101 Introduction to Crop Science
Fall, Spring. 3(3-0) R: Open to undergraduates in agriculture.
Principles of crop production including integrated crop management. Sustainable agriculture. Interna-
tional agriculture. Environmental challenges to crop production.

101L Introduction to Crop Science Laboratory
Fall. 1(0-2) P: CSS 101 or concurrently R: Open to undergraduates in agriculture.
Identification of crops, seeds, plant structures; plant nutrient deficiency symptoms; crop growth stages and environmental stresses including pests, nutri-
ents, drought, and temperature. Field trips required.

105 Agricultural Industries Seminar
Fall. 1(0-2) R: Open to agricultural technology students in the Agricultural Industries
Major. SA: AEE 105
Preparation for academic and professional success. Introduction to opportunities in the agriculture indus-
try.

110 Computer Applications in Agronomy
Fall. 3(3-0) R: Open to undergraduate students or agricultural technology students in the College of Agriculture and Natural Re-
sources. 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, spreadsheets, databases, programming languages,
networking, and software related to agriculture.

120 Issues in Food and Agriculture
Fall. 3(3-0) R: Open to undergraduate stu-
dents or agricultural technology students. Current and historical issues impacting food and agriculture.

124 Introduction to Sustainable Agriculture and Food Systems
Fall, Spring. 2(2-0) Interdepartmental with Animal Science and Community Sustainability. Administered by Crop
and Soil Sciences. R: Open to undergraduate students or agricultural technology stu-
dents. Contemporary research and movements involving agricultural and food system sustainability. Socio-
cultural factors influencing food and agriculture.

135 Crop Scouting and Investigation
Spring, Summer. 3(4-0) Interdepartmental with Horticulture. Administered by Crop and Soil Sciences. P: CSS 101 or HRT 203 RB: CSS 101L R: Open to undergraduate
students or agricultural technology students. Crop scouting for improved crop management. Field
Diagnosis. Interaction with agriculture clientele. Precision agriculture influence on crop scouting. Offered first ten weeks of semester.

151 Seed and Grain Quality
Spring. 2(2-3) R: Open to undergraduate students or agricultural technology students. 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 SA: CSS 071
Budgeting. Financial analysis. Purchasing and mate-
rials 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. Offer-
ed 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 han-
dling, legal, and environmental concerns. Calibration of equipment. Offered first ten weeks of semester.

192 Professional Development Seminar I
Spring. 1(0-2) R: Open to students in the Department of Plant, Soil and Microbial Sci-
ences. Career development, critical issues analysis, re-
sume writing, scientific presentations and public speaking in crop and soil sciences.

201 Forage Crops
Fall. 3(2-2) R: Open to undergraduate students or agricultural technology students.
Forage crop production, management, and utiliza-
tion; crop identification; soil fertilization; planting and harvesting of grasses and legumes.

202 World of Turf
Fall, Spring. Summer. 2(2-0) Not open to students with credit in CSS 232.
Role of turf in society and the environment. Prin-
ciples underlying establishment and maintenance of turf on athletic fields, parks, home lawns, and golf courses. Aesthetic, safety, and economic aspects of turfgrass management practices.

202L World of Turf Lab
Fall. 1(0-2) P: CSS 202 or concurrently Not open to students with credit in CSS 232. Turfgrass identification. Site analysis and recom-
medations. On campus facility and venue visits. Mowing equipment and practices. Turf establish-
ment. Soil cultivation and amendments, Fertilizer and pest management. Field trips required.

210 Fundamentals of Soil Science
Fall, Spring. 3(2-3) RB: CSM 141 R: Open to undergraduate students or agricultural technology students. Agricultural and natural resource ecosystems: soil, vegetation, and ground water components. Energy, water, and nutrient cycles. Soil classification and mapping. Land management and use issues.

212 Advanced Crop Production
Fall. 2(2-0) P: CSS 101 RB: CSS 210 and CSS 110 R: Open to undergraduate students or agricultural technology students. Systems approach to production of field crops in-
cluding corn, soybeans, small grains, sugar beets, and dry beans.
478 Integrated Pest Management (W)
Spring of odd years. 3(3-0) Interdepartmental with Entomology and Forestry and Horticulture. Administered by Entomology.
P: (ENT 404 or ENT 470 or PLP 405) and completion of Tier I writing requirement. Theory, philosophy and application of pest management focusing on agricultural and natural systems.

480 Soil Fertility and Management
Fall. 3(3-0) P: CSS 210 and (CSS 330 or CSS 340 or CSS 360 or (CSS 470 or concurrently)) R: Open to seniors in the Agronomy minor or in the Crop and Soil Sciences major. 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: BS 161 or PLB 105 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.

