CROP AND SOIL SCIENCES

Department of Crop and Soil Sciences
College of Agriculture and Natural Resources

101 Introduction to Crop Science
Fall, 3(2-2)

105 Agricultural Industries Seminar
Fall, 1(2-0) SA: AEE 105
Preparing students to succeed academically and professionally and introducing them to opportunities in the agriculture industry.

110 Computer Applications in Agronomy
Fall, 2(1-2) R: Open only to students in the College of Agriculture and Natural Resources. Not open to students with credit in CSE 101.
Use of computers in agriculture. Basic computer operating systems. Management and use of storage media. Laboratory experience in word processing, spread sheets, data bases, programming languages, networking, and software related to agriculture.

120 Agricultural Industry Issues
Fall, 3(3-0)
Issues facing the agricultural industry. Role of government in addressing these issues.

124 Introduction to Sustainable Agriculture and Food Systems
Fall, Spring, 1(0-2) Interdepartmental with Environmental Studies and Agriscience and Horticulture. Administered by Crop and Soil Sciences.
Impact of agricultural and social sciences on our food system. Contemporary research and movements involving agricultural and food system sustainability.

135 Crop Scouting and Investigation
Spring, 2(3-0) Interdepartmental with Horticulture. Administered by Crop and Soil Sciences. P: CSS 101 or HRT 203.
Crop production, pest scouting and other production problems, and field diagnosis. Interaction with agriculture clientele. Offered first ten weeks of semester.

151 Seed and Grain Quality
Spring, 2(2-2) SA: CSS 051
Principles and practices of producing, conditioning, testing and marketing field crop seed. Grain grading and quality evaluation. Offered first ten weeks of semester.

171 Operations Budgeting for Golf Course Managers
Spring, 2(3-0) RB: CSS 232 and CSS 210
Not open to students with credit in CSS 071. Budgeting, financial analysis, purchasing and materials management for golf course operations. Offered first ten weeks of semester.

178 Turfgrass Irrigation
Spring, 3(3-2) P: CSS 232
Turfgrass irrigation systems. Installation and maintenance including water management. Offered first ten weeks of semester.

181 Pesticide and Fertilizer Application Technology
Spring, 3(3-3) SA: CSS 081
Effective and efficient application of pesticides and fertilizers to turf and ornamentals. Pesticide handling, legal, and environmental concerns. Calibration of equipment. Offered first ten weeks of semester.

192 Professional Development Seminar I
Spring, 1(0-2) R: Open only to students in the Department of Crop and Soil Sciences.
Career development, critical issues analysis, resume writing, scientific presentations and public speaking in crop and soil sciences.

201 Forage Crops
Fall, 3(2-2)

202 The World of Turf
Fall, 2(1-2)
Role of turf in society and the environment. Principles underlying establishment and maintenance of turf on athletic fields, parks, home lawns, and golf courses. Aesthetic, safety, and economic aspects of turfgrass management practices.

203 Applied Turf Management
Fall, 1(1-0) P: CSS 202 or concurrently Not open to students with credit in CSS 232.
Principles and practices for establishing and maintaining turf in residential and commercial lawns. Field trips required.

210 Fundamentals of Soil Science
Fall, Spring, 2(2-2) P: CSS 101 RB: CEM 141

212 Advanced Crop Production
Fall, 2(2-0) P: CSS 101 RB: CSS 210 and CSS 110
Systems approach to production of field crops including corn, soybeans, small grains, sugar beets, and dry beans.

222 New Horizons in Biotechnology
Fall, 2(2-0) Interdepartmental with Entomology. Administered by Crop and Soil Sciences. P: CSS 101 or HRT 203.
Perspectives on biotechnology for safer food production, environmental quality, and improved human health. Impacts of biotechnology on the national economy. Political and ethical ramifications of applied biotechnology.

223 Turfgrass Management
Fall, 4(3-2) P: CSS 210 or concurrently RB: CSS 110 or CSE 101
Turfgrass utilization, identification, establishment and management principles. Responses to various cultural practices.

251 Organic Farming Principles and Practices
Spring, 3(3-0) Interdepartmental with Horticulture. Administered by Horticulture.
History and principles of organic farming. Farms as ecological systems. Certification process and agencies. Organic matter management, the soil food web, and nutrient availability. Biodiversity, crop rotations, plant competition, ground cover, and plant health. Integrating crops and animals. Organic animal husbandry. Field trip required.

262 Turfgrass Management Seminar
Fall, 3(2-2) A student may earn a maximum of 2 credits in all enrollments for this course. P: CSS 232 or concurrently
Presentations by turf students and industry professionals. Topics include internship experiences, technical expertise, and keys to successful career pathways.

264 Golf Course Design and Construction Techniques
Fall, 2(2-0) P: CSS 210 and CSS 232 and CSS 267 SA: CSS 164
Concepts and theory of golf course design and construction including location, space, topography, clientele, and environmental concerns.

269 Turfgrass Strategies: Integration and Synthesis
Spring, 3(3-0) P: CSS 232 and CSS 267
Issues in turfgrass management including employee relations, cultural, and environmental problems. Offered first ten weeks of semester.

