Legal Issues in Criminal Justice
Fall of even years. 3(3-0): R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Sciences-Criminal Justice major. Law as an instrument of social control, legal basis of criminal law and criminal justice policies. Legal limitations on criminal justice institutions and policies.

Security Management
Fall. 3(3-0): P:NM: (CJ 811 or concurrently) R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Organization and management of security operations in business, industry and government.

Security Administration
Spring. 3(3-0): R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Administrative and quantitative techniques for security operations. Statistical analyses. Analysis of financial statements. Operations research and computer techniques.

Quantitative Methods in Criminal Justice Research
Spring. 3(3-0): P:NM: (CJ 811) R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Descriptive and inferential statistics and computer use in criminal justice research.

Independent Study
Fall, Spring. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Approval of school.

Individual research and writing under faculty supervision.

Practicum
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Approval of school.

Observation, study, and work in selected criminal justice agencies. Participation in domestic and foreign criminal justice systems.

Policy Analysis under Conditions of Change
Spring. 3(3-0): P:NM: (CJ 811) R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Methods of policy analysis in criminal justice settings. Policy analysis for the formulation, adoption and implementation of changes.

Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to master's students in the School of Criminal Justice or to doctoral students in the Social Science-Criminal Justice major. Planned research and writing directed by student's thesis committee.

Seminar in Contemporary Criminal Justice Theory
Fall. 3(3-0): R: Open only to graduate students in Criminal Justice or in Social Science-Criminal Justice. Theoretical perspectives and issues in criminal justice and criminology.

Seminar in Criminal Justice Systems
Spring of odd years. 3(3-0): R: Open only to graduate students in Criminal Justice or in Social Science-Criminal Justice. Contempory issues in the criminal justice system.

Research Utilization in Criminal Justice
Spring. 3(3-0): R: Open only to graduate students in Criminal Justice or in Social Science-Criminal Justice. Research application in criminal justice theory and practice.

Criminal Justice Organizations and Processes
Fall. 3(3-0): R: Open only to graduate students in Criminal Justice. Theoretical perspectives on organizations and processes in criminal justice. Evaluation of organizational performance in justice agencies.

Law and Society
Spring. 3(3-0): R: Open only to graduate students in Criminal Justice. Theoretical perspectives on law, impact of law on society and the criminal justice system.

Advanced Quantitative Methods in Criminal Justice Research
Fall. 3(3-0): P:NM: (CJ 887 and STT 421) or introductory statistics course. R: Open only to graduate students in Criminal Justice. Applications of quantitative techniques to criminal justice data. Use of multiple regression and SPSS.

Advanced Topics in Criminal Justice Data Analysis
Spring. 3(3-0): A student may earn a maximum of 9 credits in all enrollments for this course. P:NM: (CJ 906) R: Open only to graduate students in Criminal Justice. Advanced quantitative analysis techniques for criminal justice data.

Advanced Topics in Criminal Justice
Spring. 3(3-0): A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to graduate students in Criminal Justice. Intensive study of one subfield of criminal justice. Critical evaluation of the literature.

Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 50 credits in all enrollments for this course. R: Open only to doctoral students in Criminal Justice. Doctoral dissertation research.
441 Plant Breeding and Biotechnology
Spring of even years. 4(3-2) Interdepartmental with Forestry; Horticulture. P:M: (CSS 350)
Plant improvement by genetic manipulation. Genetic variability in plants. Traditional and biotechnological means of creating and disseminating recombinant genotypes and cultivars.

451 Cellular and Molecular Principles and Techniques for Plant Sciences
Spring, 4(2-6) Interdepartmental with Forestry; Horticulture. P:N:M: (CSS 350 or ZOL 341)
Principles, concepts, and techniques of agricultural plant biotechnology. Recombinant DNA technology, plant molecular biology, transformation, cell tissue, and organ culture in relation to plant improvement.

452 Watershed Concepts
Fall, Spring, Summer. 3(3-0) Interdepartmental with Biological Systems Engineering; Forestry; Fisheries and Wildlife. Administered by Department of Resource Development. P:M: (RD 324 and ZOL 355) RB: organic chemistry Watershed hydrology and management. The hydrologic cycle, water quality, aquatic ecosystems and social systems. Laws and institutions for managing water resources.

455 Pollutants in the Soil Environment
Fall. 3(3-0) P:M: (CEM 143) and completion of Tier I writing requirement. R: Open only to seniors or graduate students.
Chemical and biological reactions of organic and inorganic pollutants in soils.

