981. Comparative Sociology

Fall, 3 or 4 credits. Doctoral student in sociology, completion of core courses.
Macro-sociological studies of societies. The relationship of the whole to the varied parts of societies, the connection between societies, and the patterns of change in different societies. The development of research with respect to the cross-cultural study of social structures, social institutions, and social systems.

992. Comparative Social Psychology

Winter, 3 or 4 credits. 991.
Social psychological research problems involving a comparative methodology. Social psychological functions of education, mobility, mass media, etc. Comparative study of the social psychology of modernization.

993. Comparative Research Methods

Spring, 3 or 4 credits. 991.
Sampling problems, data collection strategies, problems of translation and concept equivalence. Management, analysis and interpretation of cross-cultural data.

999. Research

Fall, Winter, Spring, Summer. Variable credits. Approval of department.
An advanced seminar devoted to analysis of designs used in current research in work and organization.

SOIL SCIENCE

SLS

College of Agriculture and Natural Resources

209. Soils and Man's Environment

Winter, 3-3-0. Interdepartmental with Fisheries and Wildlife and Resource Development Departments and Natural Resources.
Use of soil resources in a technological society as it relates to environmental quality, Nature of pollution problems and their possible solutions. Food production and world population.

210. Fundamentals of Soil Science

Fall, Winter. 5 credits.
Principles of the origin and development of soils. Relationship of properties to utilization and soil fertility to plant composition and animal health. Emphasis is placed on changing soils to serve man.

331. Soil Management

Winter, 4 (4-0). 210.
Management of soils, drainage and irrigation, organic matter, tillage, rotation, conservation practices, soil reaction, lime, fertilizers, and micronutrients. Soil management vs. soil conservation. Special study in general crops, horticultural crops, greenhouse crops, turf, and organic soils.

390. Soil Conservation and Land Use

Spring, 3 (3-0). 210.
Soil resources of the United States and methods and plans for soil conservation including control of erosion. Interpretation of soil survey maps and land evaluation for farm crops, fruits, forestry, engineering, and wildlife. Soil judging.

410. Special Soil Problems

Fall, Winter, Spring. Summer. 1 to 3 credits. May re-enroll for a maximum of 6 credits. Approval of department.
Independent study topics include: Special soil problems, fertility, geography, classification, conservation, soil management, organic soils and turfgrass soils.

420. Seminar

Winter. 1 (1-0). May re-enroll for a maximum of 4 credits. Interdepartmental and administered jointly with Crop Science.

424. Forest Soils

Spring, 4 (3-3). 210. FOR 220. Interdepartmental with and administered by the Forestry Department.
Interrelationships of forest sites and the growth of forests. Classification and productivity of forest soils. Effects of silvicultural and forest management practices on the soil. Two-day field trip required.

430. Soil Fertility and Fertilizers

Spring. 5 (4-1). 210.
Assessment of the fertility of soils and alteration of fertility by the use of fertilizers, lime, manure, and cropping systems. The role of colloids in ion fixation and exchange. Soil and tissue tests. The history, technology, and use of fertilizers.

442. Soil Microbiology

Spring. 4 (3-2). MPH 301 or 301 or 401. Interdepartmental with and administered by the Microbiology and Public Health Department.
Major groups of microorganisms of importance to soil are studied with emphasis on ecological, biochemical, and physical aspects.

470. Soil Classification and Mapping

Fall, Spring. Summer of odd-numbered years. 4 (0-4). 210 or approval of department.
Classification of soils. Interpretation of profiles in relation to land utilization for farm crops, forests, forestry, highway-airfield engineering, county and township planning, urban development and wildlife. Preparation of land use reports based upon soil maps of assigned areas.

480. Soil Geography and Land Use of the World

Spring. 4 (4-0). 210 or approval of department.
Survey of the great soil groups and their use throughout the world, their location, significant characteristics, how they are and can be utilized, and the relation of each to food and population increase.

810. Advanced Studies in Soil Science

Fall, Winter, Spring. Summer. 1 to 5 credits. May re-enroll for a maximum of 6 credits. Approval of department.
Areas of work to include: advanced studies in soil science, chemistry, classification, conservation, fertility, geography, management, microbiology and biochemistry, micronutrients, micropedology, mineralogy, organic soils and physics.

820. Seminar

Winter, Spring. 1 (1-0). May re-enroll for a maximum of 3 credits. Interdepartmental and administered jointly with Crop Science.
Studies and presentation of research in crop and soil sciences.

