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

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.

853 Plant Mineral Nutrition
Fall of odd years. 3(3-0) Interdepartmental with Horticulture. P.NM: (BOT 301)

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.

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 numbers 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
Summer. 1 credit. Given only at W.K. Kellogg Biological Station. A student may earn a maximum of 8 credits in all enrollments for this course. 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.

921 Contemporary Statistical Models in Biology
Fall of odd years. 3(3-0) P.NM: (STT 465) or approval of department. Working knowledge of SAS.

941 Quantitative Genetics in Plant Breeding
Spring of even years. 3(3-0) Interdepartmental with Forestry; Horticulture. P.NM: (CSS 450 and STT 422)
Theoretical genetic basis of plant breeding with emphasis on traits exhibiting continuous variation. Classical and contemporary approaches to the study and manipulation of quantitative trait loci.

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 Crop and Soil Sciences.
Doctoral dissertation research.

EARTH SCIENCE

Department of Geological Sciences

College of Natural Science

445 Field Studies in Earth Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Field experience and techniques in geological sciences or oceanology.

446 Laboratory Investigations in Earth Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Laboratory techniques and investigations in geological sciences or oceanology.

800 Special Problems in Earth Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Individual faculty directed study on topics in earth science.

ECONOMICS

Department of Economics

The Eli Broad College of Business and The Eli Broad
Graduate School of Management

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