MATH 4/6020 - 001
Statistics for Science and Engineering II

Fall 2019

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Lecture Hours: 3:30 - 4:45 pm, TR, M-301, Martin Hall

Prerequisites: MATH 3020 (Statistics for Science and Engineering)

Recommended Text: *An Introduction to Statistical Learning with Applications in R*, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani

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

Email Communication: I will use your Clemson email address as the primary mode of communication for sending class announcements (via Canvas). 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.

[1]Email 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 understanding of simple and multiple linear regression
- Be able to explain logistic regression and discriminant analysis, including their use in classification problems
- Demonstrate conceptual understanding of cross-validation and the bootstrap
- Demonstrate conceptual understanding the role of regularization and dimension reduction for high-dimensional data
- Demonstrate conceptual understanding of non-linear and nonparametric regression methods
- Be able to implement the above ideas on real datasets using the `R` programming language

Topics to be Covered: The (tentative) outline for the course includes the following topics: An overview of statistical learning; simple and multiple linear regression; classification; cross-validation; the bootstrap; model selection; regularized regression; the `R` statistical programming language. 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 at 4:45 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.

In-Class Labs: Occasionally, I may give a lab assignment to be completed and turned in during class. If you are absent that day, **YOU MAY NOT COMPLETE THE ASSIGNMENT FOR CREDIT AT A LATER DATE**. To accommodate absences and unusual circumstances, the lowest in-class assignment grade will be dropped from evaluation of the in-class average.

E-Learning Day: Due to a home football game, there will be **no class on Thursday, August 29**. Regardless, this will still count as a class day for us. An assignment will be made available on Canvas that day. That assignment is to be turned in and treated as a homework grade.

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. You may be asked to provide your actual code (not the printed version) so it can be run for verification.

Exams: There will be three (3) 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 three exam scores will all count and the final exam score will be averaged in as the final exam component alone. For those of you enrolled in MATH 4020, every exam will contain at least one "bonus" problem that can be used for extra credit. **These problems are mandatory if you are enrolled in MATH 6020**. The (tentative) dates for the three exams are:

- Tuesday, September 17
- Tuesday, October 10
- Tuesday, November 12

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless the instructor contacts students. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

Final Project: Rather than a final exam, you will be asked to complete a final project to count as your final exam grade in the course. Details will be provided at a later date. Materials for this project will be due on **Friday, December 13 at 2:00 pm**

Grade Evaluation: Your course grade will be evaluated according to the following weights: In-class lab average, 5%; Homework average, 15%; Average of three exams, 55%; Final project, 25%. Letter grades are determined as follows:

A: ≥ 90
B: $80 - 89$
C: $70 - 79$
D: $60 - 69$
F: < 60

Note:

- Decimals are rounded in the usual manner; e.g. an 89.5 gets rounded up to a 90, but 89.43 is rounded down to an 89.

Attendance Policy: I have no particular attendance policy. 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**. I plan to give in-class assignments from time to time, however. If you miss one, you will receive a zero for that assignment. **These cannot be made-up at a later date** (see In-Class Labs above). In accordance with university policy, if 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 27: Last day to add a class
- Thursday, August 29: E-Learning Day (no class)
- Tuesday, September 3: Last day to drop a class
- Monday, October 14 - Tuesday, October 15: Fall break, no class
- Friday, October 12: Midterm grades reported
- Tuesday, October 29: Withdrawal deadline
- Wednesday, November 27 - Friday, November 29: Thanksgiving break, no class
- Friday, December 6: Last day of classes
- Friday, December 13, 2:00 pm: Final projects due

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, (ii) plagiarism, and (iii) inappropriate contact or conduct during an exam; e.g., communicating with other students or having extra resources with you that are not allowed.

Accessibility: 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 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/`. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864-656-3181 (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.