272 Turfgrass Soil Fertility
Spring, 2(3-0) RB: CSS 210 SA: CSS 044, CSS 342
Soil-plant relationships, soil acidity and alkalinity, macro- and micro-nutrients, fertilizer materials, soil fertility evaluations, and fertilizer programming. Offered first ten weeks of semester.

290 Independent Study in Crop and Soil Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: Open only to students in the Institute of Agricultural Technology. SA: CSS 057 Not open to students with credit in CSS 057.
Field, laboratory, or library research problems.

292 Management of Turfgrass Weeds
Fall, 3(2-2) P: CSS 232 RB: PLB 105
Chemical, biological, and cultural methods of managing cool- and warm-season turfgrass weeds. Environmental considerations in weed management.

294 Issues in International Agriculture
Spring, 1(1-0) SA: CSS 494
Global issues related to food production, soil resources and sustainability of agriculture in developing and developed countries.

302 Principles of Weed Management
Fall, 3(2-2) P: CSS 101 or PLB 105 or BS 111 or HRT 203 or CSS 232
Cultural, mechanical, biological, and chemical weed management principles and practices.

330 Soil Chemistry
Spring, 2(2-2) P: CSS 210 and CEM 143
Organic and inorganic soil processes including mineralogy, adsorption, desorption, and precipitation. Chemistry of soil organic matter and inorganic soil components.

340 Applied Soil Physics
Spring, 2(2-2) P: CSS 210
Soil physical properties including solids, water, air, and heat. Transport processes in soil.
Crop and Soil Sciences—CSS

350 Introduction to Plant Genetics
Spring. 3(4-0) Interdepartmental with . Administered by Crop and Soil Sciences. P: BOT 105 or BS 111 R: Not open to freshmen or sophomores. Fundamentals of plant genetics with applications to agriculture and natural resources.

360 Soil Biology
Fall (2-2) C: CSS 210 RB: CSS 330 Overview of organismal diversity and biological soil processes. Role of macroorganisms and microorganisms in soil processing, including nutrient cycling.

382 Turfgrass Physiology
Spring. 2(3-0) Interdepartmental with Horticulture. Administered by Crop and Soil Sciences. P: (CSS 232) Completion of Tier I writing requirement. RB: PLB 105 SA: CSS 282, CSS 068 Not open to students with credit in CSS 332. Physiological principles of turfgrass growth and development. Water relations, light, temperature, respiration, photosynthesis, mineral nutrition, and hormone action. Impact of mowing, cultivation, and traffic on turfgrass growth. Offered first ten weeks of semester.

404 Forest and Agricultural Ecology
Fall. 3(3-0) Interdepartmental with Forestry. Administered by Forestry. P: CSS 210 and (BOT 105 or BS 110) RB: ZOL 355 Ecological interactions crucial to the sustainable management of crop and forest ecosystems. Plant resources, competition, community development and dynamics, biodiversity, primary productivity, nutrient cycling, ecosystem structure and function, and impacts of global environmental change.

404L Forest and Agricultural Ecology Laboratory
Fall. 1(0-3) Interdepartmental with Forestry. Administered by Forestry. P: CSS 210 and (BOT 105 or BS 110) and (FOR 404 or concurrently) RB: ZOL 355. Field studies and data analysis of ecological processes central to the sustainable management of forest and agricultural resources. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, critiques of primary literature. Two weekend field trips required.

425 Microbial Ecology
Spring. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. RB: MMB 301 SA: MPH 425 Microbial population and community interactions. Microbial activities in natural systems, including associations with plants or animals.

426 Biogeochemistry
Summer. 3 credits. Interdepartmental with Geological Sciences and Microbiology and Molecular Genetics and Zoology. Administered by Microbiology and Molecular Genetics. RB: (BS 110 or LBS 144 or LBS 148H or BS 111 or LBS 145 or LBS 149H) and (CEM 143 or CEM 251) SA: MPH 426 Integration of the principles of ecology, microbiology, geochemistry, and environmental chemistry. Societal applications of research in aquatic and terrestrial habitats.

431 International Agricultural Systems
Spring. 3(3-0) P: ANR 250 or EEP 260 or ISS 310 or ISS 315 or ISS 318 or ISS 320 or ISS 330A or ISS 330B or ISS 330C or ISS 336 R: Not open to freshmen. World production capacity for food, fiber and biofuel as related to soil, biology and climatic resources. Principles and case studies of sustainable systems presented from developing and developed countries. Emerging issues in agricultural globalization and biodiversity.

440 Soil Biophysics
Fall of even years. 3(2-2) P: CSS 210 R: Not open to freshmen or sophomores. Plant growth properties and soil physical conditions which influence productivity. Principles and applications of soil texture, structure, mechanical impedance, aeration and water. Root responses to the environment.

441 Plant Breeding and Biotechnology
Spring of even years. 3(3-0) Interdepartmental with Forestry and Horticulture. Administered by Crop and Soil Sciences. RB: ZOL 341 Plant improvement by genetic manipulation. Genetic variability in plants. Traditional and biotechnological means of creating and disseminating recombinant genotypes and cultivars. Importance of plant breeding to our food system, economy, and environment.

