895. **Computer Simulation of Social Behavior**
   Winter. 4(3-2) Approval of department.
   Survey of research in the simulation of human behavior. Training in the basic technological and conceptual tools necessary for independent research in the area. Working in detail through an operating large simulation program to appreciate how the tools apply in practice. Designing and writing a simulation program.

899. **Master's Thesis Research**
   Fall, Winter, Spring, Summer. Variable credit. Approval of department.

901. **Educational Sociology Seminar**
   Fall. Winter, 3 to 4 credits. Approval of department. Interdepartmental with the College of Education.

930. **Sociology of Work**
   Spring. 4(4)-SOC 430, SOC 310, SOC 984 or approval of instructor.
   Theory and research problems in occupational structure, work settings, functions and meanings of work, occupational mobility and career patterns.

941. **Human Ecology**
   Fall. 4(4)-Approval of department.
   The analysis of population aggregates in terms of their place in a total ecosystem, defined as the structure of interdependencies involving population, environment, technology, and patterns of organization.

942. **Urban Theory**
   Winter. 4(4)-SOC 941; SOC 912 and SOC 967 recommended.
   Examination of critique of competing theories of urban structure and process: theories of evolution of human settlement, classic location theories, human ecology, communication and system theories.

952. **Techniques of Population Analysis**
   Spring. 4(3)-SOC 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)-SOC 860.
   The design and analysis of social experiments, with special emphasis on laboratory investigation of social processes.

954. **Social Survey Methods**
   Spring. 4(4)-SOC 860.
   The design and analysis of theoretically oriented survey research. Sampling, questionnaire construction, interviewing, and data processing.

955. **Field Research Methods**
   Spring. 4 credits. SOC 312; 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 SOC 611, or approval of department.
   The experimental and theoretical investigation of organizational processes in small groups.

965. **Social Structure and Personality**
   Winter. 3 credits. SOC 811 or approval of department.
   Theoretical and research problems in analysis of influence of social systems 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. 4(3-0) STT 421, STT 422, a course in research methods. 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. 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.
   Racial, including the social mechanisms by which it is created, maintained, and weakened, 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 relationship 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 845 or SOC 846.
   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. of odd-numbered years. 4(4) or 5 credits. SOC 845.
   May be repeated for a maximum of 4 credits. SOC 845.
   Issue approach to social theory. Selected themes relate to substantive problems in theory, theory construction or the work of a historical or contemporary thinker.
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 961, 962, 963 sequence instead.

961, 982, 983—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.

422. Statistics II
Fall, Winter, Spring, Summer. 3(3-0) STT 421.
Nonparametric models, contingency table analysis, sample survey methods, simple linear regression, one-way analysis of variance.

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 hypothesis.

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

450. Theory of Games
Winter of odd-numbered years. 3(3-0) MTH 215, MTH 334.

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 800, or EC 812A, MTH 334. Interdepartmental with the departments of Agricultural Economics and Economics and administered by the Department of Agricultural Economics.
Linear programming. Theory of linear economic models. Topics in nonlinear programming.

841. Linear Statistical Models
Fall of odd-numbered years. 4(4-0) STT 443 or STT 862.
Use of linear statistical models. Curve fitting, simple and multiple regression analysis, multiple and partial correlation coefficients, the analysis of variance, simultaneous confidence intervals, more complex experimental designs.

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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 PERT; dynamic programming; game theory; queuing theory. Acquaintance with matrices advisable.

853. Methods in Operations Research II
Spring. 3(3-0) STT 862.
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 427 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 425 or MTH 428 or concurrently.
Continuous probability models, density transformations, some special continuous distributions, limit laws, Independence and dependence, critical reading literature relevant to clinical medicine and community health. Emphasis on design and interpretation.

863. Theory of Probability and Statistics III
Spring. 4(4-0) STT 862; MTH 334, MTH 426 or MTH 429 or concurrently.
Continuation of hypotheses testing, sufficiency, Bayes-Blackwellization, some nonparametric methods, linear models.
864. Stochastic Models in Biology
Fall. 3(3-0) STT 441 or STT 881.
Stochastic processes. Selected topics from growth processes, epidemic theory, prey-predator models, mathematical genetics.

871. Theory of Probability and Statistics I
Fall. 3(3-0) MTH 823 or STT 863 and MTH 921 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 situations; 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 563; EC 812A or EC 801, or approval of department. Interdepartmental with the departments of Agricultural Economics and Economics and administered by the Department of Economics.

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

878. Statistical Inference in Economics III
Spring. 3(0) EC 877 or approval of department. Interdepartmental with the departments of Agricultural Economics and Economics and 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.

887. Stochastic Models in the Physical Sciences
Spring. 3(3-0) STT 886 or approval of department.
Selected models from the physical sciences. These may include topics from the theory of queues, the theory of dams, and branching processes in cosmic ray theory.

