Stat 115A : Introduction to Probability Theory

California State University, Sacramento · Department of Mathematics & Statistics

This is the traditional upper division mathematical statistics course. The first semester consists mostly of probability theory with emphasis on various distributions and techniques.

Catalog Description

Probability axioms, discrete and continuous random variables, functions of random variables, joint densities, expectation, moment generating functions. Chebyshev's inequality, transformations, weak law of large numbers, central limit theorem. **Graded**: Graded Student. **Units**: 3.0.

Prerequisites

Stat 50 or instructor consent.

Topics

I. Probability (3 1/2 Weeks)

   A. Set Functions
   B. Random variables
   C. Densities and distributions
   D. Expectation
   E. Moment generating function and variance
   F. Cheyshev's inequality

II. Joint Distributions (2 1/2 Weeks)

   A. Joint distributions
   B. Marginal and conditional distributions
   C. Covariance
   D. Correlation and independence

III. Special Distributions (3 Weeks)

   A. Binomial
   B. Poisson, Geometric
   C. Hypergeometric
   D. Gamma, chi-squared
   E. Normal, and bivariate normal

IV. Sampling Theory (4 Weeks)

   A. Transformations and change of variable
   B. + and F distributions
   C. Order statistics

V. Limiting Distributions (2 Weeks)

A. Central Limit Theorem

B. Poisson approximation to binomial, Normal approximation to binomial