

# PLANT AND SOIL SCIENCES

## Courses

### PLNT 1101 Orientation to Plant and Soil Sciences

**Description:** Introduction to areas of study, professional activities and career opportunities in plant and soil sciences.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Undergraduate

**Schedule types:** Lecture

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

### PLNT 1213 Introduction to Plant and Soil Systems (N)

**Description:** Introduction to the concepts of plant and soil systems including cropland, rangeland and pastureland. A systems approach to the importance of plant and soil resources to the producer, consumer and citizen; modern management and production practices; maintenance of natural resources. Previously offered as AGRN 1213.

**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

### PLNT 2011 Agronomic Problem Solving

**Prerequisites:** PLNT 1213 or HORT 1013 or P BIO 1404 and MATH 1513 or Instructor Permission.

**Description:** Practical solutions to common agronomic and soil science issues.

**Credit hours:** 1

**Contact hours:** Lab: 2 Contact: 2

**Levels:** Undergraduate

**Schedule types:** Lab

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

### PLNT 2013 Applied Plant Science

**Prerequisites:** PLNT 1213 or BOT 1404 or FOR 1123 or HORT 1013.

**Description:** Application of agronomic principles to the management, improvement and use of plants. Structure and growth of crop plants relating to management strategies and adaptation to varying abiotic and biotic factors. Hands-on identification of crops, weeds, and seed quality factors; application of tools and techniques. Previously offered as PLNT 2012 and AGRN 2012.

**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

### PLNT 2041 Career Development in Plant and Soil Sciences

**Prerequisites:** Sophomore standing in plant and soil sciences.

**Description:** Develop professional skills, learn about career development resources, and understand the steps of the application and interview process. Engage industry professionals to learn about experiences and viewpoints regarding the job market. Identify career path, develop action plan to meet job requirements and gain basic understanding of personal financial management. Previously offered as AGRN 2041.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Undergraduate

**Schedule types:** Lecture

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

### PLNT 3012 Crops of Oklahoma

**Prerequisites:** PLNT 1213.

**Description:** Production, distribution, classification, utilization, and current issues or improvements of major crops in Oklahoma. This course includes, but is not limited to, wheat, soybean, sorghum, corn, peanuts, cotton, sunflowers, and bermuda grass. Previously offered as PLNT 3011.

**Credit hours:** 2

**Contact hours:** Lecture: 2 Contact: 2

**Levels:** Undergraduate

**Schedule types:** Lecture

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

### PLNT 3554 Plant Genetics and Biotechnology

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

**Description:** Basic principles of heredity. Interrelationship between classical genetics and molecular genetics emphasized. Mendelian genetics, cytogenetics, mutations, gene regulation and genetic engineering. Previously offered as AGRN 3554.

**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

### PLNT 3790 Seed and Plant Identification

**Prerequisites:** PLNT 1213.

**Description:** Identification and classification of agronomically important crop and weed species from seed and from seedling, vegetative, flowering or mature plants. Offered for fixed credit, 1 credit hours, maximum of 2 credit hours.

**Credit hours:** 1

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

**Levels:** Undergraduate

**Schedule types:** Independent Study

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

### PLNT 4013 Principles of Weed Science

**Prerequisites:** PLNT 1213 or HORT 1013.

**Description:** Basic principles of weed biology and ecology, introduction to herbicide chemistry, and methods for preventative, cultural, mechanical, chemical, and biological weed management in cropping systems, turf, and natural landscapes. Laboratories are applied and will include weed identification, calibration of field equipment, applied grower problems, and herbicide damage identification. Previously offered as PLNT 3113 and PLNT 3211. May not be used for Degree Credit with PLNT 5013.

**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

**PLNT 4033 Applied Agricultural Meteorology****Prerequisites:** PLNT 1213 and SOIL 2124.**Description:** Fundamental meteorology concepts in field-scale setting. Drivers of climate and weather and the assessment of the impacts of climate and weather on agricultural systems. Integration of weather and climate information into the process of formulating sound, data-based decisions related to various agricultural operations.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4080 Professional Internship****Prerequisites:** Consent of instructor.**Description:** Internship must be at an approved agribusiness unit or other agency serving agronomic agriculture. Requires a final conference with on campus adviser and a written report. Previously offered as AGRN 4080. 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:** Undergraduate**Schedule types:** Independent Study**Department/School:** Plant & Soil Sciences**PLNT 4113 Advanced Weed Science****Prerequisites:** PLNT 3111 and PLNT 3221.**Description:** Integrated approach for weed management. Weed life cycles and biology, weed crop interferences, herbicide families and their characteristics, and finally a systematic and integrated weed management system. Methods of conducting and interpreting research results in appropriate topics. Previously offered as AGRN 4113.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4123 Plant-Environment Interactions****Prerequisites:** PBIO 1404.**Description:** Environmental impact on plant life cycle; (i.e. germination, flowering and senescence); plant growth responses (e.g. photosynthesis, phototropism, biomass production) to light quality, precipitation, temperature, and population or community changes. Previously offered as AGRN 4123. May not be used for Degree Credit with PLNT 5123.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4133 Temperature Stress Physiology****Prerequisites:** CHEM 1215 and BIOL 1114 (or BIOL 1113 and BIOL 1111) or PBIO 1404**Description:** Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as HORT 4133. Offered in combination with HORT 5133 and PLNT 5133. May not be used for degree credit with HORT 5133 and PLNT 5133.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4353 Plant Breeding****Prerequisites:** PLNT 3554 or equivalent.**Description:** Basic principles dealing with the improvement of plants through application of genetic principles. Previously offered as AGRN 4353. May not be used for Degree Credit with PLNT 5353.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4443 Cropping Systems****Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4453 Plant Molecular Breeding****Prerequisites:** ANSI 3423 or BIOL 3023 or consent of instructor.**Description:** Use and application of genomic knowledge and molecular technology to improve agriculturally important plants. Major topics include applications of genome sequence, genetic mapping, and gene cloning structural and comparative genomics and their application in molecular breeding of agronomic crops. May not be used for degree credit with PLNT 5453.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4470 Problems and Special Study****Prerequisites:** Consent of instructor.**Description:** Problems in plant science selected from topics in range and turf, plant breeding and genetics, crop management and physiology, and weed control. Previously offered as AGRN 4470. 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

