University of Washington
STATISTICS

Course Announcement Autumn 2010

Statistics 340
Introduction to
Probability and Mathematical Statistics I
(first course in the sequence Stat 340, 341, 342)

Time: MW 11:30-12:20, and F 11:30-1:20
Place: MW Mary Gates Hall 271; F Mary Gates Hall 231
Instructor: Prof. Peter Guttorp (peter@stat.washington.edu)
Office: B-213 Padelford Hall

STAT 340 is the initial course in a core sequence for majors and minors in Statistics and in the ACMS Statistics pathway. For these students, STAT 340 replaces STAT/MATH 394-395 in building the probability background leading into mathematical statistics. STAT 340, 341 and 342, together form a 3-course sequence (Aut-Win-Spr) that provides a strong coherent foundation in probability and mathematical statistics, for further study in probability and/or statistical methods. All three quarters interweave statistics and probability. Stat 340 emphasizes probability concepts, Stat 342 emphasizes statistical concepts.

Purpose and course content:
The study of probability gives us both theory and tools to model many aspects of the way our world works. In addition, probability works in synergy with statistical theory and methods to allow us to construct and assess our probabilistic models and to build even further our understandings. Students will gain proficiency and understanding of the use of probability and statistical models and methods. The primary intended audience is students majoring in statistics, ACMS, mathematics or mathematics teaching.

Topics (for entire sequence):
Probability: probability axioms, combinatorics, conditional probability, independence, random variables, joint and conditional distributions, binomial and Poisson processes, univariate and multivariate distributions and densities, and moments; binomial, negative binomial, geometric, Poisson, normal, exponential distributions, and central limit theorem.

Statistics: basic estimation and hypothesis testing theory–derivations and properties of estimators, bias, mean squared error, efficiency, consistency, sufficient statistics, maximum likelihood and method of moments estimators, confidence intervals; hypothesis testing – derivations and properties, power, likelihood ratio tests; data from non-simple random samples; introduction to the theory underlying regression modeling and inference.

Prerequisites:

• an introductory statistics course such as Stat 220, 311, or 390

• a year of calculus, equivalent to Math 124, 125 and 126 (basics of differentiation, integration and series)

Textbook:

Larsen and Marx, An Introduction to Mathematical Statistics and its Applications, 4th edition, Prentice-Hall, 2006. Required for the entire sequence.