

Instructor: Joshua M. Tebbs
Course: Theory of Statistical Inference
Class Time/Place: 11.15-12.05 MWF in 210A LeConte
Prerequisite: STAT 512 (with a grade of C or higher)
Office: 209G LeConte (tel: 777.5163)
Office Hours: 1.00-2.00 MTWTh (or by appointment)
email: tebbs@stat.sc.edu
url: <http://www.stat.sc.edu/~tebbs/index.htm>

Required Course Material:

- Wackerly, D., Mendenhall, W., and Scheaffer, R. *Mathematical Statistics with Applications*, 7th edition. Copyright 2008, Duxbury.

Course overview/Learning outcomes: In this course, we will continue, and finish, our exploration of probability and mathematical statistics. From Wackerly, Mendenhall, and Scheaffer (WMS), we will cover Chapters 10, 11, and 16. With the time we have left (roughly 3-4 weeks), I will present an introduction to the theory of survival analysis (i.e., the analysis of time-to-event data). Survival analysis is commonly encountered in biostatistics and actuarial science. Similar to STAT 511-512, this course is a mix of application and statistical theory. Here is a breakdown of the topics we will discuss:

- Hypothesis testing (Chapter 10). Type I/II Error, large-sample tests, power, Neyman-Pearson Lemma, uniformly most powerful tests, likelihood ratio tests.
- Regression models (Chapter 11). Simple and multiple linear regression models, least squares, sampling distributions, analysis of variance, F tests, confidence and prediction intervals.
- Bayesian inference (Chapter 16). Bayesian paradigm, prior model selection, posterior computation, point estimation, credible intervals.
- Survival analysis (Supplementary notes). Censoring, hazard functions, life-table estimates, Kaplan-Meier estimator, two-sample (log-rank) tests, power and sample size, k -sample tests.

Homework Assignments: There will be 8-12 homework assignments during the semester. Homework should be written up neatly and stapled. The homework assignments are an important component of this course. Each will count towards your final grade. Late homework will receive at most 50 percent credit.

Quizzes/Take-home problems: I reserve the right to periodically give in-class quizzes or (perhaps more challenging) take-home problems. Take-home problems are due the next class meeting after they are assigned. Quiz and take-home points will count towards your homework grade (often as extra credit, but not necessarily).

Exam Schedule: We will have (two) in-class midterm examinations on September 16 and October 28. We will have a cumulative final examination on Thursday, December 8 at 9.00am. All of my exams are closed-book and closed-notes. Please note that I do not give make-up examinations unless your absence is due to a university function and you have discussed it with me at least one week in advance.

Grade Breakdown: Your course grade will be determined by your performance on homework (20 percent), the two midterms (15 percent each), the final exam (40 percent), and attendance/participation (10 percent). Final course grades will be assigned according to a 90-80-70-60 protocol.

Some comments about STAT 513:

- Feel free to ask questions during class; your questions are an important part of this course. Very few students are able to master this material without keeping up on a regular basis. See me if you have a question about finding tutors.
- Working together on homework problems is permitted and encouraged, but each student should write up his/her solutions independently of others (this will help greatly).
- Naturally, cheating on exams is an extremely serious offense and will be dealt with very harshly.
- I would like to talk to anybody with a disability that may require special attention with examinations or other aspects of the course. Please talk with me during the first or second week of class.

My expectations for you:

1. Attend every class and be on time. Turn cell phones off.
2. Read appropriate sections of the text/notes before class.
3. Spend an enormous amount of time on homework problems and on working other problems from the text.
4. Ask questions if you do not understand something or wish to know more.
5. Remember what you have learned in STAT 511-512 (or go back and re-learn it).
6. Make it your goal to understand everything we do.