MATH 4000/6000 - 001
Theory of Probability

Fall 2014

Instructor: Dr. Andrew Brown
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Office Hours: Wednesdays 3:00 pm - 4:00 pm, or by appointment
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Lecture Hours: 1:25 - 2:15, MWF, M-103, Martin Hall

Prerequisites: MATH 2060 (Multivariate Calculus), or equivalent. This is a theoretical course. As such, it involves proof writing and some set theory. There will be no time in class for an in-depth exposition of these ideas. If you are not comfortable with this, I would suggest taking some time to teach yourself a little about proof writing (logic, mathematical induction, etc.) and set theory. A textbook I have found helpful for this is *A Transition to Advanced Mathematics*, by Douglas Smith, Maurice Eggen, and Richard St. Andre.

Required Text: *A First Course in Probability*, 8^{th} (or 9^{th}) ed., by Sheldon Ross

Additional Course Resources: Please check the course webpage on Blackboard often for supplementary course material.

Email Communication: I will use your Clemson email address as the primary mode of communication for sending class announcements, etc. You are responsible for messages sent to your Clemson email inbox. If you want sensitive information (e.g. an exam grade) via email, I will only respond to emails sent from your Clemson email (xxxx@clemson.edu or xxxx@g.clemson.edu), not Gmail, Yahoo, etc.

Learning Outcomes: Upon successful completion of the course, a student should be able to:

- Count possible outcomes in certain experiments, especially as it pertains to calculating probabilities involving equally likely outcomes
- Use axioms of probability to establish properties of probability functions
- Calculate and subsequently use conditional probabilities and conditional distributions
- Recognize common discrete and continuous distributions along with some of their properties and appropriate applications
- Work comfortably with random variables, both in a univariate setting as well as in joint distributions
- Demonstrate knowledge of expectations and conditional expectations along with their use

Topics to be Covered: The (tentative) outline for the course includes the following topics: Counting principles; axioms of probability; conditional probability; discrete/continuous random variables; discrete/continuous probability distributions; joint distributions and independence; properties of expectation; limit theorems and laws of large numbers.

Homework: Homework will be assigned periodically to be graded and returned to you in a timely manner. All assignments are to be handed in at 2:15 on the due dates. **NO LATE HOMEWORK WILL BE ACCEPTED UNDER ANY CIRCUMSTANCES**. To accommodate unusual circumstances that prevent the completion of homework, the lowest homework grade will be dropped from evaluation of the homework average.

In-Class Assignments: Occasionally, I may assign a problem to be completed and turned in during class. If you are absent that day, **YOU MAY NOT COMPLETE THE ASSIGNMENT FOR CREDIT AT A LATER DATE**. To accommodate absences and unusual circumstances, the lowest in-class assignment grade will be dropped from evaluation of the in-class average.

Exams: There will be three (3) in-class exams. **THERE WILL BE NO MAKE-UP EXAMS ALLOWED UNDER ANY CIRCUMSTANCES.** To accommodate unusual circumstances that prevent you from being present for an exam, the final exam will replace your lowest exam grade. If the final exam *is* your lowest grade, the other three exam scores will all count and the final exam score will be averaged in as the final exam component alone. For those of you enrolled in MATH 4000, every exam will contain at least one "bonus" problem that can be used for extra credit. **These problems are mandatory if you are enrolled in MATH 6000**. The (tentative) dates for the three exams are:

- Wednesday, September 17
- Wednesday, October 15
- Wednesday, November 12

Final Exam: The final exam will be given on **Friday, December 12, 3:00 pm - 5:30 pm**.

Grade Evaluation: Your course grade will be evaluated according to the following weights: In-class assignment average, 5%; Homework average, 15%; Average of three exams, 55%; Final exam, 25%. Letter grades are determined as follows:

A: ≥ 90
B: $80 - 89$
C: $70 - 79$
D: $60 - 69$
F: < 60

Notes:

- If a student has a course average greater than or equal to 93 going into the final, they may exempt the final exam and receive an A in the course.
- Decimals are rounded in the usual manner; e.g. an 89.5 gets rounded up to a 90, but 89.43 is rounded down to an 89.

Attendance Policy: I have no particular attendance policy. I expect you to be mature enough to attend class without me forcing you to. If you must miss a day, you need not inform me ahead of time. **You are responsible for any material that is covered in your absence**. I plan to give in-class assignments from time to time, however. If you miss one, you will receive a zero for that assignment. **These cannot be made-up at a later date** (see In-Class Assignments above). In accordance with university policy, "[i]f no advance arrangements are made, students are authorized to leave after a fifteen minute wait (on an absent instructor or substitute)."

Important Dates:

- Tuesday, August 26: Last day to add a class
- Tuesday, September 2: Last day to drop a class
- Friday, October 10: Midterm grades reported
- Friday, October 24: Withdrawal deadline
- Monday, November 3 - Tuesday, November 4: Fall break, no class
- Wednesday, November 26 - Friday, November 28: Thanksgiving break, no class
- Friday, December 5: Last day of class
- Friday, December 12, 3:00 pm - 5:30 pm: Final Exam

Academic Integrity Policy: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form." I take academic honesty very seriously and will pursue appropriate measures in instances of suspected cheating. "Cheating" includes, but is not limited to, (i) turning in work that someone else did for credit, e.g. turning in code that someone else wrote, output someone else generated, etc., (ii) plagiarism, and (iii) inappropriate contact or conduct during an exam, e.g. talking to other students or having extra resources with you that are explicitly not allowed.

Disability Access: Students with disabilities who need accommodations should make an appointment with Dr. Arlene Stewart, Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Student Disability Services is located in Suite 239, Academic Success Building (656-6848, `sds-l@clemson.edu`). Please be aware that accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.

Clemson University Title IX (Sexual Harassment): Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any compliant process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at `http://www.clemson.edu/campus-life/campus-services/access/title-ix/`. Mr. Jerry Knighton is the Clemson University Title IX Coordinator. He is also the Director of Access and Equity. His office is located at 111 Holtzendorff Hall, 864-656-3181 (voice) or 864-565-0899 (TDD).

The course syllabus is a general plan for the course. Deviations that may be necessary will be announced to the class.