

PROBABILITY THEORY

St. Olaf College • Math 262

Prof. Matthew Wright • Fall 2023

Course Meetings

Monday, Wednesday, and Friday 8:00 – 9:05am in Regents 204

Contact the Professor

If you have any questions or concerns about the course, email Prof. Wright at wright5@stolaf.edu, or visit office hours. Prof. Wright tries to respond quickly to emails from students during the week, but responses may take a bit longer on the weekends. Office hours are scheduled daily in RMS 405:

Mondays 1 – 2pm, Tuesdays 1:30 – 2:30pm, Wednesdays 11am – noon, Thursdays 10 – 11am, Fridays 9 – 10am

If the hours above don't work for you, just send Prof. Wright an email to arrange a meeting at another time!

Web Site

The course web site is:

math262.mlwright.org

The professor maintains a course schedule and assignment calendar on this site. We will use Moodle for assignment submissions, grades, and items that require password protection.

Text

Our textbook is *Probability with Applications in Engineering, Science, and Technology*, 2nd edition, by Carlton and Devore. Note that this text is available electronically via the St. Olaf Library web site. We will cover approximately the first four chapters of this text.

Course Objectives

1. Demonstrate understanding of the mathematical concepts of probability and random variables, finding answers to simple and complex probabilistic questions.
2. Identify properties of specific discrete and continuous probability distributions and use these distributions to model real-world phenomena.
3. Use computational tools, such as the statistical computing package *R* and the computer algebra system *Mathematica*, to solve problems in probability.
4. Deepen understanding of mathematics as a human activity that combines abstract elegance with real-world utility, in which all people can find success.

Grading

Your final grade will be a weighted average of the following:

Pre-class Questions:	5%	
Homework:	35%	
Midterm Exams:	40%	(20% for each of two exams)
Final Exam:	20%	

Each of these items is explained below.

Preparing for Class: Pre-class Questions

The best way to learn mathematics is by *doing*: actively applying mathematical concepts to solve problems. Accordingly, we will spend most of our class time solving problems. Prof. Wright does not plan to lecture much in this class, but to facilitate problem solving and discussion.

To make best use of class time, each student must come to class prepared, having completed assigned readings, videos, and pre-class questions. Prof. Wright will assign specific reading from the text and provide a video lesson (approximately 15 – 20 minutes in length) in advance of most class sessions. Video lessons will contain embedded comprehension questions. These are questions to check your understanding and to indicate that you are preparing for class. Each student must answer these pre-class questions before class. The lowest two scores for each student will be dropped (that is, you can choose two days to not answer the pre-class questions without affecting your grade).

Homework

Homework will be assigned and collected frequently—approximately every other class period. Assignments and due dates will be announced in class and posted in the course web site. *Keeping up with the homework is important, not only to get a good grade, but also for mastering the course material!* Struggling with a homework problem is not a sign of failure, but part of the learning process. The proper way to work on a homework problem is as follows:

1. Read and attempt to understand the problem, looking up definitions or theorems if necessary.
2. Make a plan for solving the problem.
3. Attempt to carry out the plan. Revise the plan. Spend time thinking about the problem. Talk with your classmates about the problem.
4. If you have spent significant time on the problem and still can't solve it, then talk to Prof. Wright or another student who is working on the same problem. Then go back to step 2.
5. If you think you have solved the problem, then check your answer. Ask yourself, "Is my answer reasonable? Can I verify it in some way?" See if you can improve your solution.
6. Write your solution neatly and thoroughly.

Collaboration with peers is encouraged on homework, but you must submit your own work and completely understand your solutions. Inappropriate "collaboration" includes online tutors, solution forums, artificial intelligence, or other resources not listed in the course materials. Remember, the goals of this course are to develop and demonstrate your own

understanding of probability concepts. You will not achieve these goals if you outsource your thinking to other experts (human or artificial). You will achieve these goals through time and effort spent solving probability problems.

