STAT 670A
Advanced Mathematical Statistics

Fall 2008
Professor Bailey

Syllabus

Course Web Page: `http://rohan.sdsu.edu/~babailey/stat670A`
and `blackboard.sdsu.edu`

Meeting Time: Lectures: TTh 2:00 - 3:15 p.m. in GMCS 325

Instructor: Professor Barbara Bailey
GMCS 513
email: babailey@sciences.sdsu.edu
Office Hours: T 3:15-4:15 p.m.; Th 1:00 - 2:00 p.m.; by appointment

Reference: The textbook for the course is

Casella, G. and Berger, R. L. (2002). *Statistical Inference*, 2nd Edition. Duxbury, California.

Objectives: Mathematical statistics is the backbone of methods applied and developed in statistical practice and research. This course will provide you with the mathematical machinery and underlying statistical theory to understand and evaluate statistical routines, expand/manipulate existing or establish new procedures, communicate statistical ideas, and read the scientific, particularly statistically-related, literature to critically judge the relevance of research results. The goal is to bring together your understanding of statistical methods into a coherent conceptual and theoretical framework within which you may gain a greater comprehension and appreciation of statistical inference and thinking. Additionally, the material will teach you how to approach statistical problems from a mathematical perspective as a complement to the computational and data analytic training you receive in more applied courses and work.

Homework: Homework assignments will be regularly available on the course web page as announced in class. The homework will contain a series of practice problems of which *selected problems* **will** be graded. The homework serves as a tool to review and practice the material covered in class. All material covered on the assignments can be questioned on the exams. Late homework will not be accepted. You may drop your lowest percentage score.

Exams: There will be two in-class exams on the Thursdays October 9 and November 20. All exams are closed book. A hand calculator is necessary for all exams.

Each exam will be worth 100 points. **No makeup exams are given - no exceptions**.

The final exam will be given Tuesday, December 16 from 1:00 p.m. to 3:00 p.m. in GMCS 325. The final will be cumulative and comprehensive.

Project: As part of the course you will be asked to do an individual project. The project grade will be based in part on a brief 3-5 minute presentation (depending on the size of the class) during the last full week of classes and a brief 3-5 page written report in journal style format (i.e., 12 *pt* font, one inch margins, single-spaced, figures and tables clearly presented and labeled at the end of the abstract, page limit does not include figures, tables, nor bibliography).

You are required to attend *all* project presentations. Attendance at the presentations will be a part of your project grade.

The project will be done individually. You will illustrate and present the importance of the mathematical statistics concepts in the literature. In consultation with me, you may may choose a journal article

of interest to you. As part of the project, expect to read the journal article, write a report, and give an oral presentation to demonstrate a thorough understanding of and to illustrate the techniques/methods used in the article.

Grading: The grade for the class is based on a score composed of the following.

Homework	15%
Project	10%
Two Exams	40%
Final Exam	35%

Topics to be covered: basic outline; topics may be added and/or dropped as the semester proceeds.

1. Probability theory
   a. Basics
   b. Inequalities
2. Distributions
   a. Exponential families
   b. Moment generating and characteristic functions
   c. Identifiability
   d. Multivariate and hierarchical models
   e. Transformations
3. Sampling theory
   a. Order statistics
   b. Asymptotics
4. Descriptive statistics
   a. The principles: sufficiency, likelihood, invariance
   b. Empirical cdf and smoothing

Prerequisites: A calculus-based probability course (STAT 550 or 551A) and linear algebra (MATH 254).

Tardiness and Early exits: The class time is from 2:00 - 3:15 p.m. As common courtesy to your fellow students, we would appreciate if you show up to class on time and leave when dismissed at 3:15. If you must leave early, please inform me and sit on the aisle near an exit so as not to disturb students listening to and trying to learn from the lectures.

Code of Academic Conduct on Examinations and Assignments: "At San Diego State University, students are invited to be active members of the educational community. As with any community, its members serve a vital role in determining acceptable standards of conduct, which includes academic conduct that reflects the highest level of honesty and integrity." The "Statement of Student Rights and Responsibilities clarifies for students their role as members of the campus community, setting forth what is expected of them in terms of behavior and contributions to the success of our university." "Inappropriate conduct by Students ... is subject to discipline on all San Diego State University Campuses. The Center for Student Rights and Responsibilities coordinates the discipline process and establishes standards and procedures in accordance with regulations contained in Sections 41301-41304 of Title 5 of The California Code of Regulations, and procedures contained in Executive Order 628, Student Disciplinary Procedures for The California State University." See http://www.sa.sdsu.edu/srr/judicial for more information.

Other information: See course web page: http://rohan.sdsu.edu/~babailey/stat670A