STAT 516, Statistical Methods II -- Spring 2016

Instructor:
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Course Web Page: http://people.stat.sc.edu/hitchcock/stat516.html
[also accessible via Blackboard]

Class Meeting Times: Mon-Wed-Fri 10:50 a.m. - 11:40 a.m., Davis College, Room 209

Office Hours: Mon-Tue-Wed-Fri 1:05-2:05 p.m.
Please feel free to make appointments to see me at other times.

Textbook: *Statistical Methods, Third Edition*, by Freund, Wilson and Mohr, 2010.

Purpose: To complete a basic two course sequence (in conjunction with STAT 515 or 509) in statistical techniques available to the general practitioner for analyzing experimental data. To introduce students in many different disciplines to multiple regression and analysis of variance for basic experimental designs. To provide students with the knowledge to implement and interpret these standard linear models.

Prerequisite: Grade of C or higher in STAT 515 or STAT 509 or equivalent.

Course Outline: Chapters 6 – 11 (and part of 13) of the Freund, Wilson & Mohr textbook. Topics covered include: Simple and multiple linear regression, analysis of variance for basic designs, multiple comparisons, random effects, and analysis of covariance. Statistical packages such as SAS and R.

Learning Outcomes: This course covers the background, implementation, and interpretation of general linear models, including simple and multiple linear regression and standard designs in analysis of variance, and analysis of covariance. Upon successful completion of this course, students should be able to:

- Choose the correct model for analyzing a given data set
- Interpret model equations and their estimates
- Check model assumptions and be able to implement standard transformations to adjust for violations
- Conduct and interpret appropriate hypothesis tests about models (including adjusting for multiple comparisons)

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 two in-class midterm exams and a final exam. 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.

Homework: Homework exercises from the textbook will be assigned on the course web page. Due dates will be given on the course web page. Late homework will be penalized.

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.]

Everyone is expected to do every problem. **Please write up homework papers neatly and clearly, and write your solutions in the order the problems are assigned!** Many problems on the exams will be similar to homework problems.

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 5% 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.

Grading: The course grade will be based on quizzes (5%), homework (16%), 2 midterm exams (26% each), and a final exam (27%). 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. **Those taking STAT 516 for graduate or honors credit** will do a small project involving the analysis of real data. For these students, this will count as 5% of their course grade, with the other components scaled proportionally.

Computing: Some problems in this course involve significant computations, and for these, we will learn to use the software package SAS. You will need to create a student account in **SAS OnDemand for Academics** in order to access (for free) SAS Studio or SAS Enterprise Guide. Instructions are given on the course web page. You will receive an enrollment link in an email from the course instructor.

It is not assumed that you have much previous experience with SAS. In many industries and jobs, SAS is the standard statistical computing package used, and this course will introduce you to some of the most common SAS procedures.

You also may use the free software R to do homework problems. This is available in the labs and also as a free download for your home computer (see course web page for details). Example code in SAS and R is given on the course web page.

Tentative Course Schedule: MWF, January 11 through April 25, except:
No class (MLK Day): January 18 (Monday)
No class (Spring Break): March 7, 9, 11 (Monday, Wednesday, Friday)

Friday, Feb. 19 (tentative): Exam 1
Friday, March 25 (tentative): Exam 2
Friday, April 29 - 9:00 a.m.: final exam

** Homework Due Dates will be posted on the course web page with each homework assignment.