

# Probability Theory Math/Stat 451 by Engineering Outreach

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“Life’s most important questions are, for the most part, nothing but probability problems.”  
Pierre-Simon Laplace (1749-1827)

**Instructor:** Chris Remien, Brink 420, Phone: 208-885-5901

**Office Hours:** Set up time with instructor

**E-mail:** cremien@uidaho.edu (preferred method of contact)

**Website** [www.webpages.uidaho.edu/cremien/math451](http://www.webpages.uidaho.edu/cremien/math451)

**Textbook:** *Stochastic Modeling and Mathematical Statistics* by Francisco J. Samaniego

**Contents:** Probability theory is the study of randomness. It provides a mathematical foundation for statistics and is central to applications in many subjects including the sciences, finance, and engineering. This course serves as a prerequisite for Math 452 Mathematical Statistics and Math 453 Stochastic Models. We will cover Chapters 1-5, the following topics: axioms of probability, conditional probability, counting techniques, discrete and continuous random variables, multivariate models, and limit theorems.

**Learning Outcomes:**

- Learn to calculate probabilities of random events.
- Learn to calculate expectation and variances of random variables.
- Attain basic understanding of limit theorems, including the law of large numbers and the central limit theorem.
- Develop statistical reasoning skills by integrating course material with other mathematics.
- Learn to think like a probabilist, to see applications in other fields and other aspects of life.

**Prerequisites:** Calculus, a bit of “mathematical maturity,” and a positive attitude.

**Grade Policy:** The grading scale for this course is:

Homework: 20%	A 90-100
Exam 1: 25%	B 80-90
Exam 2: 25%	C 70-80
Final: 30%	D 60-70
	F Below 60

**Homework Policy:** Expect to spend at least two hours on homework per one hour of class time. This means that you should be spending about six hours per week on homework, especially if you struggle with mathematics. Late homework will not be accepted for any reason. Homework problems will be assigned from each section and a non-predetermined subset will be graded.

- There will be roughly 11 homework assignments.

- Homework assignments will be posted on the course webpage.
- Use sentences in your homework solutions so that the solutions are clear. The homework solutions you submit should be written neatly and in an organized manner. Some problems may be difficult and require multiple attempts before finding a successful strategy. Use scratch paper for preliminary work, and only include the successful attempt on your submitted homework.
- Your solutions should be clearly labeled and in order. If multiple sheets are required to complete an assignment, label each sheet with the name of the assignment and the section you are currently working on and STAPLE them together. Finally, please write your name, the date, and the assignment number on the front page.
- Your solutions should contain enough explanation so that I am convinced that you know what you are doing. It is typically inadequate to merely write down a final answer.
- You are encouraged to work together on homework assignments; however, each of you must submit your own assignment. Everything you submit should be in your own words and you should thoroughly understand everything you write down.
- Your two lowest homework scores will be dropped.

**Exam Policy:** Three exams, including the final, will be given. Students must bring a valid ID to the exam. There will be no make-up exams, unless a student can provide verifiable evidence that he/she has a significant illness or serious family crisis that will prevent him/her from attending. Except under extremely unusual circumstances, you must inform me in advance of the missed test. In the event this happens, you are expected to promptly make arrangements with me to make up the test. Please write neatly and show all of your work on exams.

**Expectations:**

- Math is a difficult subject. Like all difficult subjects math can only be learned with appropriate practice. Every one of you is capable of learning this material with enough practice. To succeed in this class, the most important thing is to show up to every class on time and ready to learn, having read the chapter beforehand.
- Cheating will not be tolerated and may result in severe academic sanctions. Disruptive talking in class will not be tolerated. On the other hand, asking and responding to questions in class is strongly encouraged.
- Cell phones, laptops, etc. will not be allowed during exams or class. Please turn these devices off during all classes.
- Be proactive about your education. Someone is paying a lot of money for you to learn valuable skills. Ask questions when you do not understand, either in class, after class, in office hours, or by email.
- If you know you are going to be absent for any part of the semester, make arrangements with me before, not after, the absence.

**ADA Statement:** The Americans with Disabilities Act requires that reasonable accommodations be provided for students with physical, cognitive, systemic, learning, and psychiatric disabilities. Please contact me at the beginning of the semester to discuss any such accommodation you may require for this course.