890. Statistical Problems
Fall, Winter, Spring. Variable credit. Approval of department.

899. Master's Thesis Research
Fall, Winter, Spring. Variable credit. Approval of department.

927. Theory of Measure and Integration
Spring. 3(3-0) MTH 922. Interdepartmental with and administered by the Department of Mathematics.

928. Measure Theory Applications to Probability
Fall. 3(3-0) MTH 927. Kolmogorov extension theorem. Transition measures. Conditional expectations. Uniform integrability.

929. Foundations of Decision Theory
Winter. 3(3-0) STT 928.

937. Systems Simulation
Fall. 4(4-0) MGT 836, STT 423, MTH 228. 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.

948. Mathematical Programming For Business
Spring. 3(3-0) STT 832, MTH 334, MTH 426, STT 953. Interdepartmental with and administered by the Department of Management.

949. Advanced Applied Stochastic Processes
Winter. 4(4-0) MGT 836, MTH 937. Interdepartmental with and administered by the Department of Management.
Selected topics from the following areas: Semi-Markov, Markov-renewal and regenerative process models; Markov and semi-Markov decision processes; decision theory, applications from production, inventory, reliability, queueing, and gaming theory.

951. Advanced Theory of Nonparametric Statistics
Fall of 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(3-0) STT 873, STT 929.
Possible topics include large sample behavior of likelihood functions, contingency, 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 924 or concurrently.
Possible topics include construction and analysis of linear models; regression, ridge regression; optimality criteria, relationships and merits; 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.
Topology of vague convergence of measures. Conditions for relative compactness of a set of measures. Relationships between vague, almost sure, and in-measure convergence, Donker’s theorem and its extensions, applications to statistics.

962. Martingales
Winter or even-numbered years. 3(3-0) STT 873; STT 928.
Convergence, sampling, decomposition and stopping of sub- and super-martingales. Relation with differentiation of measures. 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 integral, Ito’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 929.
Stochastic processes studied by the methods of linear spaces. Sample path properties, representative, estimation, prediction, multiplicity.

966. Semi-Groups and Applications
Spring of odd-numbered years. 3(3-0) STT 873, STT 928.
Hille-Yosida theorem, processes of independent increments, infinitely divisible processes, Markov processes in several dimensions.
14. 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.

15. Ophthalmology Clerkship
Fall, Winter, Spring, Summer, 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Development of skills and knowledge in ophthalmoscopy, neuro-ophthalmology, visual function, and management of problems such as glaucoma, the red eye, and trauma.

16. Thoracic Surgery Clerkship
Fall, Winter, Spring, Summer, 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
Problem-solving in thoracic medicine and surgery, also stressing pulmonary physiology, use of diagnostic tools and tests, and indications for surgical procedures.

18. Anesthesiology Clerkship
Fall, Winter, Spring, 4 to 16 credits. May reenroll for a maximum of 16 credits. H M 602.
Introduces common anesthetic agents and provides opportunity for performing anesthetic procedures under faculty supervision.

30. Emergency Medicine Clerkship
Fall, Winter, Spring, 4 to 8 credits. May reenroll for a maximum of 8 credits. SUR 608, H D 608, or MED 608, H M 602.
Interdepartmental with and administered by the Department of Medicine. Pathophysiology and other basic concepts will be used to explain the development of emergent conditions. Clinical diagnosis and treatment of emergencies seen in community emergency departments will be discussed.

32. Basic Audio Production (201.) Fall, Winter, Spring, 4(2-4) TC 210, TC 220, TC 230.
Basic orientation to audio and radio studios, with laboratory experiences in production, writing, and performance.

33. Television Studio Production (302.) Fall, Winter, Spring, 4(4-0) TC 210, TC 220, TC 230.
Essential U.S. public communication policy is treated through rigorous methodological analysis of case and statutory law, public documents, and related primary materials.

20. History and Economics of Telecommunications
Fall, Winter, Spring, 4(3-2) Sophomore TC majors, EC 201.
Institutional and cultural development and underlying economic principles of the telecommunications field, including broadcast programs.

23. Basic Telecommunication Technology
Spring, 4(3-2) Sophomore TC majors.
An analysis of technical factors involved in electronic communication, transmission, sound physics and audio technology, light physics, visual behavior and image technology, computer and automation controls, technical telecommunication policy formulation.

28. History of the Motion Picture
Fall, Winter, 4(2-4) Sophomores.
Development of the motion picture from its beginning to the present, emphasizing social background and cultural values. Screening of significant films from various periods and countries.

301. Basic Audio Production (201.) Fall, Winter, Spring, 4(2-4) TC 210, TC 220, TC 230.
Basic orientation to audio and radio studios, with laboratory experiences in production, writing, and performance.

302. Basic Video Production (302.) Fall, Winter, Spring, 4(2-4) TC 210.
Basic orientation to video and television studios, with lab experiences in production, writing, and performance.

310. Basic Telecommunication Policy
Fall, Winter, 4(4-0) TC 210, TC 220, TC 230.
Essential U.S. public communication policy is treated through rigorous methodological analysis of case and statutory law, public documents, and related primary materials.