442 Agricultural Ecology
Fall. 3(3-0) R: Open to juniors or seniors or graduate students. Ecological principles in the design and management of agricultural ecosystems. Integration of ecological factors regulating crop and rangeland productivity.

451 Biotechnology Applications for Plant Breeding and Genetics
Spring. 3(2-2) Interdepartmental with Forestry and Horticulture. Administered by Crop and Soil Sciences. RB: (CSS 350 or ZOL 341) and CSS 441. Principles, concepts, and techniques of agricultural plant biotechnology. Recombinant DNA technology, plant molecular biology and transformation in relation to plant improvement.

452 Watershed Concepts
Fall, Summer. 3(3-0) Interdepartmental with Biosystems Engineering and Environmental Studies and Agriscience and Forestry and Fisheries and Wildlife. Administered by Environmental Studies and Agriscience. P: ESA 324 and ZOL 355 RB: organic chemistry SA: RD 452. 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: (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 Statistics for Biologists
Fall. 3(3-0) Interdepartmental with Animal Science and Statistics and Probability. Administered by Statistics and Probability. RB: STT 421 Biological random variables. Estimation of population parameters. Testing hypotheses. Linear correlation and regression. Analyses of counted and measured data to compare several biological groups including contingency tables and analysis of variance.

467 BioEnergy Feedstock Production
Fall. 3(3-0) Interdepartmental with Biosystems Engineering and Forestry. Administered by Crop and Soil Sciences. P: MTH 103 or MTH 116 RB: CSS 101 and CSS 210 Agronomic, economic, technological, and environmental principles involved in bioenergy feedstock production. Cultivation, harvest, transportation, and storage of agricultural and forest biomass.

470 Soil Resources
Fall. 3(2-3) RB: 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.

477 Pest Management I: Pesticides in Management Systems
Fall of even years. 3(3-0) Interdepartmental with Entomology and Fisheries and Wildlife and Horticulture. Administered by Entomology. RB: (CEM 143 or CEM 251) and (PLP 405 and CSS 402) and (ENT 404 or ENT 470) R: Open to juniors or seniors or graduate students. Chemistry, modes of action, and environmental fate of pesticides. Product development and regulation. Social aspects of pesticide use.

478 Pest Management II: Biological Components of Management Systems
Fall. 3(2-3) Interdepartmental with Entomology and Forestry and Fisheries and Wildlife and Horticulture. Administered by Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 402) 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.

480 Soil Fertility and Management
Fall. 3(3-0) P: CSS 101 and CSS 330 and CSS 340 and CSS 360 (and CSS 470 or concurrently) Comprehensive management of agricultural soils. Soil fertility, including liming and fertilizer materials and other nutrient sources. Site specific soil management. Environmental impacts including soil erosion, runoff, and organic matter mineralization.

486 Biotechnology in Agriculture: Applications and Ethical Issues
Fall of even years. 3(3-0) Interdepartmental with Forestry and Horticulture and Philosophy. Administered by Horticulture. P: BOT 105 or BS 111 RB: 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.
880 Scientific Communication and Professional Development
Spring. 1(0-2)
Interactive professional experiences including grant preproposal preparation and presentation, scientific presentations, mock position interviews, and resume preparation.

890 Independent Study
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 graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Natural Science. Individual study on field, laboratory, or library research.

891 Current Topics in Ecology and Evolution
Summer. 1 to 2 credits. A student may earn a maximum of 10 credits in all enrollments for this course. Interdepartmental with Plant Biology and Zoology. Administered by Zoology.
Presentation and critical evaluation of theoretical and empirical developments in ecology and evolutionary biology 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 Forestry and Horticulture. Administered by Horticulture. R: Open only to graduate students in the Plant Breeding and Genetics major or Genetics major. Approval of department.

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 Forestry and Horticulture. Administered by Horticulture.
Experience in review, organization, oral presentation, and analysis of research.

892B Ecological Food and Farming Systems Seminar
Fall, Spring. 1 credit. Interdepartmental with Community, Agriculture, Recreation and Resource Studies. Administered by Crop and Soil Sciences.
Experiential learning, and multidisciplinary and applied research, in ecological food and farming systems.

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 the College of Agriculture and Natural Resources or 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 the Department of Crop and Soil Sciences. Master's thesis research.

921 Geostatistics
Fall of odd years. 3(3-0) RB: Statistical methods or approval of department. Working knowledge of SAS software. Spatial variability analysis. Variogram models. Kriging and cokriging. Field experiments with spatial trends. Longitudinal data. Modeling in the presence of spatial and temporal correlations.

941 Quantitative Genetics in Plant Breeding
Spring of even years. 3(2-2) Interdepartmental with Forestry and Horticulture. Administered by Crop and Soil Sciences. RB: CSS 819 and STT 464
Theoretical and genetic basis of statistical analysis of quantitative traits using genetic markers. Computational tools for the study of quantitative traits.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in the Department of Crop and Soil Sciences. Doctoral dissertation research.