Instructor: Joshua M. Tebbs, Professor, Department of Statistics  
Prerequisite: MATH 241 (or concurrent enrollment)  
Class Time: 8:30-9:45 TTh in 210 LeConte  
Office: 215C LeConte (tel: 803-576-8765)  
Office Hours: 10:00-11:30 TTh  
email: tebbs@stat.sc.edu  
url: http://people.stat.sc.edu/tebbs/  

Required Course Material:  


**Course Information:** This course will give you an introduction to probability and distribution theory. The material serves as a basis for STAT 512 and STAT 513 and is also useful and fascinating in its own right. STAT 511 (MATH 511) has a prerequisite of multivariate calculus, and a strong mastery of differentiation, integration, series/sequences, and related facts is necessary. From Wackerly, Mendenhall, and Scheaffer (WMS), we will cover the following chapters:

- **Probability (Chapter 2):** Set theory, probability axioms, probability rules, counting techniques, conditional probability, Bayes’ rule.
- **Discrete Distributions (Chapter 3):** Random variables, probability mass functions, mathematical expectation, moment-generating functions, named discrete distributions (e.g., binomial, geometric, Poisson, etc.).
- **Continuous Distributions (Chapter 4):** Random variables, probability density functions, cumulative distribution functions, mathematical expectation, moment-generating functions, named continuous distributions (e.g., exponential, normal, beta, etc.), Chebyshev’s Theorem, mixture distributions.
- **Multivariate Distributions (Chapter 5):** Random vectors, joint, marginal, and conditional distributions, conditional expectation, bivariate normal distribution, multinomial distribution, covariance and correlation.

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.

**Homework Assignments:** There will be 12 homework assignments during the semester. Homework should be written up neatly and stapled. The homework assignments are an important component of this course. Each will count towards your final grade. Late homework will not be accepted.
Quizzes/Extra Problems: I may periodically give in-class quizzes or take-home problems. Take-home problems are due the next class meeting after they are assigned. Quiz and take-home points will count towards your homework grade (often as extra credit, but not necessarily).

Exam Schedule: We will have in-class midterm examinations on Tuesday, October 2 and Tuesday, November 13. A cumulative final examination will be on Tuesday, December 11, at 9:00am. All of my exams are closed-book and closed-notes (and I do not allow formula sheets). Please also note that I do not give make-up examinations unless your absence is due to a university function, you have given me appropriate documentation, and you have discussed it with me at least one week in advance.

Grade Breakdown: Your course grade will be determined by your performance on homework (30 percent), the midterms (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.

Additional comments:

- Mathematical courses like STAT/MATH 511 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 probability 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 Office of Student Disability Services (ph: 803-777-6142). All examinations given through this office will run concurrently with the dates/times listed above.

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 3.5.1 (2018-07-02, Feather Spray). The “An Introduction to R” manual available at this site (on the left, under “Manuals”) is an excellent resource.