825. Clay Mineralogy

(945.) Winter. 4 (4-0). 840, 850 or approval of department. Interdepartmental with and administered by the Geology Department.
Structures and properties of clays; their origins, occurrence, and utilization. Methods of studying clays including X-ray diffraction, differential thermal analysis, infrared absorption and other chemical and physical techniques.

830. Soil Fertility and Plant Nutrition

(930.) Spring of odd-numbered years. 3 (3-0). 430 or approval of department.
Fundamental concepts in soil fertility and mineral nutrition of plants; fate of nutrients applied to soils, nutrient uptake, translocation and utilization by plants; principles of laboratory, greenhouse and field research methods.

835. Organic Soils

Spring. 2(2-0). Approval of department.
Information pertinent to organic soils formation, classification, water control, conservation, plant nutrients, soil testing, commercial utilization, special crops, road construction, and real estate development will be presented. Field trip included.

840. Soil Physics

Fall. 5 (5-0). 430; CEM 162 or approval of department.
Physical properties of soil (texture, structure, consistency, color, water, temperature, etc.), their quantitative measurement, and relation to plant growth and agronomic engineering practices.

850. Soil Chemistry

Winter, 5(3-6). 430; CEM 162, 383; or approval of department.
Chemistry of mineral weathering and soil formation, ion activities, ionic exchange and equilibria reactions, soil pH, specific elements and their chemical analysis, and availability of nutrients to plants.

860. Soil Biochemistry

Spring of even-numbered years. 4 credits. 850; MPH 442.
Biochemical transformations of mineral nutrients and of natural and exotic organic materials in soils, considered in relation to chemical, physical and ecological systems in the complex soil environment.

870. Origin and Classification of Soils

Winter, 4 (4-3). 470, 840, or approval of department.

880. Fertility and Management of Tropical and Subtropical Soils

Winter. 3 (3-0). Approval of department.
Fertility and management of tropical and subtropical soils; the use of soil testing techniques with field studies to evaluate the fertility status and develop cropping systems for optimum production.
317. Quantitative Business Research Methods
Fall, Winter, Spring, Summer. 4(3-2)

318. Interdepartmental softs and administered by the Marketing and Transportation Administration Department.
Application of statistical techniques to business decision-making. Topics covered include applications of linear regression and correlation, analysis of variance, selected non-parametric tests, time series, and index numbers.

341. Probability for Teachers
Spring. 4(4-0) MTH 301 or approval of department.
Primarily for majors in mathematical education. Probability theory will be studied as a mathematical structure. Although some examples of the use of the theory will be discussed (as the use of some theorems is discussed in a course in plane geometry) the major emphasis will be on understanding the structure of probability theory.

351. Introduction to Statistics
Spring. 4(4-0) MTH 214.
Probability models, discrete random variables, the binomial, hyper-geometric and Poisson distributions, statistical inference based on the binomial distribution, normal random variables, test of hypothesis and confidence intervals based on the normal distribution.

421. Statistics I
Fall, Winter, Spring, Summer. 4(4-0) MTH 108.
Credit may not be earned in more than one of the following: 201, 215, 421. This course and 422, 423 form a one year sequence in statistics for those without a calculus background. 421 provides an introduction to a few of the main ideas of probability and statistics. The course sequences 441-2-3 and 861-2-3 form one year sequences in statistics for those with a calculus background. Those expecting to use statistics in their graduate research should consider one of the full year sequences. Descriptive statistics, elementary probability and combinatorials. The binomial distribution. Random variables, their expectations and variances. The Central Limit Theorem. Estimation and inference. Simple tests based on the binomial, normal, t, chi-square and F distributions.

422. Statistics II
Fall, Winter, Spring, Summer. 3(3-0)
421.
Nonparametric tests: sign test, Wilcoxon's rank sum test, Spearman's rank correlation test, runs test. Multiple regression analysis. Least squares estimation and tests for simple linear hypotheses.

423. Statistics III
Fall, Winter, Spring, Summer. 3(3-0)
422.
Application of multiple regression analysis to analysis of variance problems. Design of experiments including randomized block designs, Latin squares, fractional designs, and balanced incomplete block designs.

441. Probability and Statistics I: Probability
Fall, Winter, Spring, Summer. 4(4-0) MTH 215.
Mathematical probability as a basis for the theory of statistics. Discrete and continuous probability models, conditional probability and independence, random variables, central limit theorem, sampling distributions.

442. Probability and Statistics II: Inference
Winter, Spring. 4(4-0) MTH 334 or concurrently.
Estimation, confidence intervals, test of hypotheses, linear hypotheses.