26:960:575 Introduction to Probability

W 6:00 - 8:50 p.m.

Ackerson Hall 106 — Global Financial Market Center

Professor: Zachary G. Stoumbos, Ph.D.

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Office Hours: W 5:00-6:00 p.m. at the Newark Campus Office, or by appointment.

Textbook: *Introduction to Probability Theory* (1971), by P. G. Hoel, S. C. Port, and C. J. Stone, Houghton Mifflin Company: Boston, MA. ISBN: 0-395-04636-x.

Examinations: There will be two Tests and a comprehensive Final Exam. Make-up exams will be given only in extreme emergencies at the discretion of the Professor, and will require written documentation from an appropriate source, such as a medical doctor.

Homework: Homework will be assigned during each class period and will be discussed during the following class period if questions arise. Homework will not be collected for grading, but it is the responsibility of each student to complete the assignments.

Grading: Each Test will be worth 30% and the Final Exam 40%.

Description: This course will present the fundamentals of probability theory. Special attention will be given to manifestations of this theory in decision-making.

Objectives: This course will develop the basic concepts and tools of probability and distribution theory. It will provide a foundation for additional study of statistics, probability, stochastic processes, or for applications in other fields.

Course Outline:

Introduction to basic concepts: Sample spaces, events, axioms of probability, concepts of conditional probability and independence. (Chapters 1-2)

Random variables: Discrete and continuous, and Chebyshev's Inequality. (Chapters 3-5)

Jointly distributed random variables: Multivariate distributions, sums and quotients of random variables, Bayes rule. (Chapter 6)

Expectation, moments, and the Central Limit Theorem: Variance, covariance, moment generating functions, characteristic functions, and conditional expectation. (Chapter 7-8)

Random walks and Poisson processes: Relation to the exponential distribution. (Chapter 9, as time permits)

Markov chains: Markov and decision processes. (Chapter 9 and supplementary notes, as time permits)