Write your solutions clearly and neatly, explaining your reasoning. Homework will be due at 5pm on the due date. Late work will *not* be accepted in general, but if extenuating circumstances arise, talk with the professor as soon as possible. Your lowest *two* homework grades will be dropped.

Exams

This course will have two midterm exams and a final exam. Midterm exams are tentatively scheduled as follows:

Midterm Exam 1: Friday, October 6, on Sections 1.1 – 2.4 of the text

Midterm Exam 2: Friday, November 10, on Sections 2.5 – 3.7 of the text

The **final exam** will be Friday, December 15, 9:00 – 11:00am. This exam will cover roughly Chapters 1 – 4 of the text. Please put this final exam time in your calendar and plan to be present. By college policy, travel arrangements are not a valid reason for asking to reschedule an exam.

Strategies for Success

- Complete the reading, videos, and pre-class questions before class.
- Attend class and participate in class activities. (Failure to attend class usually results in poor performance.)
- Keep up with the homework assignments. Start early — don't wait until the last minute to get started!
- Practice is essential for learning mathematics! Work each problem carefully and thoroughly.
- Work with other students. Mathematics is a collaborative activity! You will find that you will both learn from and teach your classmates.
- Ask questions!
- If you are having trouble, seek help! Prof. Wright is happy to talk with you.

Computers and Software

We will make frequent use of the computer algebra system *Mathematica* and the statistical computing package **R**. You are encouraged to install these programs on your own computer and bring it to class, and these programs are also available on computers in several locations on campus. Please talk with the professor if you have any questions or concerns about this.

Getting Help

Prof. Wright is your primary resource for help in this course and is happy to talk with you. When you need help, or if you have any concerns about the course, please email Prof. Wright or visit his office hours.

Your classmates are a valuable resource. The professor encourages you to discuss course topics and homework problems with your classmates, as long as you write and turn in your own work.

Furthermore, the Academic Success Center offers tutoring, academic coaching, and other services – talk with Prof. Wright or email the Academic Success Center for more information. If you have any concern at all related to this course, please email Prof. Wright.

Academic Integrity

Claiming someone else's work as your own will earn you a failing grade on the work in question. Don't do it. For more information, see the *Academic Integrity* section of *The Book* (wp.stolaf.edu/thebook/academic/integrity).

The Honor Pledge applies to exams in this course. The Honor Pledge reads:

"I pledge my honor that on this examination I have neither given nor received assistance not explicitly approved by the professor and that I have seen no dishonest work."

The Honor Pledge is violated when information could result in an unfair advantage for one or more students is given or received before, during, or after a test. On each exam, students will be asked to either affirm the Honor Pledge or indicate awareness of violations by intentionally not signing the pledge.

Inclusivity and Access

Prof. Wright is committed to facilitating a safe, caring, and inclusive learning community, respecting those of differing backgrounds and beliefs. As part of St. Olaf College, we aim to be respectful to everyone in this class, regardless of race, ethnicity, religion, gender, or sexual orientation. All students are capable of success in mathematics, and Prof. Wright aims to create an environment in which all can succeed. If you have any questions or concerns, don't hesitate to talk with Prof. Wright.

If you have any concerns about access to course materials, or if English is not your first language and this causes you concern, please talk with Prof. Wright.

Health and Accommodations

Prof. Wright is committed to supporting all students. He recognizes that emotional, physical, or psychological experiences, both in and out of the classroom, have the potential to distract students from learning. If you have any concerns, please do not hesitate to contact the professor—he is available to listen and discuss what resources may be available to you.

If you are feeling sick, please do not come to class—instead, email the professor. Face masks to prevent the spread of respiratory diseases are welcome in class. Please respect individuals who may choose to wear face masks.

If you have an accommodation letter from the Disability and Access (DAC) office, please meet with the professor early in the course to discuss, plan, and implement your accommodations in the course. Otherwise, if you have or think you have a disability please contact the Disability and Access office at 507-786-3288 or wp.stolaf.edu/academic-support/dac/.