**PLNT 4543 Cropping Systems****Prerequisites:** PLNT 1213 or HORT 1013 or BOT 1404; PLNT 2013.**Description:** Principles of developing and managing cropping systems in the Great Plains for the efficient use and conservation of soil and water resources while promoting yield, managing soil fertility, and effectively controlling pests. May not be used for degree credit with PLNT 5543.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 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 SOIL 4571. Previously offered as AGRN 4571.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4573 Bioenergy Feedstock Production****Prerequisites:** PLNT 1213.**Description:** Understand production and management practices for potential bioenergy feedstocks. Distinguish feedstock sources and end products. Identify physiological mechanisms to improve yield and quality under current and future climates. Use simulation and GIS tools to project biomass and ethanol yields. May not be used for Degree Credit with PLNT 5573.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4923 Applications of Biotechnology in Pest Management****Prerequisites:** BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1215 or equivalents.**Description:** Applications of biotechnology in managing arthropod pests of plants, animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, effectiveness and associated problems or concerns resulting from their use. Same course as ENTO 4923, PLP 4923, and PLNT 4922. May not be used for Degree Credit with PLNT 5923.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 4933 Gene Editing and Genetically Modified Crops****Prerequisites:** PLNT 3554 or ANSI 3423 or BIOL 3023 or Consent of Instructor.**Description:** Principles and techniques in editing and overexpressing genes in transgenic crops with improved agronomic traits. Controversies and consumer concerns over transgenic plants, biotechnology regulations and global status of biotech crops. Laboratory techniques in recombinant DNA cloning, transformation, and tissue culture. May not be used for Degree Credit with PLNT 5933.**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**PLNT 4990 Senior Thesis in Plant and Soil Sciences****Prerequisites:** Consent of instructor.**Description:** Supervised undergraduate research in topics related to plant and soil sciences. Completion of an approved research project based on a thesis topic in plant or soil science will include submission of a written report and a public defense of the work. 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:** Undergraduate**Schedule types:** Independent Study**Department/School:** Plant & Soil Sciences**PLNT 5000 Master's Thesis****Prerequisites:** Consent of advisor.**Description:** Research planned, conducted and reported in consultation with a major professor. 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**PLNT 5013 Principles of Weed Science****Prerequisites:** PLNT 1213 or HORT 1013.**Description:** Basic principles of weed biology and ecology, introduction to herbicide chemistry, and methods for preventative, cultural, mechanical, chemical, and biological weed management in cropping systems, turf, and natural landscapes. Laboratories are applied and will include weed identification, calibration of field equipment, applied grower problems, and herbicide damage identification. May not be used for degree credit with PLNT 4013.**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

