

Syllabus
MATH 4000/6000: Theory of Probability
Fall 2019, Section 001

Instructor: Brian H. Fralix

Instructor's Office: Martin O-310

Telephone Number and Email Address: (864) 656-5197, bfralix@clemson.edu

Office Hours: 3:30PM - 4:30PM Monday through Thursday, and by appointment.

Course Location and Meeting Time: Martin M-103, 2:30PM - 3:20PM MWF

Course Website: <http://bfralix.people.clemson.edu/math4000.htm>

Textbook: *Introduction to Probability*, Second Edition, by J.K. Blitzstein and J. Hwang.

Note that the Second Edition of Blitzstein and Hwang's text is available online at <https://projects.iq.harvard.edu/stat110/home>.

Blitzstein and Hwang's textbook will be the main textbook for the course, but I will also make use of material and questions from the text *Probability with Applications in Engineering, Science, and Technology*, Second Edition, by M.A. Carlton and J.L. Devore.

Note too that Carlton and Devore's text is accessible online through Clemson University Libraries: just search the catalog online at <https://libraries.clemson.edu> as you would for any other text.

Prerequisites: MATH 2060 (Calculus of Several Variables), or consent of instructor

Attendance Policy: I will keep a record of your attendance, but your attendance record will not affect your final grade in the course. Please keep in mind though that you will most likely need to attend lectures in order to ensure you properly understand the material. *It is extremely important that you do not fall behind!* If you start to feel as though you are falling behind, see me as soon as possible and I will do my best to help you get up to speed on the material. Like all other courses in mathematics, the best way to study for this course is to devote a small amount of time each day to the course (around an hour or two): cramming one day or two before each test is not a successful strategy with regards to achieving long-term understanding of the material.

Late Instructor: If the instructor is late, students should wait 15 minutes before leaving.

Course Description: (*From the Undergraduate Announcements*) "Principal topics include combinatorial theory, probability axioms, random variables, expected values, special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem."

I plan to cover the majority of Chapters 1-5, Chapter 7, and parts of Chapter 8 of Blitzstein and Hwang.

Goals and Objectives: Upon completion of the course, students will be able to do the following:

- Use simple counting arguments to calculate probabilities of events within a sample space having outcomes that are equally likely to occur.

- Use the Axioms of Probability to calculate probabilities of events from probabilities of simple events.
- Understand how to interpret the concepts of conditional probability and independence, and how to use them in calculations.
- Understand the role that random variables play in probability theory, as well as how to make use of objects associated with random variables (like cumulative distribution functions, probability mass functions, probability density functions) in calculations.
- Know when it is useful to use well-known random variables (e.g. Bernoulli, Binomial, Poisson, Hypergeometric, Uniform, Exponential, Gamma, Normal) to model random phenomena.
- Use joint distributions to model possible interactions between multiple random variables.
- Use the ideas of expected value, variance, covariance, and other moments to gain a rough understanding of the behavior of various types of random variables.

Grading Policy: There will be three in-class tests (each worth 15% of your grade), along with the final exam (worth 35%, and is cumulative), which will also be taken in-class. Homeworks will also be assigned periodically throughout the semester, and these will account for the remaining 20% of your grade.

Your end-of-semester grades will be assigned according to the following scale: $[90, 100] \rightarrow A$, $[80, 90) \rightarrow B$, $[70, 80) \rightarrow C$, $[60, 70) \rightarrow D$, and $[0, 60) \rightarrow F$. The instructor has the right to curve grades upward, i.e. a score of 90 represents *at least* an A, a score of 80 represents *at least* a B, etc..

Homework: Homework assignments will be announced in class, and posted on the course web site. Based on past experience with teaching this course, I suspect you should have about ten homework assignments for the semester.

Test Dates: Test 1 will be held on Friday, September 20; Test 2 will be held on Wednesday, October 23; Test 3 will be held on Friday, November 22. The Final Exam will take place on Thursday, December 12 from 3:00PM - 5:30PM.

MATH 6000 Students: Students enrolled in MATH 6000 will have extra questions on each homework assignment, as well as tests/exams that are different from the tests/exams taken by the MATH 4000 students.

Official Statement of Academic Integrity: (*From the Undergraduate Announcements*) “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.”

Disability Access Statement: “Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities,

course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the students responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>."

Clemson University Title IX Statement: "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, veterans status, genetic information or protected activity 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/>.

Ms. Alesia Smith is the Clemson University Title IX Coordinator and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).