STAT 513, Theory of Statistical Inference -- Fall 2014

Instructor:
David Hitchcock, associate professor of statistics
209A LeConte College
Phone: 777-5346
Email: hitchcock@stat.sc.edu
Course Web Page: http://www.stat.sc.edu/~hitchcock/stat513.html
(Also accessible via Blackboard)

Classes: Meeting Times: MWF 10:50 am - 11:40 am, Sloan College, Room 105

Office Hours: Mon-Wed-Fri 1:15-2:30, Tuesdays 11:00-12:00 or **please feel free** to make an appointment to see me at other times.

Textbook: *Mathematical Statistics with Applications, 7th edition.* (2008), by Wackerly, D., Mendenhall, W., and Scheaffer, R.

Purpose: To provide a strong foundation in mathematical development of statistical inference methodology.

Prerequisite: STAT 512 with a grade of C or higher.

Course Outline: Chapters 10, 11, and 16 of the Wackerly, Mendenhall, and Scheaffer textbook, along with some supplementary notes. Topics covered include: Hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests, power, theory of linear models including multiple linear regression and ANOVA, Bayesian inferences, advanced topics including survival analysis.

Learning Outcomes: Upon successful completion of this course, students should be able to: (1) form or calculate and interpret statistical hypotheses, error rates, and power; (2) construct appropriate hypothesis tests for basic settings (e.g., 1-sample and 2-sample for means and variances); (4) perform and derive estimators and tests within linear statistical models; (4) perform and interpret basic Bayesian statistical analyses; (5) understand the fundamentals of survival analysis.

During Class: No cell phones may be on during class. Laptop computers must be put away during class time. Tablets (e.g., i-pads) may be used *only for note-taking*, only if flat on the desk like a traditional notebook. Students may not use tablets to look at web pages, play games, etc.

Exams: There will be three in-class exams (see dates on next page) and a final exam on Saturday, Dec. 13. Exams may not normally be made up, except in extreme circumstances, for which written documentation of excuse (doctor's note, funeral notice, etc.) is required. If you suspect you may miss an exam day, it is important to contact me well in advance of the test date.

Quizzes: There will be 12 **unannounced** short (1-minute) quizzes during class at random times throughout the semester. Quizzes will usually be given near the end of class, but may be given at the beginning of class occasionally. Your performance on these quizzes will count for 3% of your grade. **None of these quizzes may be made up**; however, **only your best 8 scores** on these quizzes will be counted toward your grade; if you miss a quiz, it will be one of the quiz grades that are dropped when the quiz average is calculated. The quizzes will consist of simple questions based on the material discussed during lecture. The purpose of the quizzes is to encourage students to attend class every day and to pay careful attention during class.

Homework: Homework assignments will be posted periodically on the course web page and will be due on the specified date given. Certain problems will be graded on effort and correctness (1 point for making a decent effort at the problem, 1 point for a correct (or very nearly correct) solution). Other problems will be graded on effort (1 point for making a decent effort at the problem) and not for correctness, but you should try to understand how to solve all these problems before test time!

You must write your homework solutions NEATLY. You must present your solutions in the order that the problems are assigned. Handwritten solutions are fine, but if you type solutions, you should use either LaTeX or MS Word's Equation Editor, since other word processors (like Word without Equation Editor) are not designed for mathematical typing.

Each student's homework must be done independently. You may ask each other informal questions about the homework, but everyone is to do his/her own work. If homework is found to be copied, all students involved will receive a 0. Of course, you may always ask me questions about the homework. [To be clearer, students can ask each other informal ORAL questions about homework, but **cannot look at or copy each other's homework papers**. All submitted homework must be their own work.]

Project: STAT 513 is defined as an Integrative Course. As such, it includes a component that integrates broad ideas underlying the statistics major as well as themes contained in the Carolina Core. This component will be a required data analysis project involving data collection, computer analysis, and a written summary report. Information will be given out separately about the project, but it will be due near the end of the semester.

Course Notes: Some pdf files with the (incomplete) notes I will be following in class are available on the course web page. It is recommended (though not required) that you print these notes out ahead of time and bring them to class where you can fill in the blank parts.

Graduate Students: Any students enrolling in the course for graduate credit must do a short graduate project that will count for 3% of their course grade (with other grade components being rescaled proportionally). Any graduate students should please see me for details.

Grading: The course grade will be based on quiz average (3%), homework average (13%), project (6%), the three midterm exams (18.5% each), and a comprehensive final exam (22.5%). The lowest midterm exam score may be replaced by the final exam score (if the final exam score is higher). The overall course average will result in the following grades: 90-100 = A, 87-89 = B+, 80-86 = B, 77-79 = C+, 70-76 = C, 67-69 = D+, 60-66 = D, 59 and below = F.

Course Schedule: MWF, August 22 through December 5, except:
No class (Labor Day): September 1 (Monday)
No class (Fall Break): October 24 (Friday)
No class (Thanksgiving Break): November 26, 28 (Wednesday, Friday)
Last day to withdraw without "WF" grade: October 9 (Thursday)
September 17: Exam 1
October 15: Exam 2
November 19: Exam 3
Saturday, Dec. 13 (9:00 a.m.): final exam