Required Course Material:


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.

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. In Chapter 9, I may decide to include additional material on Bayesian estimation from Chapter 16 (WMS) if time permits.

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 10-12 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 a midterm exam on Thursday, March 7 during class time or a midterm exam that is due on this date, depending on whether the exam is “in-class” or “take-home,” respectively. A cumulative in-class final examination will be on Tuesday, May 7, at 12:30pm. All in-class exams, including the final, 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 midterm (20 percent), and the final exam (50 percent). Final course grades will be assigned according to a 90-80-70-60 schedule.

**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 Office of Student Disability Services (tel: 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](http://www.r-project.org); the latest version is R 3.5.2 (2018-12-20, Eggshell Igloo). The “An Introduction to R” manual available at this site (on the left, under “Manuals”) is an excellent resource.