968. Symbolic Interactionism: Theory and Research
Spring, 4(4-0) SOC 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.

Race, 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. Theoretical Perspectives in Sociology
Winter, 4 credits, SOC 645 or SOC 545.

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

977. Seminar in Selected Theoretical Issues
Spring, odd-numbered years, 4(4-0) May reenroll for a maximum of 8 credits, SOC 645.

Issue approach to social theory. Selected themes relate to substantive problems in theory, theory construction or the work of a historical or contemporary thinker.

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, SOC 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
Spring, 3 or 4 credits, SOC 981.

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

989. Seminar in Work and Organizations
Winter, 4(4-0) May reenroll for a maximum of 8 credits. Thirty graduate credits and approval of instructor.

Selected topics in the sociology of work, occupations, and complex organizations.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

SPANISH

See Romance and Classical Languages.

STATISTICS AND PROBABILITY

College of Natural Science

Introductory courses are further classified as follows:

315, 316—sequence for undergraduate students of Business Administration.

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.

201. Statistical Methods
Fall, Winter, Spring, Summer, 4(4-0) MTH 108 or MTH 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: STT 201, STT 315, STT 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.

296. Special Topics in Statistics and Probability
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 6 credits. MTH 108 or approval of department.
423. Statistics III
Fall, Winter, Spring, Summer. 3(3-0)
STT 422.
Multiple regression. Analysis of variance for various experimental designs, including randomized block, two and three way factorial, nested and Latin square 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) STT 441, MTH 334 or concurrently.
Estimation, confidence intervals, test of hypotheses, linear hypotheses.

443. Probability and Statistics III: Inference
Spring. 4(4-0) STT 442.
Multiple linear regression, analysis of variance, goodness of fit test, certain non-parametric tests.

490. Statistical Problems
Fall, Winter, Spring. 1 to 6 credits.
Approval of department.
Individualized study adapted to the preparation and interests of the student.

520. Biostatistical and Epidemiological Reasoning
Fall. 4(4-0) Approval of instructor. Interdepartmental with and administered by the Department of Community Health Science.
Concepts and principles from biostatistics and epidemiology to facilitate critical reading literature relevant to clinical medicine and community health. Emphasis on design and interpretation.

825. Sample Surveys
Fall. 3(3-0) STT 423 or STT 442 or STT 862.
Application of statistical sampling theory to survey designs involving simple random, stratified, and systematic samples; sub-sampling, double sampling, ratio and regression estimates; other topics.

826. Nonparametric Statistics
Spring. 4(4-0) STT 442 or STT 862.
Current tests of hypotheses which may be made without specification of the underlying distribution. Rank tests and tests based on permutation of observations. Tolerance and confidence sets. Large sample distributions. Applications to research in the social and natural sciences.

833. Mathematical Programming
Spring. 3(3-0) EC 900, or EC 812A, MTH 334. Interdepartmental with the departments of Agricultural Economics and Economics. Administered by the Department of Agricultural Economics.
Linear programming. Theory of linear economic models. Topics in nonlinear programming.

837. Systems Simulation
Fall. 4(4-0) MCT 833. Interdepartmental with and administered by the Department of Management.
The concept of a model, model building, characteristics of simulation models. Techniques of computer simulation. Simulation models in research and management planning, control, validation and experimental design. Special purpose languages.

841. Linear Statistical Models
Fall. 4(4-0) STT 443 or STT 863.
Use of linear statistical models. Curve fitting, simple and multiple regression analysis, multiple and partial correlation coefficients, the analysis of variance, simultaneous confidence intervals, multivariate experimental designs.

843. Multivariate Analysis
Winter of even-numbered years. 3(3-0) STT 443 or STT 863.
The multivariate normal distribution, tests of hypothesis on means, discriminant analysis, multivariate analysis of variance, principal components, factor analysis, analysis of multivariate categorical data.

844. Time Series Analysis
Winter of odd-numbered years. 3(3-0) STT 443 or STT 863.
The autocorrelation function and its spectrum, moving average and autoregressive processes, model identification and estimation.

852. Methods in Operations Research I
Winter. 3(3-0) STT 441 or STT 861.
Optimization techniques and probability models with a wide variety of applications: linear programming, including special problems; network analysis, including FERT; dynamic programming; game theory; queuing theory. Acquaintance with matrices advisable.

853. Methods in Operations Research II
Spring. 3(3-0) STT 852.
Continuation of STT 852. Inventory theory; Markov chains with applications; simulation as adjunct to mathematical models; advanced topics in linear programming; non-linear programming.

861. Theory of Probability and Statistics I
Fall. 4(4-0) MTH 424 or MTH 425 or concurrently.
Discrete probability models. Random variable expectation, combinatorial analysis, conditional probability and independence, generating functions, some special discrete distributions, continuous probability models.

862. Theory of Probability and Statistics II
Winter. 4(4-0) STT 861, MTH 435 or MTH 425 or concurrently.
Continuous probability models, density transformations, some special continuous distributions, limit laws. Introduction to statistical inference, estimation of parameters, hypothesis testing.

863. Theory of Probability and Statistics III
Spring. 4(4-0) STT 862, MTH 334, MTH 426 or MTH 429 or concurrently.
Continuation of hypothesis testing, sufficient, Rao-Blackwellization, some nonparametric methods, linear models.

