

Math 349 - Probability Theory

Instructor: Barry Balof

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Class Times: Monday, Wednesday, and Friday 11-1150

Class Location: Olin 201

Office Hours: Tuesdays 1-230, Wednesdays 10-11, Thursdays 10-1130. Also by appointment or by chance. Note: These hours are subject to change as demand warrants.

Course Goals: Our goal is to learn the basics of probability theory and probability distributions. You will learn to think probabilistically, which involves facets of both *combinatorics* (which you might not have seen), and *calculus* (which, hopefully, you have!). By the end of the course, you will be able to

- Explain and use the fundamentals of probability.
- Demonstrate knowledge and use of discrete and continuous random variables and probability distributions
- Recognize well known families of probability distributions and when they are appropriately used
- Find expected values and variances, as well as joint, marginal, and conditional distributions.
- Demonstrate knowledge and use of the Central Limit Theorem and sampling distributions for commonly used statistics
- Demonstrate basic familiarity with R and its use in simulations.

Course Materials. We will be using the book *Mathematical Statistics with Applications* by Wackerly, et. al., 7th edition. Please ensure that you have the correct edition of the book, especially if you buy it from somewhere other than the Whitman bookstore. We will also make use of the software package R , available as a free download at <http://www.r-project.org>.

We will be covering Chapters 2-7 in the textbook:

- Probability and Combinatorics (Ch 2)
- Discrete Random Variables and their Probability Distributions (Ch 3)
- Continuous Random Variables and their Probability Distributions (Ch 4)
- Multivariate Probability Distributions (Ch 5)
- Functions of Random Variables (Ch 6)
- Sampling Distribution and the Central Limit Theorem (Ch 7)

Evaluations: This course will have two midterms and a final. The midterms (dates approximate) will be the week of Feb 24 and the week of April 13. All exams will be announced at least a week in advance. The Final exam will be on Tuesday, May 19 at 2PM. I will assign homework daily and collect it weekly. In addition, there will be a group project in the second half of the semester (details to follow).

The overall course breakdown will be as follows:

- Homework and Class Participation: 15%
- Midterms: 20% each
- Project: 10%
- Final: 35%

Academic Honesty: You are welcome, in fact encouraged, to collaborate on homework assignments. However, the work that you turn in must be your own. No copying from any source! Exams and quizzes, with rare exceptions, will be closed book, closed notes, and closed colleague. Directions around the use of calculators will be given with each exam.

Classroom Community: Mathematics is a highly collaborative enterprise, and we learn better when we learn together. In order to achieve our goals, we must foster mutual respect, regardless of background or beliefs. Racism, sexism, or other forms of discrimination have no place in the classroom or at the college. All students are capable of success, and it is imperative that we work under that ethos.

Academic Support: If you are a student with a disability who will need accommodations in this course, please meet with Antonia Keithahn, Assistant Director of Academic Resources: Disability Support (Memorial 326, 509.527.5767, keithaam@whitman.edu) for assistance in developing a plan to address your academic needs. All information about disabilities is considered confidential, and I will work in confidence with the ARC to provide whatever accommodations are deemed appropriate.