

942. Urban Theory
Winter. 4(4-0) 941; 812 and 967 recommended.

Examination and critique of competing theories of urban structure and process; theories of evolution of human settlement, classic location theories, human ecology, communication and system theories.

943. Seminar in Human Ecology and Urban Sociology
Spring. 4(4-0) 942.

Presentation and critique of theory and research in human ecology and urban sociology with emphasis on student papers and research designs.

952. Techniques of Population Analysis
Spring. 4(3-1) 420; STT 422; or approval of department.

Techniques for the analysis of population size and composition, mortality, fertility, migration, population estimates and forecasts, population and labor force distribution, and selected techniques of ecological analysis.

953. Experimental Methods
Winter. 4(3-2) 860.

The design and analysis of social experiments, with special emphasis on laboratory investigation of social processes.

954. Social Survey Methods
Spring. 4(4-0) 860.

The design and analysis of theoretically oriented survey research. Sampling, questionnaire construction, interviewing, and data processing.

955. Field Research Methods
Spring. 4 credits. 492; approval of department.

An overview of the design and execution of social research.

964. Seminar in Small Group Research
Fall. 3 to 5 credits. Thirty graduate credits including 811, or approval of department.

The experimental and theoretical investigation of organizational processes in small groups.

966. Social Structure and Personality
Winter. 3 credits. 811 or approval of department.

Theoretical and research problems in analysis of influence of social positions on personality, and influence of personality and social factors in allocating persons to different social positions. Stress will be placed upon quantitative research and contemporary theories of social structure and personality.

967. Introduction to Formal Theory in Sociology
Spring. Variable credit. 966.

Analysis of the structure of formal theory in sociology and of the problems of interpretation and verification of deterministic and probabilistic theories. Examination of specific practices of theory construction.

968. Symbolic Interactionism: Theory and Research
Spring. 1 to 4 credits. 811; social psychology concentration.

Theoretical and research problems within the framework of symbolic interaction. The socialization process and the development, maintenance, and enhancement of the self. Critique of the literature and proposals for new research directions.

970. Theories of Conflict and Change
Fall. 3(3-0) Approval of department.

Major theoretical European and American contributions to the study of conflict and change.

971. Race, Politics, and Social Structure
Winter. 3(3-0) Approval of department.

Racism, including the social mechanisms by which it is created, maintained, and lessened, and the variant forms of political action related to racism and social structure.

972. War and International Conflict
Spring. 3(3-0) Approval of department.

Causes, structure and patterns of wars between societies, revolutions within societies and the relation of war and revolution to cross-cultural conflict and change.

973. Values, Crises and Utopias in a Post-Modern Society
Fall. 3(3-0) Approval of department.

Macro-sociological approach to study of social problems and stresses; planned change; and conscious improvement of modern societies.

976. Contemporary Social Systems
Winter. 4 credits. 494 or approval of department.

Comparison and analyses of concepts, conceptual schemes and theories of outstanding social theorists in relation to modern research.

978. Comparative Rural Social Organization
Spring. 4 credits.

Structure and function of social organizations ranging from societies to small groups. The comparative approach will be used in studying phenomena involved in the transitions from agrarian to industrial societies.

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.

982. Comparative Social Psychology
Winter. 3 or 4 credits. 981.

Social psychological research problems involving a comparative methodology. Social psychological functions of education, mobility, mass media use, etc. Comparative study of the social psychology of modernization.

983. Comparative Research Methods
(980.) Spring. 3 or 4 credits. 981.

Sampling problems, data collection strategies, problems of translation and concept equivalence. Management, analysis and interpretation of cross-cultural data.

991. Research Seminar in Work and Organization

Fall, Winter, Spring. 2(2-0) May re-enroll for a maximum of 6 credits. Thirty graduate credits and approval of instructor.
An advanced seminar devoted to analysis of designs used in current research in work and organization.

999. Research
Fall, Winter, Spring, Summer. Variable credits. Approval of department.

SOIL SCIENCE SLS

College of Agriculture and Natural Resources

202. Soils and Man's Environment
Winter. 3(3-0) Interdepartmental with Fisheries and Wildlife and Resource Development Departments and Natural Resources.

Use of soil-water 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 5 credits. Approval of department.

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 site 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
(481.) Spring. 4(3-2) MPH 200; 301 or 401. Interdepartmental with and administered by the Microbiology and Public Health Department.

