STAT 714 fa 2023 Linear Statistical Models

Time/place:	10:05 – 11:20 TR, LeConte College 205
Instructor:	Karl Gregory
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Required textbook

The course will focus on the material covered in the book:

Monahan, J. (2008). *A Primer on Linear Models*. CRC Press.

I will post my lecture slides at the course website.

Pre-requisites

The required pre-requisite courses are either STAT 513 and MATH 544 or STAT 712 or an equivalent course.

Topics covered

We will spend about 4 weeks reviewing linear algebra, covering (i) vectors and matrices, the matrix inverse, (ii) characterizing solutions to systems of linear equations, (iii) column space, null space, and rank of a matrix, (iv) projections and least-squares, (v) eigenvalues and eigenvectors, and (vi) symmetric matrices and quadratic forms.

Then, following the Monahan book, we will study these topics:

1. The linear least squares problem

2. Estimability and least squares estimators

3. The Gauss–Markov model

4. Distributional theory

5. Statistical inference

6. Variance components and mixed models

Grading

There will be homework, quizzes, two midterm exams, and a final exam:

- Homework (10%): There will be a homework assignment every couple of weeks.

- Quizzes (10%): There will be a pop quiz at the beginning of class on some days. There will be around 8 quizzes throughout the semester. I will not offer make-up quizzes, but will drop the lowest 2 quiz grades.

- Two midterm exams (25% each): These will be on *Tuesday, Oct 17th* and on *Tuesday, Nov 21st*.

- Final exam (30%): This is on *Tuesday, Dec 12th, at 9:00 am.*

The final exam score, if it exceeds the lower of the first two exam scores, will replace the lower score. The thresholds 90%, 87%, 80%, 77%, 70%, 67%, and 60% will be used to determine the assignment of the letter grades A, B+, B, C+, C, D+, and D, respectively. The grade of F will be assigned to those earning less than 60%.

Honor code

See the Carolinian Creed in the Carolina Community: Student Handbook & Policy Guide. Violations of the USC Honor Code may result in a 0 for the work in question, and, in accordance with University policy, other punishments up to and including expulsion from the University.