864. Stochastic Models in Biology
Fall. 3(3-0) STT 441 or STT 861.
Stochastic processes. Selected topics from growth processes, epidemic theory, predator-prey models, mathematical genetics.

871. Theory of Probability and Statistics I
Fall. 3(3-0) MTH 863 or STT 863 and MTH 821 or concurrently.

872. Theory of Probability and Statistics II
Winter. 3(3-0) STT 871; MTH 822 or concurrently.
Basic concepts of decision theory. Most powerful tests. Standard statistical methods for use in the binomial, Poisson and normal situation, sequential and nonparametric methods; linear models.

873. Theory of Probability and Statistics III
Spring. 3(3-0) STT 872, MTH 927 or concurrently, or approval of department.

876. Statistical Inference in Economics I
Fall. 3(3-0) STT 443 or STT 863; EC 812A or EC 801; or approval of department. Interdepartmental with the departments of Agricultural Economics and Economics. Administered by the Department of Economics.

877. Statistical Inference in Economics II
Winter. 3(3-0) EC 876 or approval of department. Interdepartmental with the departments of Agricultural Economics and Economics. Administered by the Department of Economics.

878. Statistical Inference in Economics III
Spring. 3(3-0) EC 877 or approval of department. Interdepartmental with the departments of Agricultural Economics and Economics. Administered by the Department of Economics.
Validation and application of dynamic econometric models. Bayesian approach to estimation problems. Recent developments in econometric methods and in applied econometric research.

886. Stochastic Processes and Technological Applications
Winter. 3(3-0) STT 441 or STT 861.
Discrete stochastic processes, Markov chains, birth and death processes, branching processes. Selected technological applications.
951. Nonparametric Statistics
Fall, odd-numbered years. 3(3-0)
STT 873, STT 928 or concurrently.
Possible topics include small and large sample properties of distribution free tests; robust estimation of location, scale and regression parameters; nonparametric ANOVA.

952. Asymptotic Theory
Spring of even-numbered years. 3(3)
STT 873, STT 929.
Possible topics include large sample behavior of likelihood functions; contiguity; Bahadur and Pitman efficiency of statistical procedures.

953. Advanced Theory of Linear Statistical Models
Fall of even-numbered years. 3(3-0)
STT 873, STT 928 or concurrently.
Possible topics include construction and analysis of linear models; regression; ridge regression; optimality criteria; relationships and metrics; existence and construction of optimal designs.

954. Sequential Analysis
Spring of odd-numbered years. 3(3-0)
STT 873, STT 929.
Possible topics include sequential estimation, testing and design; optimal stopping.

961. Convergence of Measures and Random Variables
Fall of odd-numbered years. 3(3-0)
STT 873, STT 928, or concurrently.
Topological properties of convergence of measures. Conditions for the existence of a set of measures. Relationships between various kinds of convergence; uniform convergence, convergence in measure and weak convergence.

962. Martingales
Winter or even-numbered years. 3(3-0)
STT 873, STT 928.
Convergence, sampling, decomposition and stopping of sub- and super-martingales. Relations between probabilities and theorems of martingales. Applications to sequential analysis and boundary crossing probabilities.

963. Diffusion and Brownian Motion
Spring of even-numbered years. 3(3-0)
STT 873, STT 928.
One dimensional diffusion, speed and drift measures, local time, stochastic integrals, Hölder's theorem.

964. Renewal Theory and Random Walk
Fall of even-numbered years. 3(3-0)
STT 873, STT 928 or concurrently.

965. Second Order Processes
Winter of odd-numbered years. 3(3-0)
STT 873, STT 928.
Stochastic processes studied by the methods of linear spaces. Sample path properties, representation, estimation, prediction, multiplicity.

966. Semi-Groups and Applications
Spring of odd-numbered years. 3(3-0)
STT 873, STT 928.
Hille-Yosida theorem, semigroups of independent increments, infinitely divisible processes, Markov processes in several dimensions.

990. Problems in Statistics and Probability
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 10 credits.
STT 873.
Seminars or individual study on an advanced topic in statistics.

995. Topics in Statistics and Probability
Fall, Winter, Spring. Variable credit.
Nonparametric statistics, multivariate statistical analysis, statistical time series analysis, Bayesian statistics, reliability theory, stochastic approximation, design of experiments, sets of decision problems, stochastic processes, sequential analysis, other topics.

STUDIO ART
See Art.

SURGERY SUR
College of Human Medicine

606. Surgery Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 43 credits. H M 602.
An introduction to the surgical patient, stressing surgical diagnosis, pre-operative evaluation and post operative care. Objectives are designed to help the student attain acceptable levels of surgical competence for physicians.

609. Otolaryngology Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Common otolaryngologic disorders, emergencies, including diagnosis and treatment, and judgments concerning proper management by primary physicians.

610. Plastic Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Principles of wound healing and tissue repair. Indications and applications of plastic procedures.

611. Urology Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Demonstration of clinical manifestations of genitourinary disease, investigative methods and techniques of diagnosis and management, familiarity with urologic emergencies and performance of basic urologic skills.

613. Orthopedic Clerkship
Fall, Winter, Spring. Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Diagnostic and management information and skills, including emergencies, in common orthopedic problems.

614. Neurosurgery Clerkship
Fall, Winter, Spring. Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
A hospital-based experience to provide the student with familiarity with the field and understanding of the contribution of neurosurgery in medicine generally.