Stat 442: Mathematical Statistics II
Course Syllabus
Spring 2009

Contact Information:
Instructor: *Solomon W. Harrar, Ph.D.*
Office Hours: *MW 1-2PM or by Appointment*
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Class Time and Place: MWF 10:10-11:00 AM, Math 108

Course Objectives: A prime objective of the Math 441-442 course sequence is to present techniques and basic results of probability and mathematical statistics at a rigorous and advanced calculus level.

In Math 441, we developed the probabilistic tools and language of mathematical statistics. The course described probabilistic models for and properties of random variables, common probability distributions, and a bit of sampling distributions. In the present course, Math 442, the theoretical underpinnings of statistical inference procedures are studied. In particular, the theory of estimation, confidence sets and hypothesis testing are investigated.

Learning Goals (Mathematics Department Assessment Document):

1. To understand how to derive estimators and their properties, such as distribution, variance, bias, MSE, and consistency and other asymptotic properties.
2. To understand the theory behind confidence intervals and hypothesis tests.
3. To understand likelihood theory and apply it to estimation and hypothesis testing.
4. To gain an understanding of the theory behind normal-based inference procedures for the one and two-sample problems.
5. To be able to use software to obtain numerical solutions to problems where analytical solutions are not possible and to carry out simulations to compare inference procedures.

Course Content: In Math 442, we shall cover most, but most of the materials in chapters 6, 7, 8 and 11. We will supplement some of the chapters from other sources.

1. *Multivariate Distributions and Random Samples*: Sections 3.7, 3.9, 4.8, 5.7, 5.8,
2. *Point Estimation*: Sections 6.1-6.9, 7.6, 7.7, 7.8
3. *Sampling Distributions*: Sections 7.1-7.4, 11.1, 11.2, 11.5
4. *Interval Estimation*: Section 7.5
5. *Hypotheses Testing*: Sections 8.1-8.9

Prerequisite: Math 441 or instructor's consent.

Required Text:

- M. H. DeGroot and M. J. Schervish, *Probability and Statistics*, Third Edition, Addison Wesley 2001.

References (*Available in the library***):**

- Robert V. Hogg and Allen T. Craig. Introduction to Mathematical Statistics. 5th ed., Prentice Hall, 1996.

- A. M. Mood, F. A. Graybill and D. C. Boes. Introduction to the theory of statistics, 3rd ed. McGraw-Hill, 1974.

Grading Policy:

- Homework (10%)
- Mid Term (60%)
- Final Exam (30%)

Grading Scale:

90-100 ~ A, 80-89 ~ B, 70-79 ~ C, 60-69 ~ D, 0-59 ~ F

Homework: Homework will be assigned almost every class day, to be handed in the next class day. Late homework will not be accepted. Every time before you start working on your homework, I expect you to rewrite the class notes and understand them together with the materials in the textbook.

Exams:

- There will be three mid terms and one cumulative final exam in this course. The mid term exam will occur on February 20, March 20 and April 17, and the final exam will occur on May 13 from 10:10 AM to 12:10 PM.
- In all exams, a few pages containing common probability distributions and their properties will be allowed. Otherwise, the exams are closed notes and books.
- If you can not make it to an in class exam due to a reason for which you can produce acceptable documentation, please let me know as soon as possible.

Attendance: I expect you to attend class regularly. However, attendance and class participation will have only the obvious indirect bearing on your course grade. At any rate, the student is responsible to get caught up with the materials covered and homework assigned.

Some Dates You May Want to Know:

Feb 13--Last day to drop/add on Cyberbear
Feb 16 -- Presidents Day Holiday
Mar 9-- Last day to drop/add by paper form
Mar 30 – Apr 3 -- Spring Break
May 8 -- Last day to drop/add by petition
May 11-15 -- Finals Week

Disability: Students with disabilities are welcome to discuss accommodations with me.

Student Code: All students need to be familiar with the Student Conduct Code. You can find it in the "A to Z Index" on the UM home page.

Academic Honesty: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.