STATISTICS 705 SYLLABUS
Data Analysis II Spring 2020

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MW 2:20-3:35 LC 201 777-5070
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Text *Applied Linear Statistical Models 5e* by Michael Kutner, Christopher Nachtsheim, John Neter and William Li. Softcover international versions of this text are available online and suitable for this course.

Disabilities If you qualify for accommodations because of a disability, please submit a letter to me from the Student Disability Resource Center in a timely manner so that your needs can be addressed. The Student Disability Resource Center determines accommodations based on documented disabilities. Contact: 777-6142, LeConte 112A; sadrc@mailbox.sc.edu; (`sc.edu/about/offices_and_divisions/student_disability_resource_center/`)

Learning Outcomes Students should be able to

- Analyze one and two-factor studies using established parametric test procedures
- Derive results for the matrix formulation of the general linear model
- Diagnose the validity of model assumptions in one-factor and two-factor studies and take appropriate corrective measures
- Analyze multi-factor data sets with randomization restrictions and random effects and prepare written and oral presentations on the analysis
- Derive appropriate test procedures for multi-factor data sets with randomization restrictions and random effects
- Analyze data for count data responses and binary responses using logistic regression and Poisson regression
- Analyze regression data using approaches other than linear models, including generalized additive models and nonlinear models

Attendance Though attendance is never a problem with graduate students, I would like to note that my policy corresponds to the policy stated in the student handbook: If you miss more than 10% of your classes (> 3 classes), the teacher may choose an appropriate penalty. I will deduct 2% from your final class average for each additional day that you miss after the third absence; excused and unexcused absences both count as absences.

Grading Grades will be weighted in the following way:

In-class exam	100 points
Homework/Classwork	100 points
Project	100 points
Final Exam	100 points
Total	400 points

The project can be undertaken with a partner (or partners) and will consist of a proposal, a final draft and oral presentation. I use the project to enhance (or reinforce) several skills you will need in your future (or current) career: written and oral communication, practical problem-solving and teamwork. The oral presentation should provide useful practice for professional presentations.

The exam administered during the semester and the final exams are in-class exams because exposure to in-class exams helps prepare students for the qualifying examination at the end of their first year.

You are encouraged to discuss homework and class assignments with your classmates and me, but all such assignments must be written independently. Do not copy any part of another student's work or computer code. Incidences of cheating and academic dishonesty will be punished to the full extent allowed under university regulations.

We will have "in-class" activities that will help in your development as a statistics professional. After each colloquium, we will discuss the colloquium topic (briefly–colloquia are often difficult for first-year students to understand). For portions of the course in which the text is exemplary, we will have lectures that emphasize active learning. Before some of our scheduled lectures, you will have thoroughly read the day's material, and have prepared and uploaded a write-up for an on-line assessment of the material (these assignments will be posted in Blackboard a week ahead of their due date). We will discuss the assignment at the start of class on the due date; grades will be based on preparation and participation. We will have activities that take place during class; these will be built into the lecture notes and range from quick responses to those that take more time and are more in the spirit of the work taking place in a flipped classroom.

Computing and Technology I will maintain a class web page that will be used to post lecture notes, homeworks, tests, and other course-related materials. The URL for the class web page is `people.stat.sc.edu/grego/courses/stat705`. All assignments will be posted on Blackboard (though assignment materials will be on the website). Grading will be entirely electronic and handled through Blackboard. I will use the computer/LCD projection system extensively in class for presentations and demonstrations of computer software.

We will be using two computer packages throughout the course. Proficiency with SAS is a course objective, and familiarity with R is a professional requirement. SAS is available through SAS On Demand (the course link is included in Blackboard under Course Documents), on office desktops, or for rent from USC (accessed via the Purchase Computer Software tab in Self Service Carolina). R can be downloaded for free at `https://cran.r-project.org` and supplemented with R Studio (`https://RStudio.com`). All code used in class will be available on the course webpage; extensive coding examples are available on previous instructors' websites (Profs. Ho, Hitchcock and Hanson) as well.

Date	Assignment/Topic	Graded Work
1/13	Ch 11. Robust and quantile regression	
1/15	Ch 11. Local regression and bootstrap	
1/20	No class (MLK service day)	
1/22	Ch 16. Single-factor studies	CE 1
1/27	Ch 16 and 17. Analysis of factor level means	CE 2
1/29	Ch 17.	HW 1
2/3	Ch 18. ANOVA diagnostics and remedial measures	CE 3
2/5	Ch 19. Two-factor studies	CE 4
2/10	Ch 19.	CE 5 (in class)
2/12	Ch 19.	HW 2
2/17	Ch 20 and 21. Randomized Complete Block Designs	
2/19	Ch 22. ANCOVA	CE 6
2/24	Ch 23 and 24. Unbalanced two-factor studies and multi-factor studies	
2/26	Ch 25 and 27. Simple random effects and mixed effects models	HW 3
3/2	Ch 27. Repeated measures within one factor	
3/4	Exam 1	
3/9	No classes (Spring Break)	
3/11	No classes (Spring Break)	
3/16	Ch 27.	
3/18	Contingency tables	CE 7
3/23	Contingency tables	
3/25	Logistic regression	HW 4
3/30	Logistic regression	Project Proposal due, CE 8
4/1	Logistic regression	CE 9
4/6	Poisson regression	HW 5
4/8	Poisson regression	CE 10 (in class)
4/13	Generalized linear mixed models	
4/15	Nonlinear models for continuous response	Project Draft due
4/20	Nonlinear models	CE 11
4/22	Basis expansions/Project Presentations	
4/27	Project presentations	

The final exam will be held on Monday, May 4 at 12:30 PM in Gambrell 003