873. *Theory of Probability and Statistics III*

Spring. 3(3-0) 872; MTH 927 or concurrently; or approval of department.

Asymptotic distributions of some statistics. Cramer-Rao inequality. Asymptotic properties of maximum likelihood methods.

876. *Statistical Inference in Economics I*

Fall. 3(3-0) 443 or 863; EC 812A or 801; or approval of department. Interdepartmental with the Agricultural Economics and the Economics Departments and administered by the Economics Department.

Review and extension of single-equation regression models. Properties of least-squares estimators under alternative specifications. Problems of analyzing nonexperimental data. Errors in variable, autoregressive and heteroscedastic models.

877. *Statistical Inference in Economics II*

Winter. 3(3-0) EC 876 or approval of department. Interdepartmental with the Agricultural Economics and Economics Departments and administered by the Economics Department.

Specification interpretation and estimation of simultaneous equation models. Nonlinear models. Bayesian approach to estimation problems. Recent developments in econometrics.

878. *Statistical Inference in Economics III*

Spring. 3(3-0) EC 877 or approval of department. Interdepartmental with the Agricultural Economics and Economics Departments and administered by the Economics Department.

Validation and application of dynamic econometric models. Bayesian approach to estimation problems. Recent developments in econometric methods and in applied econometric research.

881. *Probability and Stochastic Processes I*

Fall. 3(3-0) MTH 821 or concurrently.

Discrete probability models, dependence and independence, random variables and expectation. Exponential and uniform densities. Special densities and mixtures. Multivariate densities. Probability distributions in R^r.

882. *Probability and Stochastic Processes II*

Winter. 3(3-0) MTH 822 or concurrently.

Laws of large numbers, applications in analysis. Basic limit theorems. Markov processes and semi-groups. Renewal theory. Random walks in R^1.

883. *Probability and Stochastic Processes III*

Spring. 3(3-0) MTH 823 or concurrently.

Laplace transforms, Tauberian theorems, resolvents. Applications of Laplace transforms. Characteristic functions. Application of Fourier methods to random walks. Harmonic analysis.

886. *Stochastic Processes and Technological Applications*

Winter. 3(3-0) 441 or 861.

Discrete stochastic processes. Markov chains, birth and death processes, branching processes. Selected technological applications.

887. *Stochastic Models in the Physical Sciences*

Spring. 3(3-0) 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, Summer. Variable credit. Approval of department.

899. *Research*

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

927. *Theory of Measure and Integration*

Spring. 3(3-0) MTH 822. Interdepartmental with and administered by the Department of Mathematics.

Introduction to the theory of integration over abstract spaces. Topics include: measure spaces; measurable and integrable functions; modes of convergence, theorems of Egoroff, Lusin, Riesz-Fischer, Lebesgue; absolute continuity, and the Radon-Nikodym theorem; product measures and Fubini's theorem. Applications to some of the classical theories of integration and summability.

937. *Systems Simulation*

Fall. 4(4-0) MGT 836, STT 423, MTH 228. Interdepartmental with and administered by the Management Department.

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. 4(4-0) MGT 836, MTH 334, 426, STT 863. Interdepartmental with and administered by the Management Department.

Large mathematical programs with special structure. Duality and decomposition in mathematical programming. Basic theory of dynamic programming; multistage decision processes and the principle of optimality. Risk, uncertainty, and introduction to stochastic and adaptive control processes.

949. *Advanced Applied Stochastic Processes*

Winter. 4(4-0) MGT 836, 937. Interdepartmental with and administered by the Management Department.

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, queuing, and gaming theory.

971. *Advanced Theory of Statistics I*

Fall. 3(3-0) 873, MTH 927, 981 or concurrently.

General decision theory. Concepts of loss, risk, admissibility, completeness, minimax and Bayes solutions. Sufficiency, equivariance and their associated reductions. Monotome likelihood ratio and exponential families. Optimality properties of tests.

972. *Advanced Theory of Statistics II*

Winter. 3(3-0) 971; 982 or concurrently.

Statistical convergence theorems. Variables and distributions in n-space. Asymptotic and exact sampling distributions. Tests of significance.

973. *Advanced Theory of Statistics III*

Spring. 3(3-0) 972.

Continuation of 972.

981. *Advanced Theory of Probability I*

Fall. 3(3-0) 863; MTH 927 or approval of department.

Measures on infinite product spaces and Kolmogorov' consistency theorem. Distributions and characteristic functions. Independence. Series of independent random variables.

982. *Advanced Theory of Probability II*

Winter. 3(3-0) 981 or approval of department.

Central limit problem: the classical limit problem, the bounded variances case, and limit laws for infinitely divisible random variables. Conditional probabilities and expectations. Martingales with discrete time.

983. *Advanced Theory of Probability III*

Spring. 3(3-0) 982 or approval of department.

Ergodic theory; individual and L_p ergodic theorems. Second order processes, weakly and strongly stationary processes. Foundations; separability and measurability of processes; properties of sample functions. Continuous time martingales. Processes with independent increments.

