

# MATH 8020-001

## General Linear Hypothesis II

Spring 2017

**Instructor:** Dr. Andrew Brown

**Office:** O-309, Martin Hall

**Office Phone:** (864) 656-1716<sup>1</sup>

**Office Hours:** Wednesdays, 3:30 pm - 4:30 pm, or by appointment

**Email:** ab7@g.clemson.edu

**Lecture Hours:** 1:25 pm - 2:15 pm, MWF, E-004, Martin Hall

**Prerequisites:** MATH 8010 or consent of the instructor.

**Required Text:** *Linear Models in Statistics*, 2<sup>nd</sup> ed., by Alvin Rencher and Bruce Schaalje.

**(Potentially) Useful References:** *Linear Statistical Models*, 2e, by Stapleton; *Linear Algebra and its Applications*, by Strang; *Plane Answers to Complex Questions*, by Christensen; *Theory and Application of the Linear Model*, by Graybill; *Bayesian Data Analysis*, 3e, by Gelman et al.; *Bayesian Methods for Data Analysis*, 3e, by Carlin and Louis; *Categorical Data Analysis*, 2e, by Agresti; *Applied Longitudinal Analysis*, by Fitzmaurice, Laird, and Ware.

**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.

---

<sup>1</sup>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 competency with multivariate normal regression
- Demonstrate competency with the non-full rank linear model
- Demonstrate competency with the basics of the Bayesian linear model
- Know the differences between a fixed-effects model, random-effects model, and mixed model
- Demonstrate competency with basic analysis of categorical data

**Topics to be Covered:** This course is a direct continuation of MATH 8010. The (tentative) outline for the course includes the following topics: Random- $x$  regression; the non-full rank case of the general linear model (e.g., ANOVA models), including estimability, testability, and sums of squares; the Bayesian linear model; linear mixed models; analysis of categorical data.

**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 2:15 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.

**Exams:** There will be no exams in this course.

**Final Exam:** There will be no final exam. Instead, you will be asked to complete a final project in the form of a research paper or presentation. Details to be given later in the course.

**Grade Evaluation:** Your course grade will be evaluated according to the following weights: Homework average, 30%; Class participation, 40%; Final project, 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:**

- Monday, January 16: MLK holiday, no class.
- Wednesday, January 18: Add deadline
- Wednesday, January 25: Drop deadline
- Friday, March 3: Midterm grades due
- Friday, March 17: Withdrawal deadline

- Monday, March 20 - Friday, March 24: Spring break, no class

**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](mailto: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.**