Probability: Math 351-001

Location: Horizon Hall 2017 (Used to be Robinson B) Time: MW 3:00-4:15pm Instructor: Dr. Rebecca Goldin	
Office:	Exploratory Hall 4214
Office Hours:	Mondays, 2pm-3pm, Wednesdays 4:15-5:15 & by appointment
Phone:	Email is the best way to reach me!
Email:	rgoldin@gmu.edu

Prerequisite

MATH 213 with a C or better (or equivalent)

Required Resources

Text

A First Course in Probability, by Sheldon Ross, 10th Edition.

I will do my best to describe the problems without specifying their numbers, so that you can use an online or used version of an older edition. It is your responsibility to get a copy of the 10th edition when and if it is necessary.

Technology & Notebooks

You should have two notebooks for the course, plus a folder (electronic or physical) to keep your problem sets. One notebook is for notes in class, and other is a special dictionary of examples, theorems and ideas that you will be creating throughout the course.
You will want to have access to Excel and a calculator. Some students might like to use R.

All problem sets and exams will be uploaded to Gradescope, an online grade management system that is not currently integrated with Blackboard. You will be invited to create an account during the first week of class. You are required to scan your homework (no pictures!) or use latex to write your homework.

Course Content

Important topics include (but are not limited to):

- Writing excellent arguments for your work
- Counting
    - Outcome space
    - principles of counting
    - sums versus products
    - permutations, combinations
- Probability
    - Axioms of probability
    - Sample spaces, “equally likely outcomes”
    - Probability as a function
    - Independence & Conditional probability, including Bayes’ Theorem
    - Law of Large Numbers (introduction)
    - Sampling in the real world (introduction)
- Discrete random variables
    - Expectation and variance of a discrete random variable
    - Bernoulli random variable
    - Binomial random variable
    - Poisson random variable
    - Independence of random variables
    - Sums of random variables
    - Probability mass functions, cumulative distribution function
    - Simulation
    - Modeling in the real world (introduction)
- Continuous random variables
    - Expectation and variance of a continuous random variable
    - Uniform distribution
    - Normal distribution
    - Exponential random variables
    - Independence of random variables
    - Central Limit Theorem (restricted form) and how to use it
    - Simulation
- Jointly distributed random variables
    - Joint distribution functions
    - Independence
    - Conditional probability revisited
- Properties of expectation
- Law of Large Numbers, Central Limit Theorem (general form)

Assessment & Your Grade

Your grade for the course will be calculated based on

- Two in-class exams (worth 20% each);
- Homework (worth 40%);
- A final exam (20%)

The grading scale is different than you may have seen in most classes. All points are earned rather than given, and I will give you effective and productive feedback on your work. You are expected to follow high standards of integrity, mathematical precision, and of explanation of your work.

90-100	A
80-89.5	A-
75-79.5	B+
70-74.5	B
65-69.5	B-
60-64.5	C+
55-59.5	C
40-54.5	D
0-39.5	F

I do not give out the grade of C-.

I reserve the right at my discretion to increase your grade slightly. However, there is no sympathy for students who do not come to class, do not read in advance, and do not do the homework!

Make-up tests are given only in extraordinary situations that require written proof. Partial solutions will be posted on Blackboard.

Most if not all grading will occur in Gradescope. You can keep track of most of your grades there. The final exam grade and the final course grade will be posted on Blackboard.

Exam Information

Exam 1: Date announced in weekly announcements

Exam 2: Date announced in weekly announcements

Final Exam: 1:30-4:15pm, Monday, December 12 2022

There are no make-up tests allowed unless you have an extremely serious and well-documented excuse. You must see me in advance if at all possible, such as a religious reason. If this is not possible due to the nature of the event, you must provide written documentation, such as a dated and timed letter from a doctor/hospital in the case of medical excuse, a death certificate in the case of a family death, etc. Oversleeping is not an excuse. Minor medical difficulties such as a headache or flu that does not require being in the doctor's office is not an excuse. If you are not sure if your reason is excusable, and/ or if you can possibly make it to the exam but it's inconvenient, then it is not an excuse.

Homework and In-Class Discussion

What will homework and discussion be like?

Each week, you will have one problem set due based on material covered in class or reading that you were assigned. There are approximately 12 problem sets due throughout the course, including during exam weeks.

Homework will frequently be due *before class begins.* We will have some classtime to discuss problems, so it's always to your advantage to look at the problems in advance.

Homework consists of reading the text, and doing problems assigned for an in-class discussion and/or for turning in, many of which will be graded by me.

You will be asked to explain your answers to others with some frequency. Expect to be at the board!

You are encouraged to work with other students on the problem sets (no other resources, just other students!). You must write up your own work individually and without copying from another student's work. You must make reference to any students you have worked with on your problem sets. *Make sure you understand and can defend/explain everything you write up!*

Late policy and absences

Late homework is accepted up to 1 week late for 75% credit, and subsequently not accepted except under extraordinary circumstances. I will post solutions to select problems on Blackboard.

Class Culture

We will be discussing many problems in groups of various sizes. It will be extremely important to be considerate and respectful of other students and their ideas. We have banned from the classroom words like “obvious”!

Please turn off your cell phone before class and turn off notifications on your computer. I expect laptop computers to be closed during class, unless you have a special exception due to a disability or unless you are making reference to your problem sets.

Advanced Mathematical Learning Skills Development

For abstract ideas such as those occurring in this classroom, it is *extremely useful* to create a dictionary of examples and theorems. We will be discussing this throughout the class.

Additional Course Information

Disability statement
If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703.993.2474. All academic accommodations must be arranged through that office.

Honor Code
The University Honor Code is to be followed at all times. Sharing information of any kind about exams is prohibited. Any violations will be sent to the Honor Committee and will result in a grade of zero. This also applies to take-home quizzes. See the University Honor Code.

Getting Help
Use each other! Use the Internet! Email your professor! Come to Office Hours! Try the Tutoring Center!

GMU Deadlines
Drop Date:

- No tuition penalty through September 6
- Final drop date is September 13