Instructor: Joshua M. Tebbs, Professor, Department of Statistics
Prerequisite: MATH/STAT 511 with a grade of C or higher
Class Time: 9:40-10:30am MWF in LeConte 103
Office: 217 LeConte (tel: 803-576-8765)
Office Hours: 8:45-9:30am and 10:45-11:30am MWF; open-door policy all other times
email: `tebbs@stat.sc.edu`
url: `http://people.stat.sc.edu/tebbs/`

TA: TBD (email: `tbd@email.sc.edu`)

Required Course Material:

- Wackerly, D., Mendenhall, W., and Scheaffer, R. *Mathematical Statistics with Applications*, 7th edition. Copyright 2008, Duxbury.

Course Information: This course is a continuation of MATH/STAT 511 and introduces you to topics in mathematical statistics. From Wackerly, Mendenhall, and Scheaffer (WMS), we will cover the following chapters:

- Functions of Random Variables (Chapter 6): Method of distribution functions, transformations, method of moment generating functions, order statistics.
- Sampling Distributions and the Central Limit Theorem (Chapter 7): Statistics, sampling distributions, t and F distributions, Central Limit Theorem.
- Estimation (Chapter 8): Bias, mean-squared error, standard error, confidence intervals for one and two population parameters, sample size determination.
- Properties of Point Estimators and Methods of Estimation (Chapter 9): Relative efficiency, sufficiency, Rao-Blackwell, uniformly minimum variance unbiased estimators, method of moments, maximum likelihood estimation, asymptotic considerations.

We will focus on both theory and application in this course. You will be expected to derive theoretical results using algebra and calculus and apply these results to problems in different applications.

Note: This course is important for those of you considering careers in actuarial science. Exam P (Probability) essentially consists of Chapters 2-7 from WMS. Recall we covered Chapters 2-5 in MATH/STAT 511. The material covered in Chapters 8-9 (and in STAT 513) will be helpful for later actuarial examinations.

Homework Assignments: There will be 10 homework assignments during the semester. The problems assigned will come from WMS, and I will post solutions on the course web page.

Exam Schedule: We will have two midterms: one after Chapter 6 and one after Chapters 7-8. Specific exam dates will be announced in class as we near completing these chapters. A cumulative final examination will be on Friday, April 26 at 9:00am.

Grade Breakdown: Your course grade will be determined by your performance on homework (30 percent), the midterm exams (30 percent; 15 percent each) and the final exam (40 percent). Final course grades will be assigned according to a 90-80-70-60 schedule. Plus grades of B+, C+, and D+ may be assigned near the borders.

Additional comments:

- Mathematical courses like STAT 512 can be challenging, and very few students are able to master the material without keeping up on a regular basis. My homework assignments, which are long and time-consuming, are designed to keep you working while exposing you to different types of questions you might see in the future (e.g., my exams, actuarial exams, other courses, etc.).

- In this course, many students are overwhelmed by the amount of algebra and calculus that is performed in lectures, homework problems, and examinations. It is strongly recommended that you review calculus concepts such as real functions, limits, graphical methods, differentiation, integration, sequences and series, exponential and logarithmic functions, partial derivatives, multiple integrals, etc. **This is a course that introduces you to statistics from a mathematical point of view.** If your algebra and calculus skills are rusty, then you will have problems learning the material, and you will likely do poorly in this class.

- Working together on homework problems is permitted and encouraged. However, each student should write up his/her solutions independently of others (this will help greatly). Naturally, cheating on exams is an extremely serious offense and will be dealt with in the harshest possible way.

- Students with documented disabilities who need special accommodations with exams or other aspects of the course should contact the Student Disability Resource Center (Close-Hipp, 102; ph: 803-777-6142).

Computing: We will use R. It is OK if you do not know R (or have never heard of it), because you will learn by example. The R package is available for free at `www.r-project.org`; the latest version is R 4.3.2 (2022-10-31, Eye Holes). The "An Introduction to R" manual available at this site (on the left, under "Manuals") is an excellent resource.