990. *Problems in Statistics and Probability*

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 10 credits. 873.

Seminar 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.

999. *Research*

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

STUDIO ART

See **Art.**

SURGERY* SUR

College of Human Medicine

608. *Surgery Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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.

*Established February, 1971.

609. *Otolaryngology Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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 re-enroll 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 re-enroll for a maximum of 34 credits. H M 602.

Demonstration of clinical manifestations of genito-urinary disease, investigative methods and techniques of diagnosis and management, familiarity with urologic emergencies and performance of basic urologic skills.

612. *Rectal Surgery*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll for a maximum of 34 credits. H M 602.

Data collection, physical examination, and problem formulation relating to colon and rectal disease. Involvement in special techniques, examinations, and surgical procedures is an important aspect of the experience.

613. *Orthopedic Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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 re-enroll 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.

615. *Ophthalmology Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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.

616. *Thoracic Surgery Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll 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.

617. *Emergency Medicine Clerkship*

Fall, Winter, Spring, Summer. 1 to 17 credits. May re-enroll for a maximum of 34 credits. H M 602.

Exposure to acute problems of wide variety is provided by this experience. Evaluation, management and disposition of patients is seen in the framework of the continuing patient care system.

SYSTEMS SCIENCE

See Electrical Engineering and Systems Science.

TELECOMMUNICATIONS TC

College of Communication Arts and Sciences

120. *Telecommunication in the United States*

Fall, Winter, Spring. 3(3-0) Non-majors.

History, economics, public control, programming, social effects and future of telecommunication; primarily radio and television broadcasting and cable communication. Citizen responsibilities in the development of telecommunication systems and services.

150. *Introduction to Telecommunication*

Spring. 3(3-0) Majors.

Nature, development, economics, social control and influence of the telecommunication media in modern society.

201. *Fundamentals of Radio Broadcasting*

Fall, Winter, Spring, Summer. 4(2-4) 150.

Basic orientation to the radio studio, with laboratory experiences in production, writing, and performance.

202. *Fundamentals of Television Broadcasting*

Fall, Winter, Spring. 4(2-4) 201.

Basic orientation to the television studio, with laboratory experiences in production, writing, and performance.

280. *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.

310. *Basic Telecommunication Policy*

Winter, Spring. 4(4-0) 150, Juniors, approval of department.

Essential U.S. public communication policy is treated through rigorous methodological analysis of case and statutory law, public documents and related primary materials.

333. *Television Directing*

Fall, Winter, Spring, Summer. 4(2-4) 202 and approval of department.

Television producing and directing methods with assigned experiences in the television studios.

335. *Television and Radio Audience Studies*

Winter, Summer. 3(3-0) Juniors.

Analysis and evaluation of broadcast audience measurement services and other feedback systems. Broadcast audience characteristics, attitudes and behavior.

350. *Advanced Radio Production*

Winter, Spring. 4(2-4) 201 and approval of department.

Planning, coordinating and producing the radio program. Emphasis on documentary and studio productions utilizing original ideas and methods.

351. *Television Studio Production*

Fall, Spring. 4(2-4) Junior majors, 202 and approval of department.

Advanced television crew operations. Writing and production of programs directed by students in 451.

390. *Cinema I*

Fall. 4(3-2) 280 and approval of department.

Survey of the film production process: concepts, techniques, procedures, problems, tools. Emphasis on production as the execution of film design.

399. *WKAR-TV Internship*

Fall, Winter, Spring. 2 credits. May re-enroll for a maximum of 4 credits. 202; television-radio majors only; approval of department.

Internship in television studio operation.

401. *Television and Radio Station Management*

Fall, Spring. 4(4-0) Seniors and 15 credits in television and radio courses.

Problems of station management in budgeting, programming, sales, government regulation and community relations.

402. *Television and Radio Station Programming*

Winter, Spring. 4(4-0) Seniors and 15 credits in television and radio courses.

Objectives and methods of planning television and radio programs. Evaluation of individual program formats and their relation to various types of audiences and markets. Laws and regulations affecting programming.

415. *Cable Communication*

Winter. 4(4-0) Juniors.

History, technology, public policy, services, economics, management and social effects of broadband cable communication systems.

437. *Television Program Development*

Winter, Summer. 3(1-4) Senior non-majors.

Television production planning and practices. Designed for non-majors who desire a working knowledge of the medium for application in other fields.

451. *Advanced Television Directing*

Fall, Spring. 3(0-6) Senior majors, 333 and approval of department.

Assigned experiences in television directing of programs written and produced by students in 351.

489. *Television and Radio in Education*

Fall, Summer. 4(4-0) Seniors; Juniors with approval of department.

Uses of broadcast media for instructional purposes, both on-the-air and in the classroom. Current usages by institutions of higher learning and public schools, including both broadcasting and closed-circuit television. Survey of research studies of the effects of educational broadcasting. Types of educational programs are evaluated. Specialists in educational radio and television participate as guest lecturers.