

MATH 8050-001

Data Analysis

Fall 2016

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Lecture Hours: 2:30 - 3:45 pm, MW, M-204, Martin Hall

Prerequisites: Students are expected to have completed a course in introductory statistics and a course in introductory probability before enrolling in this course. Strictly speaking, linear algebra is not a prerequisite for this course, but we will make use of some results from the subject. If you are not familiar with elementary linear algebra (e.g., matrix algebra, determinants, linear dependence, etc.), it will be helpful for you to find some resources and start reviewing it now. I will give a brief overview of basic matrix operations, but there will be no time for an extensive review. You will need to put in some effort on your own.

Recommended Text: *Applied Linear Statistical Models*, 5th ed., by Michael Kutner, Christopher Nachtsheim, John Neter, and William Li. Other useful references include *Practical Regression and ANOVA Using R*, by Julian Faraway, and *Modern Applied Statistics with S*, by W. N. Venables and B. D. Ripley.

Additional Course Resources: Please check the course webpage on Blackboard often for supplementary course material.

Email Communication: I will use your Clemson email address as the primary mode of communication for sending class announcements, etc. You are responsible for messages sent to your Clemson email inbox. If you want sensitive information (e.g., an exam grade) via email, I will only respond to emails sent from your Clemson email (xxxx@clemson.edu or xxxx@g.clemson.edu), not Gmail, Yahoo, etc.

¹Email is my preferred mode of communication. It will probably be easier to get in touch with me that way.

Learning Outcomes: Upon successful completion of the course, a student should be able to:

- Demonstrate conceptual and procedural understanding behind fitting simple and multiple linear regression models
- Define an appropriate statistical model for a given basic data analysis problem, and be able to defend the model choice
- Perform model diagnostics and inference
- Perform statistical calculations using the statistical software package R (particularly the `lm()` function) and understand basic R output

Topics to be Covered: The (tentative) outline for the course includes the following topics: A brief review of random variables, probability/sampling distributions, single-sample and two-sample inference; simple/multiple linear regression; model diagnostics; multicollinearity; model selection; logistic regression and generalized linear models; additional selected topics if time permits.

Homework: Homework will be assigned periodically to be graded and returned to you in a timely manner. All assignments are to be handed in by 3:45 pm on the due dates. **NO LATE HOMEWORK WILL BE ACCEPTED UNDER ANY CIRCUMSTANCES.** To accommodate unusual circumstances that prevent the completion of homework, the lowest homework grade will be dropped from evaluation of the homework average.

Computer Instruction: I plan to occasionally give assignments that include the use of R, free software available at www.r-project.org. All computing assignments are expected to be completed in R and must be handed in with (1) the relevant output from the program, with your name and date included in the heading of it, and (2) the code you used in your program to get the results you handed in. Both the code and output are to be printed and handed in as you would any other homework assignment. Each student is responsible for typing and turning in *their own code*. **You can work together, but you must turn in your own code and your own output, with your name included on both.** I would suggest saving all of the code you write to a permanent location. In certain situations, you may be asked to provide your actual code (not the printed version) so it can be run for verification.

Exams: There will be two (2) in-class exams. **THERE WILL BE NO MAKE-UP EXAMS ALLOWED UNDER ANY CIRCUMSTANCES.** To accommodate unusual circumstances that prevent you from being present for an exam, the final exam will replace your lowest exam grade. If the final exam *is* your lowest grade, the other two exam scores will both count and the final exam score will be averaged in as the final exam component alone. The (tentative) dates for the two exams are:

- Wednesday, September 21
- Wednesday, October 26

Final Exam: The final exam will be given on **Thursday, December 8, 3:00 pm - 5:30 pm.**

Grade Evaluation: Your course grade will be evaluated according to the following weights: Homework average, 10%; Average of two exams, 60%; Final exam, 30%.

Attendance Policy: You are graduate students. I expect you to be mature enough to attend class without me forcing you to. If you must miss a day, you need not inform me ahead of time. **You are responsible for any material that is covered in your absence.** In accordance with university policy, “[i]f no advance arrangements are made, students are authorized to leave after a fifteen minute wait (on an absent instructor or substitute).”

Important Dates:

- Tuesday, August 23: End of add period
- Tuesday, August 30: End of drop period
- Friday, October 7: Midterm grades reported
- Friday, October 21: Withdrawal deadline
- Monday, November 7 - Tuesday, November 8: Fall break, no class
- Wednesday, November 23 - Friday, November 25: Thanksgiving break, no class
- Thursday, December 8, 3:00 pm - 5:30 pm: Final Exam

Academic Integrity Policy: “As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a ‘high seminary of learning.’ Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.” I take academic honesty very seriously and will pursue appropriate measures in instances of suspected cheating. “Cheating” includes, but is not limited to, (i) turning in work that someone else did for credit; e.g., turning in code that someone else wrote, output someone else generated, etc., (ii) plagiarism, and (iii) inappropriate contact or conduct during an exam; e.g., talking to other students or having extra resources with you that are not allowed.

Disability Access: Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly

encouraged – drop-ins will be seen if at all possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain, and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.

Clemson University Title IX (Sexual Harassment): Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information, or protected activity (e.g., opposition to prohibited discrimination or participation in any compliant process, etc.) in employment, educational programs and activities, admissions, and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Mr. Jerry Knighton is the Clemson University Title IX Coordinator. He is also the Director of Access and Equity. His office is located at 110 Holtzendorff Hall, 864-656-3184 (voice) or 864-565-0899 (TDD).

The course syllabus is a general plan for the course. Deviations that may be necessary will be announced to the class.