488 Agricultural Cropping Systems: Integration and Problem Solving
Spring. 3(2-2) P: (CSS 101 and CSS 210) and completion of Tier I writing requirement. RB: (PLP 405 and ENT 404) and Course work in crop production and management. R: Open to seniors in the Agronomy minor or in the Crop and Soil Sciences major. Integration and synthesis of agronomic and related concepts in agricultural cropping systems. Problem solving and application of information.

490 Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: CSS 101 or CSS 210 R: Approval of department; application required. Individual work on field, laboratory, or library research problem of special interest to the student.

491 Special Topics
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: CSS 101 or CSS 210 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 Professional Development Seminar II
Fall. (10-2) P: (CSS 192 or CSS 262) and (CSS 210 and completion of Tier I Writing requirement) R: Open to seniors in the Department of Plant, Soil and Microbial Sciences. Synthesis, integration and application of agronomic principles to current issues in agronomy via discussion and oral and written communication.

493 Professional Internship in Crop and Soil Sciences
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, ANR 493, ANS 493, CMP 493, CSS 493, CSSUS 493, EEP 493, FLM 493, FSC 493, FW 493, HRT 493, PKG 493, and PLP 493. P: Completion of Tier I writing requirement; R: Approval of department; application required. Supervised professional experiences in agencies and businesses related to crop and soil sciences and environmental soil sciences.

499 Undergraduate Research
Fall, Spring, Summer. 3(0-9) R: Approval of department; application required. Faculty supervised research in a selected area of crop and soil sciences or environmental soil science.

802 Weed Biology
Spring of even years. 2(2-0) RB: A previous course in weed science or plant biology or ecology. Weed biology, including weed seed production and dispersal and seed fate. Weed life history traits and ecophysiology, including invasive species. Data collection in weed ecology research.

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.

814 Advanced Statistics for Biologists

819 Advanced Plant Breeding
Fall of even years. 3(3-0) Interdepartmental with Forestry and Horticulture. Administered by Horticulture. RB: STT 422 and ZOL 341 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.

820 Plant Reproductive Biology and Polyploidy
Spring of odd years. 3(3-0) Interdepartmental with Forestry and Horticulture and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology Genetic processes underlying variations in plant reproductive biology and polyploidy. Utilization of these characteristics in plant breeding.

821 Crop Evolution
Spring of odd years. 1 credit. Interdepartmental with Forestry and Horticulture and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology Cultural and biological aspects of the evolution of domestic plants.

822 Historical Geography of Crop Plants
Spring of odd years. 1 credit. Interdepartmental with Forestry and Horticulture and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology Development and spread of the major crop species.

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

842 Population Genetics, Genealogy and Genomics
Fall. 3(3-0) Interdepartmental with Animal Science and Forestry and Fisheries and Wildlife and Genetics and Horticulture. Administered by 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 to graduate students in the College of Agriculture and Natural Resources or in the College of Engineering or in the College of Natural Science. Ion activities, ionic exchange and equilibrium reactions. Soil pH, macro- and micronutrients, saline soils and availability of nutrients to plants.

853 Plant Mineral Nutrition
Fall of odd years. 3(3-0) Interdepartmental with Horticulture. Administered by Horticulture. RB: PLB 301 Inorganic ion transport in plant cells and tissues. Physiological responses and adaptation to problem soils. Genetic diversity in nutrient uptake and use by plants. Physiological roles of elemental nutrients in crop growth.

856 Plant Molecular and Omic Biology
Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology and Plant Biology. Administered by Plant Biology. RB: ZOL 341 SA: BOT 856 Recent advances in genetics and molecular biology of higher plants.

865 Environmental Fate of Organic Contaminants in Soils
Spring of even years. 3(3-0) RB: Undergraduate level coursework in general and organic chemistry, and introductory microbiology. Chemistry and biology of toxicants in soils as determinant of environmental fate.

880 Scientific Communication and Professional Development
Spring. 1(0-2) Interactive professional experiences including grant proposal preparation and presentation, scientific presentations, mock position interviews, and resume preparation.
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 to graduate students in the College of Agriculture and Natural Resources or in the College of Engineering or in the College of Natural Science.

Individual study on field, laboratory, or library research.

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.

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.

Selected topics in plant breeding.

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.

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.

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 to graduate students in the College of Agriculture and Natural Resources or in the College of Engineering or in the College of Natural Science.

Selected topics in crop and soil sciences of current interest and importance.

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 to masters students in the Department of Plant, Soil and Microbial Sciences.

Master's thesis research.

Geostatistics
Fall of odd years. 3(3-0) RB: Statistical methods or approval of department. Working knowledge of SAS software.


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.

Doctoral Dissertation Research
Fall, Spring. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open to doctoral students in the Department of Plant, Soil and Microbial Sciences.

Doctoral dissertation research.