 Soil Biogeochemistry**

**Prerequisites:** SOIL 4893 or Consent of Instructor.

**Description:** Foundational and emerging concepts in soil biogeochemistry with an emphasis on transformation and fates of carbon, nitrogen, and phosphorus from molecular to global scales. Discussions are focused on molecular-scale processes occurring at the interface between mineral surfaces, microbes, and plants all the way to the controls on nutrient storage and cycling at the ecosystem-scale. Student-led discussions on peer-reviewed literature and exploration of key topics in soil biogeochemistry.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Plant & Soil Sciences

**SOIL 6000 Doctoral Thesis**

**Prerequisites:** Consent of instructor.

**Description:** Independent research to be conducted and reported with the supervision of a major professor as partial requirement for the PhD degree. Offered for variable credit, 1-6 credit hours, maximum of 36 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

**SOIL 6010 Advanced Topics and Conference**

**Prerequisites:** MS degree.

**Description:** Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Independent Study

**Department/School:** Plant & Soil Sciences

**SOIL 6583 Soil Physics Theory**

**Prerequisites:** SOIL 4683 or equivalent and MATH 2233 or equivalent.

**Description:** Theoretical understanding and modeling skills required to analyze and predict mass and energy transport in the soil-plant-atmosphere continuum. Application of analytical and numerical models for diverse transport phenomena including water, heat, and solute transport through soil.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Plant & Soil Sciences