**PLNT 5020 Graduate Seminar****Prerequisites:** Graduate standing.**Description:** Discussions of research philosophy, methods, interpretation and presentations. Profession development and contributions to the scientific community. Same course as SOIL 5020. Offered for fixed credit, 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**PLNT 5110 Problems and Special Study****Prerequisites:** Consent of instructor.**Description:** Supervised study of special problems and topics not covered in other graduate courses. Previously offered as AGRN 5110. 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**PLNT 5113 Advanced Weed Science****Description:** Integrated approach for weed management. Weed life cycles and biology, weed crop interferences, herbicide families and their characteristics, and finally a systematic and integrated weed management system. Methods of conducting and interpreting research results in appropriate topics. Previously offered as AGRN 4113. May not be used for degree credit with PLNT 4113.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 5123 Plant-Environment Interactions****Prerequisites:** PBIO 1404.**Description:** Environmental impact on plant life cycle; (i.e. germination, flowering and senescence); plant growth responses (e.g. photosynthesis, phototropism, biomass production) to light quality, precipitation, temperature, and population or community changes. May not be used for degree credit with PLNT 4123.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 5133 Temperature Stress Physiology****Description:** Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as HORT 5133. Offered in combination with HORT 4133 and PLNT 4133. No credit with degree credit in HORT 4133 and PLNT 4133.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 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**PLNT 5293 Plant Response to Water Stress****Prerequisites:** BIOC 3653, BOT 3463.**Description:** Physiological ramifications of water deficit stress on cells, tissues, plants and canopies. Discussion of the soil/plant/atmosphere continuum, and avoidance and tolerance mechanisms leading to drought resistance. Photosynthesis, transpiration, and water-use efficiency and their relationship to biomass accumulation and crop yield. Previously offered as AGRN 5293.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 5313 Simulation Models in Research, Management and Policy****Prerequisites:** PLNT 1213.**Description:** Use crop simulation models (CSM) and decision support systems to address challenges associated with food, fuel, feed and fiber production. Utilize CSM as research, management, and policy tools. Evaluate CSM as surrogates to field studies and to design experiments to fill in knowledge gaps.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 5353 Plant Breeding****Prerequisites:** PLNT 3554 or equivalent.**Description:** Basic principles dealing with the improvement of plants through application of genetic principles. May not be used for degree credit with PLNT 4353.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences**PLNT 5403 Physiological Action of Herbicides****Prerequisites:** BOT 3463.**Description:** The mode of action, uptake and translocation, and metabolism of herbicides in crops and weeds. Previously offered as AGRN 5403.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Plant & Soil Sciences

**PLNT 5412 Plant Breeding Methods**

**Prerequisites:** PLNT 3554 or PLNT 4353 or consent of instructor.  
**Description:** Development and application of genetic principles to breeding methodology of self- and cross-pollinated crops; emphasis on selection methods pertinent to plant improvement; methods of new cultivar development, release, and commercialization. Previously offered as PLNT 5414.

**Credit hours:** 2

**Contact hours:** Lecture: 2 Contact: 2

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5413 Data Science for Agriculture and Natural Resources**

**Description:** Data science principles and skills in the context of agricultural and natural resources research. Topics include data capture, quality control, data manipulation, visualization, reproducible analysis, and communication of results. Emphasis on workflows and analytical techniques tailored for agricultural and natural resource management research.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5433 Biotechnology in Plant Improvement**

**Prerequisites:** PLNT 3554, PLNT 4353, and BIOL 3014 or consent of instructor.

**Description:** Use of emerging technologies in cell biology and molecular genetics to study and manipulate plants. Emphasis on genetic systems which influence productivity and end-product utilization. The integration of biotechnology into plant breeding programs and issues concerning the release of genetically engineered organisms into the environment. Previously offered as AGRN 5433.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5453 Plant Molecular Breeding**

**Prerequisites:** ANSI 3423 or BIOL 3023 or consent of instructor.  
**Description:** Use and application of genomic knowledge and molecular technology to improve agriculturally important plants. Major topics include applications of genome sequence, genetic mapping, and gene cloning structural and comparative genomics and their application in molecular breeding of agronomic crops. May not be used for degree credit with PLNT 4453.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5543 Cropping Systems**

**Description:** Principles of developing and managing cropping systems in the Great Plains for the efficient use and conservation of soil and water resources while promoting yield, managing soil fertility, and effectively controlling pests. May not be used for degree credit with PLNT 4543.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5573 Bioenergy Feedstock Production**

**Prerequisites:** PLNT 1213.

**Description:** Understand production and management practices for potential bioenergy feedstocks. Distinguish feedstock sources and end products. Identify physiological mechanisms to improve yield and quality under current and future climates. Use simulation and GIS tools to project biomass and ethanol yields. May not be used for degree credit with PLNT 4573.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5923 Applications of Biotechnology in Pest Management**

**Prerequisites:** BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1215 or equivalents.

**Description:** Applications of biotechnology in managing arthropod pests of plants, animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, effectiveness and associated problems or concerns resulting from their use. May not be used for degree credit with PLNT 4923.

**Credit hours:** 3

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

**Levels:** Graduate

**Schedule types:** Lecture

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

**PLNT 5933 Gene Editing and Genetically Modified Crops**

**Prerequisites:** PLNT 3554 or ANSI 3423 or BIOL 3023 or consent of instructor.

**Description:** Principles and techniques in editing and overexpressing genes in transgenic crops with improved agronomic traits. Controversies and consumer concerns over transgenic plants, biotechnology regulations and global status of biotech crops. Laboratory techniques in recombinant DNA cloning, transformation, and tissue culture. May not be used for degree credit with PLNT 4933.

**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

**PLNT 6000 Doctoral Thesis****Prerequisites:** Consent of adviser.**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**PLNT 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**PLNT 6410 Topics in Plant Breeding and Genetics****Prerequisites:** Consent of instructor.**Description:** Selected topics in the statistical and experimental analysis of quantitative traits, evolutionary development of domesticated plants and animals, and techniques used in breeding crop plants. Previously offered as AGRN 6410. Offered for variable credit, 1-3 credit hours, maximum of 6 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 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****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