Major groups of microorganisms of importance in soils are studied with emphasis on ecological, biochemical, and physical aspects.

470. Soil Classification and Mapping
Fall, Spring; Summer of odd-numbered years. 4(0-8) 210 or approval of department.

Classification of soils. Interpretation of profiles in relation to land utilization for farm crops,

fruits, 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.

488. The Impact of Animal Resource Management Upon the World's Developing Nations

Winter. 3(4-0)

For course description, see *Interdisciplinary Courses*.

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 study include chemistry, fertility, geography, management, microbiology, micropedology, organic soils, physics, physical chemistry, and soils of the tropics.

820. Seminar

Fall, Winter, Spring. 1(1-0) May re-enroll for a maximum of 3 credits.

825. Clay Mineralogy

(945.) Winter. 4(3-4) 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.

840. Soil Physics

Fall. 5(3-6) 430; CEM 162 or approval of department.

Physical properties of soil (texture, structure, consistency, aeration, water, temperature, etc.), their quantitative measurement, and relation to plant growth, and agronomic and 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 equilibrium 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(3-2) 470, 840, or approval of department.

Genesis, morphology and classification of major soils of the world. Relationships among soils in natural and cultural landscapes. How soil properties affect their use, management and conservation. Land classifications for various purposes.

880. Soils and Land Use in Tropical and Subtropical Regions

Spring. 3(3-0) Approval of department. Interdepartmental with Agriculture.

Problem oriented studies of soils and land use

in the tropics and subtropics in relation to their genesis, morphology, taxonomy, and management.

899. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

930. Soil Fertility

Spring. 4(4-0) 850 or approval of department.

Fundamental concepts in soil fertility and nutrient uptake by plants; history and development of field plot and greenhouse techniques; research methods in soil fertility; and origin, utilization and management of organic soils.

999. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

SOUTH ASIAN LANGUAGES

See Linguistics and Oriental and African Languages.

SPANISH

See Romance Languages.

STATISTICS AND PROBABILITY

STT

College of Natural Science

Courses are classified as follows:

Courses with the last two digits more than 40 require minimum prerequisites of MTH 215.

Courses with the last two digits less than 40 require fewer mathematics prerequisites.

Introductory courses are further classified as follows:

123, 315—sequence for Business Administration students.

201—survey course.

421, 422, 423—minimal sequence for students planning to use statistical methods in their research.

441, 442, 443—minimal sequence in theory of statistics. Qualified students should take the 861, 862, 863 sequence instead.

861, 862, 863—sequence for students preparing to do advanced work in statistics.

881, 882, 883—sequence in analytic probability theory and stochastic processes at graduate mathematics level.

123. Statistics in Business Decision-Making

Fall, Winter, Spring. 4(2-2) 315.

Statistical inference and decision-making under uncertainty. Summarization of information and statistical tests. Statistical decision rules and their evaluation in terms of expected cost. Risk.

201. Statistical Methods

Fall, Winter, Spring, Summer. 4(4-0) MTH 108 or 111. Primarily for students in psychology, sociology, anthropology, political science, economics, agriculture, and forestry. Credit may not be earned in more than one of the following: 201, 315, 421.

Descriptive statistics, elementary probability and combinatorics. The binomial distribution. Random variables, their expectations and variances. Central Limit Theorem, estimation and inference. Simple tests based on the binomial, normal, t, chi-square and F distributions.

315. Introduction to Probability

(121.) Fall, Winter, Spring, Summer. 4(5-0) MTH 111. Credit may not be earned in more than one of the following: 201, 315, 421.

Set and algebra of sets. Chance experiments, outcomes and events. Probabilities of events. Conditional probability, independent trials, Bayes' theorem. Introduction to statistical inference relevant to business decision problems.

316. Fundamentals of Statistical Inference

Fall, Winter, Spring, Summer. 4(5-0)

315. Primarily for students in the College of Business. Interdepartmental with the Marketing and Transportation Administration Department.

Description of sample data, applications of probability theory, sampling, estimation, tests of hypotheses.

317. Quantitative Business Research Methods

Fall, Winter, Spring, Summer. 4(3-2)

316. Interdepartmental with 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, continuous 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, 315, 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 complete one of the full year sequences.

Descriptive statistics, elementary probability and combinatorics. 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, run tests. 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, factorial designs, and balanced incomplete block designs.