464 Statistical Methods for Biologists I
Fall. 3(3-0) Interdepartmental with Statistics and Probability; Animal Science. Administered by Department of Statistics and Probability. P:N:M: (STT 421)
Biological random variables. Estimation of population parameters. Testing hypotheses. Linear correlation and regression (prediction). Analyses of counted and measured data to compare several biological groups (contingency tables and analysis of variance).

465 Statistical Methods for Biologists II
Spring. 3(3-0) Interdepartmental with Statistics and Probability; Animal Science. Administered by Department of Statistics and Probability. P:N:M: (STT 464)
Concepts of reducing experimental error: covariance, complete and incomplete block designs, latin squares, split plots, repeated-measures designs, regression applications, and response surface designs.

470 Soil Resources
Fall. 3(2-3) P:N:M: (CSS 210) R: Not open to freshmen or sophomores.
Evaluation of the properties, genesis, and classification of soil resources to assist in making land-use decisions. Field trips required.

477 Pest Management I: Pesticides in Management Systems
Fall. 3(3-0) Interdepartmental with Entomology; Fisheries and Wildlife; Horticulture. Administered by Department of Entomology. P:N:M: (CEM 143 or CEM 291) and (BOT 405 and CSS 402) and (ENT 404 or ENT 470 or FW 328) Chemistry, efficient use, and environmental fate of pesticides. Legal and social aspects of pesticide use.

478 Pest Management II: Biological Components of Management Systems (W)
Spring of even years. 3(2-3) Interdepartmental with Entomology; Forestry; Fisheries and Wildlife; Horticulture. Administered by Department of Entomology. P:M: (ENT 404 or ENT 470 or BOT 403 or CSS 402 or FW 328) and completion of Tier I writing requirement. Principles of host plant resistance and biological control and their relationship to the design of agroecosystems. Classification of insect biological control agents.

486 Biotechnology in Agriculture: Applications and Ethical Issues
Fall of even years. 3(3-0) Interdepartmental with Horticulture; Forestry; Philosophy. Administered by Department of Horticulture. P:M: (BOT 105 or BS 111) P:N:M: (CSS 350 or ZOL 341) R: Not open to freshmen or sophomores.
Current and future roles of biotechnology in agriculture: scientific basis, applications. Environmental, social, and ethical concerns.

490 Independent Study
Fall. 3(3-0) P:M: (CSS 210) R: Open only to seniors or graduate students.
Individual work on field, laboratory, or library search problem of special interest to the student.

491 Special Topics
Fall. 3(3-0) P:M: (CSS 210) R: Open only to seniors or graduate students.
Topics from crop production, crop physiology, turfgrass management, organic soils, turfgrass soils, soil fertility, plant and soil relationships, genetics, biotechnology, environmental science, or sustainable agriculture.

492 Seminar
Fall. 1(1-0) P:M: (CSS 210) and (CSS 342 or CSS 370) and completion of Tier I writing requirement. R: Open only to seniors in the Department of Crop and Soil Sciences.
Synthesis, integration, and application of agronomic principles to current issues in agronomy via discussion and oral written communication.

493 Professional Internship in Crop and Soil Sciences
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department; application required. A student may earn a maximum of 6 credits for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, CSS 493, FIM 493, FW 493, HRT 493, PKG 493, PRM 493, PRR 493, and RD 493 Supervised professional experiences in agencies and businesses related to Crop & Soil Sciences and Environmental Soil Sciences

805 Herbicide Action and Metabolism
Spring of odd years. 2(2-0)
Properties and characteristics of herbicides. Processes involved in herbicide action, transport, and fate in plants and soils.

819 Advanced Plant Breeding
Fall. 3(3-0) Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture. P:N:M: (CSS 450 and STT 422)
Genetic expectations resulting from breeding strategies with cross- and self-pollinated crop plants. Germplasm collections, mapping populations, and modifications of reproductive biology useful for crop improvement.

825 Clay Mineralogy and Soils Genesis
Spring of even years. 4(3-0) Interdepartmental with Geological Sciences. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Mineral structures. X-ray diffraction, pedogenic processes, and mineral transformations and stability.

827 Techniques in Cytogenetics
Fall of odd years. 1(0-3) Interdepartmental with Forestry; Horticulture.
Preparation of chromosomes from commercially important plants for cytogenetic analysis.

829 Advanced Microbial Ecology
Fall of even years. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Department of Microbiology and Molecular Genetics.
Functional roles of microorganisms, their population dynamics and interactions, and their mechanisms of evolutionary change in natural communities, laboratory experiments, and mathematical models.

