Stat 512
Statistical Inference

Syllabus
Autumn 2003

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(or by appointment)

Assistants : Kyle Rudser (rudserk@u.washington.edu)
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Office hours : (see web pages)

Time and Place : Lectures : MWF 10:30 - 11:20 HSB T625 (except HSB D209 on M 6 Oct 03)
Th 10:30 - 11:20 HSB D209

Class Web Pages: http://faculty.washington.edu/∼semerson/s512

The web page will be used to post announcements, homework assignments, etc. I urge you to check this site regularly. Questions that are submitted to me (via email or otherwise) that I think might be of general interest will have their answers posted on the web page, as well.

Prerequisites : Stat 395 and Stat 421, 423, 504 or Biost 514,
or the equivalent (the latter courses can be taken concurrently),
or permission of the instructor

Text : Required: Dudewicz and Mishra (DM)
Modern Mathematical Statistics
Optional: Casella and Berger
Statistical Inference (optional)

Computing : Software : S-Plus or R

This is a class in statistical theory. However, some homework problems may not be able to be solved in closed form. In those cases, students may be required to perform numerical searches or numerical integration to obtain the answers.

Assignments : Written problem sets approximately weekly

Homework problems requiring a written solution are assigned approximately one week in advance of their due date. Students are encouraged to seek help from the instructor, the TAs, or other students with the written homework problems. However, the work that is handed in should reflect only that student's work. That is, obtaining help from other students in order to learn the METHODS of solution is allowed, but copying another student's answer is NOT. Problems handed in one day late will be discounted 50%. Problems handed in two days late will be discounted 75%. Students will not receive credit for problems

handed in more than two days late except under the most extenuating of circumstances. We reserve the right to grade only selected portions of the written homework.

Homework Review Sessions:

On each Friday following the due date for a homework assignment, one or both TAs will review the solution to the assigned problems. Attendance at this session is entirely optional. The location of these sessions will be posted on the class web page.

Grading	:	Written homeworks	35%
		Each of two midterms	20%
		Final examination	25%

Miscellanea :

1. Homework assignments will be posted on the course web pages approximately one week in advance. Usually these assignments will be problems from Dudewicz and Mishra. Occasionally supplemental problems will also be assigned.
2. Electronic mail (e-mail) will be used for communication of errata and other announcements that are of interest to the general class. It is the student's responsibility to ensure that his/her current e-mail address is known to the instructor, if the student does not receive email from the instructor by the end of the first week of class. Similarly, it is the student's responsibility to ensure that any changes to his/her email address is made known to the instructor. Throughout the quarter, students may submit questions regarding the course material via e-mail. Answers to questions that I feel are of general interest will be broadcast to the entire class (the identity of the source of the question will be protected). Questions that are likely to be of interest only to a single student will usually be answered individually. I try for reasonably quick turnaround on email questions, but backlogs do occur. It may happen that I think I have answered your question in a general message broadcast to the class, but you are still unsure of the answer. Do not hesitate to send your question again, and I will try to address it further.

Course Content

This two quarter course sequence covers the mathematical theory behind standard statistical inferential techniques. It is targeted to graduate students majoring in statistics, biostatistics, quantitative ecology, and other disciplines requiring an understanding of statistical theory. The course starts with a review of the probability theory that is the basis for that inference. We will then cover both frequentist and Bayesian methods of point estimation, interval estimation, and hypothesis testing.

We will generally follow the organization of Dudewicz and Mishra. The first six chapters deal with probability theory, most of which should have been covered in prerequisites for this course. Nonetheless, I will cover material from these chapters as follows.

0. It is presumed that students are completely familiar with the content of chapter 1 and sections 2.1 and 2.2.
1. I will briefly summarize the main results in sections 2.3 and 2.4.
2. Coverage of chapters 3 and 4 will primarily focus on a review of the most important probability distributions used in this course.
3. While it is presumed that all students are familiar with the material in chapter 5, I will review this material from the perspective of the role it plays in statistical inference.
4. The material of chapter 6 will be covered in some detail, especially as it pertains to large sample results.

Following the review of probability theory, we will cover frequentist methods of point estimation and optimality of estimators. This material will likely fill the remainder of STAT 512, with STAT 513 covering material on theory of frequentist testing (both parametric and nonparametric), Bayesian methods, and decision theory.