

Title: Introduction to Probability and Statistics

Catalog

Description: Sample spaces, combinatorics, and random variables. Density and distribution functions. Expectation, variance, and covariance. The binomial, uniform, poisson, negative binomial, hypergeometric, exponential, and normal distributions. Sampling distributions, estimation, and hypothesis tests.

Course: This course is intended for students who have completed one semester of calculus and who wish to take an introductory course in probability and statistics.
and Statistics 50 concentrates on the fundamentals of probability, sample spaces, combinatorics, random variables. Density and distribution functions, expectation, variance, and covariance, the binomial, uniform poisson, negative binomial, hypergeometric, exponential, and normal distributions, gamma beta, central limit theorem, confidence interval estimation, and hypothesis tests. Students will be given periodic writing assignments which encourage them to think through concepts of the course. Students will be given periodic writing assignments that encourage them to think through concepts of the course

Prerequisites: Math 26A, Math 30 or AP credit for AB calculus in high school.

Learning

Objectives: Understand the basic principles of probability including the laws for unions, intersections, and complementation, Bayes theorem and use these principles in problem solving situations. Understand the definitions of discrete, continuous, and joint random variables, compute the mean, variance and covariance of random variables, know the definition of density and distribution function of a random variable and be able to find one from the other, and be able to find the marginal density and distribution functions from the joint density function. Define the binomial, uniform, Poisson, negative binomial, hypergeometric, exponential, Gamma, Beta and normal random variables, know their probability density and distribution functions, compute the mean and variance of these random variables, and use the normal and Poisson distributions to approximate binomial probabilities. Estimate population parameters from data sets and use the sampling distributions to compute confidence intervals for these population parameters. Learn the basic components of hypothesis testing and perform hypothesis tests on population means, variances and proportions.

Text: Probability and Statistics for Engineers by Hayter, 2nd Edition

Coverage: Chapters 1 through 10. The use of statistical software software will be discussed.

Writing

Component: STAT 50 satisfies Area B4 of the GE requirements. Students are advised to practice interpreting the results of statistical analyses using technical and non-technical language while solving assigned word problems dealing with real life situations. Class discussions will emphasize this writing component requirement of the course through the above criterion.

Examinations: There will be three midterm examinations and a comprehensive final examination for this course.
The examination schedule is given below.

Midterm I	Feb. 18
Midterm II	Mar. 18
Midterm III	Apr. 22
Final	May 16

Grading: Written work is scored on the following scale and your grade in this course is assigned according to the following percentages.

Homework	100 (10.0%)	88% - 100%	A
Midterms (150 pts each)	500 (50.0%)	76% - 87%	B
Final	400 (40.0%)	65% - 76%	C
		50% - 64%	D
Total	1000	below 50%	F

Topics covered: Stat 50

- I. Probability 2 Weeks
 - A. Sample spaces and events
 - B. Operations on events (union, intersection, complement)
 - C. Counting principles
 - D. Independent and dependent events
 - E. Conditional probability
 - F. Bayes' theorem

- II. Random Variables 3 Weeks
 - A. Definitions
 - B. Density and distribution functions
 - C. Expectation
 - D. Variance
 - E. Joint probability distributions
 - F. Independent and dependent random variables
 - G. Covariance and correlation

- III. Special Random Variables 3 Weeks

