Instructor: Joshua M. Tebbs
Course: Mathematical Statistics I
Class Time/Place: 1:10-2:00pm MWF in LeConte 107
Office: LeConte 217
Office hours: 12:00-1:00pm MWF (I also have an "open door" policy)
email: `tebbs@stat.sc.edu`
www: `http://people.stat.sc.edu/tebbs/`

Required Textbook:

- Casella, G. and Berger, R. (2002). *Statistical Inference*, Second Edition. Duxbury.

Course overview: This is the first semester of a two-semester sequence in mathematical statistics, taught at the graduate level. A mastery of calculus is assumed and higher level mathematics courses (e.g., real analysis, etc.) will aid in your understanding. This is a theoretical course, with an emphasis on writing proofs and derivations. We will cover most of the material in Chapters 1-5 from Casella and Berger. In particular, we will discuss

- Probability (Chapter 1). Axiomatic foundation of probability, conditional probability, random variables, distribution and density/mass functions.
- Transformations/Expectations (Chapter 2). Functions of random variables, expectation, moment generating functions.
- Common Distributions (Chapter 3). Discrete and continuous distributions, exponential families, location-scale families, inequalities.
- Multivariate Distributions (Chapter 4). Joint, marginal, and conditional distributions, independence, transformations, hierarchical models, covariance and correlation.
- Sampling Distributions (Chapter 5). Distributions of sums of random variables, Central Limit Theorem, t and F distributions, order statistics, stochastic convergence.

Homework: I will give numerous homework assignments throughout the semester. In addition to the homework, I encourage you to work out solutions to other problems in the text and the "extra problems" on the course web site. This is the best way to learn the material and much can be learned by doing (or at least reading) extra problems. I strongly discourage the use of generative AI tools (e.g., ChatGPT, etc.) when working on assignments.

Exams: We will have a 50-minute midterm exam after we complete each chapter (Chapters 1-4). Each exam will be on the first Monday after completing the chapter in class. We will have a cumulative final examination on Wednesday, December 9 at 12:30pm. All of my exams are closed-book and closed-notes. Please note that I do not give make-up examinations.

Grade Breakdown: Your course grade will be determined by your performance on the four midterms (10 percent each), the homework (10 percent) and the final exam (50 percent). Final course grades will be assigned according to a 90-80-70-60 scale.