Course Information

STAT 1631/2630 Intermediate Probability
Fall 2025
G36 Benedum Hall
Monday and Wednesday, 11:00 am - 12:15 pm

Instructor

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Office hours: Wednesdays 1:00 pm - 2:00 pm

Overview

This course is the first semester of a two-semester sequence in intermediate probability and mathematical statistics. It is for undergraduate and graduate students who have already had some exposure to calculus-based probability theory. This first semester will cover Chapters 1-6 and some materials from Chapter 7 of the text DeGroot and Schervish, including basic probability calculations; conditional probability, independence and Bayes' Rule; discrete and continuous correlation; functions of random variables and sampling distributions; and large random samples.

The sequel to this course, STAT 1632/2640 "Intermediate Mathematical Statistics," is heavily dependent on this course, and covers theories of statistical inference likely using the same textbook (depending on the instructor).

All resources from class will be posted on Canvas https://my.pitt.edu/launch-task/all/uctl-canvas. You need your username and password to log into the system.

Prerequisite

MATH 0220, 0230, 0240 (three semesters of analytical geometry and calculus) & *STAT 1151* (a one-semester introductory probability course using calculus), or their equivalents. If you feel you are lacking some background, please talk to me and we can determine if the course is right for you.

Textbook

Probability and Statistics, 4th Ed. by Morris H. DeGroot and Mark J. Schervish

Course Organization

Every week I will upload the course materials on Canvas, which may include lecture notes, assignments, and practice exams. Students are expected to check emails at least once every 12 hours during the week and every 24 hours over the weekends.

Below is a tentative schedule.

- Week 1 (8/25, 8/27): Introduction to probability (chapter 1), the definition of conditional probability (ch 2.1).

  - Assignment 1 release (due 9/8)

- Week 2 (9/3): Independent events (ch 2.2).

- Week 3 (9/8, 9/10): Bayes' Theorem (ch 2.3), random variables and distributions (ch 3.1-3.3).

  - Assignment 1 due. Assignment 2 release (due 9/15)

- Week 4 (9/15, 9/17): Functions a of random variable (ch 3.8), bivariate distributions (ch 3.4), marginal distributions (ch 3.5).

  - Assignment 2 due. Assignment 3 release (due 9/22)

- Week 5 (9/22, 9/24): Conditional distributions (ch 3.6), multivariate distributions (ch 3.7).

  - Assignment 3 due. Assignment 4 release (due 9/29)

- Week 6 (9/29, 10/1): Functions of two or more random variables (ch 3.8), expectation of a random variable (ch 4.1-4.2).

  - Assignment 4 due. Week for midterm review, no assignment.

- Week 7 (10/6, 10/8): Variance (ch 4.3).

  - **First midterm on Oct. 8, based on materials covered by the first 5 weeks.**

  - Assignment 5 release (due 10/13).

- Week 8 (10/13, 10/15): Moments (ch 4.4), the mean and the median (ch 4.5), covariance and correlation (ch 4.6), conditional expectation (ch 4.7).

  - Assignment 5 due. Assignment 6 release (due 10/20).

- Week 9 (10/20, 10/22): Some discrete distributions (ch 5.1-5.5).

  - Assignment 6 due. Assignment 7 release (due 11/2)

- Week 10 (10/27, 10/29): Some continuous distributions (ch 5.6-5.8), the multinomial distributions (ch 5.9).

  - Assignment 7 due. Week for midterm review, no assignment.

- Week 11 (11/3, 11/5): The bivariate normal distributions (ch 5.10), introduction to large sample properties (ch 6.1).

  - **Second midterm on Nov. 5, based on materials covered from week 6 to week 9 (week 9 is included).**

      – Assignment 8 release (due 11/17).

- Week 12 (11/10, 11/12): The law of large numbers (ch 6.2), the central limit theorem (ch 6.3).

- Week 13 (11/17, 11/19): The central limit theorem (ch 6.3), tail bounds.

      – Assignment 8 due. Assignment 9 release (due 12/1).

- Week 14 (12/1, 12/3): General techniques for simulating continuous random variables (if time allows), review.

      – Assignment 9 due.

References

A First Course in Probability. 8th edition by Sheldon Ross.

Teaching Assistants

Wenhan Jiang, wej40 [at] pitt [dot] edu

Office hours: TBA

Grading

Your overall course grade will be determined as a weighted average of the following categories:

25%	Homework assignments	*The lowest score will be dropped.*
20%	1st midterm	**Wed, Oct. 8, 2025, 11:00 am - 12:15 pm,** *in class.*
25%	2nd midterm	**Wed, Nov. 5, 2025, 11:00 am - 12:15 pm,** *in class.*
30%	Final exam	**time TBA.**

Undergraduate and graduate students will be graded separately. I will examine the distributions of the total scores of both groups and look for clusters of total scores that represent clear-cut differences in quality of performance.

Exams

In general, **NO MAKE-UP EXAMES** are granted. Make-up exams will be given only in rare cases of emergency. If an emergency occurs on the exam day, you must contact the instructor *before* the exam (or arrange for someone else to do so). We will not approve any exam reschedueling requests based on personal reasons such as travel, leisure, or to ease exam week schedules. We will not approve any exam rescheduleing requests for students who take another class whose lectures or final exam occur at the same time as those of our class. No make-up exams will be granted to a student who contats us after the exam is over. No special accommodations will be made for students who arrive late to exams, regardless of the reason (missing a bus; overslept; sick; etc.).

If you need to miss an exam due to a sudden severe illness, injury, traumatic event, etc., after consulation with the instructor it is possible that you will be given an **Incomplete** in the course and asked to complete the course in a future semester.

Homework

There are 9 assignments in total. According to the tentative schedule, most of them will be due on Tuesday. Please submit your homework electronically on Canvas. For the written part, you can scan your work and upload a pdf version. Clearly label each problem. Note that we **DO NOT** accept late homework. However, the lowest score will **NOT** be counted in your final grade.

Academic Integrity

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Understanding and Avoiding Plagiarism tutorial.

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Statement on Classroom Recording To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Diversity and Inclusion

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, see: http://diversity.pitt.edu/affirmative-action/policies-procedures-and-practices.

I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or e-mailing titleixcoordinator@pitt.edu. Reports can also be filed online: https://www.diversity.pitt.edu/make-report/report-form. You may also choose to report this to a faculty/staff member; they are required to communicate this to the University's Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648- 7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Accessibility

The Canvas LMS platform was built using the most modern HTML and CSS technologies, and is committed to W3C's Web Accessibility Initiative and Section 508 guidelines. Specific details regarding individual feature compliance are documented and updated regularly.