Math 328 Probability Syllabus
Agnes Scott College, Spring 2021
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The class is hybrid, in person and through Canvas and Zoom. If you have any technology issues (wifi, Zoom, Canvas, etc.), just let me know and we'll figure out something that will work for you.

All times are Atlanta (US Eastern) time zone.

Office hours: Mon 2:00-3:00, Tues 10:00-11:00, and by appointment. On Zoom - links on Canvas.

Required material: The textbook is Tijms, *Understanding Probability*, Cambridge University Press, 3rd Edition, ISBN 978-1107658561.

Class structure: (Details and links on Canvas.) The class will meet in-person and also be live on Zoom; you can choose which works best for you. (Zoom class meetings will be recorded and posted on Canvas. To preserve the integrity of the classroom experience and to protect students' privacy, which we are legally required to do, only students registered in the course may attend a Zoom class meeting.) There will also be online discussion on Canvas - each week, you are required to post at least one comment, and respond to another student's comment.

Plan: We'll cover most of chapters 1-10. Topics include foundations of probability theory, conditional probability, discrete and continuous random variables, the law of large numbers and the central limit theorem, important distributions, and applications. There's a more detailed schedule below, but it's subject to change.

Homework: By now you've probably figured out that working problems is mostly how you learn math. There will be homework assigned nearly every week, due at midnight on Wednesdays. I strongly encourage you to work in groups, but you must make sure that you understand the problem completely yourself before submitting your answer. You will turn in some of each assignment on Webwork, which you can access through Canvas. You can submit answers as many times as necessary on Webwork (up to the due date), so I expect that you'll get 100% on each assignment. Some of the assignments you do not need to turn in, but you are responsible for the material - completing only the Webwork assignments is not enough for you to learn the material. This is a 4-credit course. In addition to in-class time, you will be spending time outside of class on various activities. The first and most important activity is to regularly read the text and to work through and understand the examples in each section. You should try to spend time on this every day.

Projects: There will be no exams (midterm or final). Instead, you will complete 4 group (2-3 people) projects. Each project will consist of a paper and a recorded video presentation. You'll turn in a draft of the paper in advance and I'll give you feedback to be incorporated into your paper and presentation. There will be information about each project on Canvas.

Honor code and group work: All students are expected to follow the honor code throughout the semester; all exams and assignments should be pledged.
I strongly encourage you to work on the homework in groups. I suggest that you work on the problems by yourself first, making a note of anything giving you trouble; then meet with your group and work through the remaining problems together; and finally submit the solutions by yourself. Every group member must submit her own solutions independently; just copying the group's answers is plagiarism and is unacceptable.

Getting help: Chances are that sooner or later you'll get stuck on something, so don't get frustrated. Think hard, and if you're still stuck, do something else for a while. (It's amazing how often that works.)
My office hours are above - these are times when I'm guaranteed to be sitting around on Zoom waiting to talk to someone. If you want to see me at other times, please let me know and we'll find a time.
Finally, I can't emphasize enough that your classmates are your best source of help.

Course goals:
Learn to solve basic combinatorics and probability problems
Develop the ability to describe random events using probability density functions and cumulative distribution functions, and to compute probabilities associated with these events.
Be able to work with random variables.
Be able to work with the properties and applications of the basic distribution functions.
Develop the mathematical foundation for statistical estimation and hypothesis testing.
Learn to communicate mathematics effectively, both orally and in writing.
Develop skills in problem analysis and problem solving.
Interpret real-world problems in the language of mathematics.

Assessment: Homework 30%, weekly discussion participation 10%, each project 15% (3% draft, 7% paper, 5% presentation).

Late work: Late work won't be accepted, and you won't be allowed to make up missed exams, except under very exceptional circumstances (e.g., the sasquatch attacks - and even then you should get a note from the sasquatch). In the case of a conflict that you absolutely can't resolve (for example, a religious holiday), you may arrange to take a midterm exam early.

Attendance and participation: I expect you to be at every class meeting, either in person or on Zoom, on time, unless you've talked to me about having to be absent for technological or other reasons. However, tardiness or absence will have no (direct) effect on your grade. Participation in the weekly discussions on Canvas is required.

Course evaluation: Your feedback on the course is extremely valuable to me, the math department, and the administration. In particular, I take your comments very seriously and use them to improve the course the next time I teach it. You are responsible for completing an evaluation of the course at the end of the semester.

Title IX: For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, 404-471-6547) or Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435).

Inclusion: This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's decisions about gender expression and identity. Please let me know your preferred name or gender pronoun if different from the class roster. The Gay Johnson McDougall Center for Global Diversity and Inclusion is centered and grounded in dismantling systems of oppression, including structural and systemic racism, as well as empowering each individual to take action that uplifts and builds community. Students can contact them at diversity@agnesscott.edu or 404.471.6118.

ADA: Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

Date	Topic
Wed 1/20	1 Introduction
Fri 1/22	2.1 (optional: 2.1.3) Law of Large Numbers, 2.2 Basic concepts
Mon 1/25	More 2.2, 2.3 Expected value
Wed 1/27	2.4 Drunkard's walk, 2.9 Simulation
Fri 1/29	Catch up, examples
Mon 2/1	7.1 Axioms (opt.: 7.1.2), 7.2 Compound experiments (opt.: 7.2.1)
Wed 2/3	More 7.2, 7.3 Basic rules
Fri 2/5	**No class meeting - work on project #1**
Mon 2/8	3.1 Birthday problem
Wed 2/10	3.2 Coupon collector problem
Fri 2/12	3.7 Draft lottery
Mon 2/15	Catch up, examples
Wed 2/17	4.1 Binomial distribution
Fri 2/19	4.2 Poisson distribution (opt.: 4.2.4)
Mon 2/22	4.3 Hypergeometric distribution
Wed 2/24	**No class meeting - work on project #2**
Fri 2/26	5.1 Normal distribution
Mon 3/1	5.2 (opt.: 5.2.4) Variance and standard deviation
Wed 3/3	5.3 Sums, 5.4, 5.5 Central Limit Theorem
Fri 3/5	5.6 Statistics, 5.7 Confidence intervals
Mon 3/8 - Tues 3/16	**Journeys/Peak Week/Spring Break**
Wed 3/17	Catch up, examples
Fri 3/19	6.1 Conditional probability, Monty Hall
Mon 3/22	6.2 Bayes' Rule
Wed 3/24	8.1 Conditional probability

Date	Topic
Fri 3/26	8.2 Law of conditional probability
Mon 3/29	8.3 Bayes' Rule in odds form
Wed 3/31	**No class meeting - work on project #3**
Fri 4/2	**Spring holiday**
Mon 4/5	9.1 Random variables, 9.2 Expected value
Wed 4/7	9.3 Sums, 9.4 Variance
Fri 4/9	9.5 Independence
Mon 4/12	9.6 Important examples
Wed 4/14	9.6 Important examples
Fri 4/16	9.6 Important examples
Mon 4/19	Catch up, examples
Wed 4/21	10.1 Probability densities
Fri 4/23	10.2 Expected value, 10.3 Variance
Mon 4/26	10.4 Important examples
Wed 4/28	10.4 Important examples
Fri 4/30	10.4 Important examples
Mon 5/3	**No class meeting - work on project #4**
Wed 5/5	Summary/review