831 Soil and Plant Resources for Sustained World Food Production
Spring of odd years. 3(3-0)
World food production capacities related to soil and climatic resources. Management and utilization of genetic resources for sustained production of human foods and animal feeds.

832 Environmental and Natural Resource Law
Fall. 3(3-0) Interdepartmental with Resource Development; Agricultural Economics; Forestry; Geography. Administered by Department of Resource Development. P:N:M: (RD 430) Origin and development of environmental law. Theories of power, jurisdiction, sovereignty, property interests, pollution, and other bases for legal controls of natural resources. Common law and constitutional limitations on governmental power.

836 Plant Evolution and the Origin of Crop Species
Fall of even years. 3(3-0) Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture. P:N:M: (CSS 350) Cultural and biological aspects of the evolution of domestic plants. Origin and diversity of cultivated plants.

837 Confocal Microscopy
Fall. Spring. 2(2-2) Interdepartmental with Natural Science. Administered by Natural Science. R: Approval of department; application required.
Crop and Soil Sciences-CSS

840 Soil Physics Fall of odd years. 3(2-3) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Physical properties of soil including texture, structure, consistency, aeration, moisture content, and temperature. Quantitative measurement of plant growth. Agronomic and engineering practices.

841 Soil Microbiology Spring of even years. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Department of Microbiology and Molecular Genetics. P:NM; (MIC 425) SA: MPH 841. Ecology, physiology, and biochemistry of microorganisms indigenous to soil.

842 Population Genetics, Genealogy and Genomics Fall. 3(3-0) Interdepartmental with Forestry, Animal Science, Genetics; Fisheries and Wildlife; Horticulture. Administered by Department of Forestry. RB: Pre-calculus, basic genetics. Population genetic processes underlying patterns of molecular genetic variation. Genealogical approaches to the study of genomic diversity, phylogenetic reconstruction, and molecular ecology.

850 Soil Chemistry Spring. 3(3-3) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Ion activities, ionic exchange and equilibrium reactions. Soil pH, macro- and micronutrients, saline soils and availability of nutrients to plants.


855 Interfacial Environmental Chemistry Fall of even years. 4(4-0) R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Principles and mechanisms of reactions at solid-liquid interfaces emphasizing environmental chemistry. Sorption of ionic and organic compounds. Properties of colloids. Kinetics of surface reactions.

863 Mineral-Water Interactions Spring of odd years. 4(3-2) Interdepartmental with Geological Sciences. Administered by Department of Geological Sciences. R: Open only to graduate students in Crop and Soil Sciences or Geological Sciences or Geography. Mineralogy, petrology and geochemistry of fluid-rock reactions in geologic, sedimentary and geochemical cycles. Rock and mineral weathering, soil formation, genesis and burial diagenesis of sediments and sedimentary rocks, and metamorphism.

865 Organic Chemistry of Soils Spring of odd years. 2(2-0) Chemistry of natural and anthropogenic organic substances in soils.

870 Techniques of Analyzing Unbalanced Research Data Spring. 4(4-0) Interdepartmental with Animal Science; Forestry; Fisheries and Wildlife; Horticulture. Administered by Department of Animal Science. P:NM; (STT 464) R: Open only to graduate students in the College of Agriculture and Natural Resources. SA: ANS 943. Not open to students with credit in ANS 943. Linear model techniques to analyze biological research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Prediction of breeding values and estimation of population parameters from variance and covariance components.

890 Independent Study Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Individual study on field, laboratory, or library research.

891 Current Topics in Ecology and Evolution Spring of even years. 3(3-0) Interdepartmental with Zoology; Botany and Plant Pathology. Administered by Department of Zoology. Presentation and critical evaluation of theoretical and empirical developments by visiting scientists.

891B Selected Topics in Plant Breeding and Genetics Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture. R: Open only to graduate students in Plant Breeding and Genetics or Genetics. Approval of department. Selected topics in plant breeding.

892 Plant Breeding and Genetics Seminar Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Horticulture; Forestry. Administered by Department of Horticulture. Experience in review, organization, oral presentation, and analysis of research.

893 Selected Topics Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, or College of Natural Science. Selected topics in crop and soil sciences of current interest and importance.

899 Master's Thesis Research Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in Crop and Soil Sciences. Master's thesis research.

911 Introduction to Microeconomics Fall, Spring, Summer. 3(3-0) Not open to students with credit in EC 251H. Economic institution, reasoning and analysis, consumption, production, determination of price and quantity in different markets. Income distribution, market structure and normative analysis.