THE UNIVERSITY OF TEXAS AT AUSTIN
Department of Statistics and Data Sciences

College of Natural Sciences

SDS 321

Introduction to Probability and Statistics

Spring 2026

Professor	Purnamrita Sarkar
Office Hours	TBA via zoom
Email	purna.sarkar@austin.utexas.edu
Course Web page	https://psarkar.github.io/sds321.html
Teaching Assistant	Ryan Zhang (ryanzhang@utexas.edu)
Office Hours	Tuesday from 3:40 p.m. - 5:40 p.m. at GDC 7.418 in the Poisson bowl
Location	

Syllabus

Course Description

This course provides an introduction to probability and statistics. The first part of the course covers the fundamentals of probability theory, including discrete and continuous random variables, multiple random variables, and limit theorems. This section of the course will also cover the application of probability to counting problems.

The second part of the course will focus on classical statistical inference, covering parameter estimation, hypothesis testing, and confidence intervals.

Prerequisites Students are expected to have a good familiarity with Calculus I. No previous experience with probability or statistics is assumed.

Quantitative Reasoning

This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

Textbook

In addition to the slides and material made available on the course webpage, students will be assigned readings and additional problems from the course textbook

- Introduction to Probability. Dimitri P. Bertsekas and John N. Tsitsiklis, 2nd edition. Athena Scientific. Note that the first edition does not cover the statistics portion of the course.

- A First Course in Probability, by Sheldon Ross

Course website

Slides, homework problems and any additional material will be posted at the course website: `https://psarkar.github.io/sds321.html`.

Grades will be posted at `canvas.utexas.edu`.

Evaluation

There will be four exams. I will drop the lowest grade of the first three. Please note that the **the final exam is cumulative and cannot be dropped**.

If you have to miss an exam due to a legitimate documented conflict, please let me know as soon as possible, and we will make arrangements for a make-up exam. **Letting me know after the exam will lead to a zero grade**.

There will also be approximately weekly homeworks (no homework will be assigned on midterm days) - 10 homeworks in total which should be submitted via canvas by Friday 5pm (unless otherwise specified). The final exam will consist of two fifty minute exams. The lowest homework grade will be dropped. The homeworks will count for 40% of the grade. The three counted exams will each carry 20%.

ChatGPT and Generative AI Tools

It is a violation of university policy to misrepresent work that you submit or exchange with your instructor by characterizing it as your own, such as submitting responses to assignments that do not acknowledge the use of generative AI tools. Please feel free to reach out to me with any questions you may have about the use of generative AI tools before submitting any content that has been substantially informed by these tools.

Requests for Regrade

Clerical requests will be corrected without hassle. Other regrading requests must be submitted in writing within on week (7 days) of the exam's return. Be aware that the entire exam will be subject to regrading, and grades may go up or down.

What do you do if you are feeling sick?

Please do not come to class if you are at all sick. Please follow the university's recommendations. regarding COVID-19. I will be flexible by providing extensions for assignments and quizzes as long as:

1. You communicate with me about your absence **within a week** of the missed assignment or quiz. If you let me know more than a week later, you will receive a **zero grade in that quiz**.

2. There isn't a consistent pattern of requesting to turn in assignments late.

Tentative course outline

- **Week 1 (Jan 12–Jan 18, 2026):** Probability, events, probability calculus. Textbook Sections 1.1 and 1.2

- **Week 2 (Jan 19–Jan 25, 2026):** Conditional Probability and Statistical Independence. Textbook Sections 1.3–1.4;
  HW1 due

- **Week 3 (Jan 26–Feb 1, 2026):** Conditional prob & independence (ctd.). Law of total probability; Bayes rule. Conditional independence. Textbook Sections 1.4 and 1.5. Counting rules; Textbook Section 1.6
  HW2 due

- **Week 4 (Feb 2–Feb 8, 2026):** Counting rules (ctd). Textbook Section 1.6 counting rules — some more examples.
  HW3 due

- **Week 5 (Feb 9–Feb 15, 2026):** Review of Chapter 1
  Quiz 1 (in class)

- **Week 6 (Feb 16–Feb 22, 2026):** Discrete r.v.'s, Section 2.2
  HW4 due

- **Week 7 (Feb 23–Mar 1, 2026):** Function of r.v.; Section 2.3. Expectation & variance; Section 2.4
  HW5 due

- **Week 8 (Mar 2–Mar 8, 2026):** Expectation & variance (ctd.). Joint and conditional PMF; Sections 2.5 and 2.6
  HW6 due

- **Week 9 (Mar 9–Mar 15, 2026):** Review & Exam 2

- **Week 10 (Mar 16–Mar 22, 2026):** Spring Break (no classes)

- **Week 11 (Mar 23–Mar 29, 2026):** Moments of discrete r.v.'s (Ber, Bin, Poi, Geo); continuous r.v.s: Sections 3.1 and 3.2
  HW7 due

- **Week 12 (Mar 30–Apr 5, 2026):** Continuous r.v.'s (ctd.): Section 3.3; joint pdf: Section 3.4
  HW8 due

- **Week 13 (Apr 6–Apr 12, 2026):** Joint (ctd); conditional pdf: Section 3.5. Continuous Bayes' theorem; Section 3.6 (slides)
  HW9 due

- **Week 14 (Apr 13–Apr 19, 2026):** Frequentist Statistics; Sections 9.1 and 9.2

- **Week 15 (Apr 20–Apr 26, 2026):** Bayesian Statistics; Sections 8.1 and 8.2

- **Friday, May 1, 2026:** Quiz 3 and 4

  HW10 due

Students with Disabilities
Students with disabilities may request appropriate academic accommodations from the Disability and Access Division of student affairs, 512-471-6259,

`https://disability.utexas.edu/accommodations-and-services/`. Once you have a letter from D&A please contact me to discuss the accommodations.

Religious Holy Days
By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Scholastic Honesty
We expect students to behave with integrity. I am happy to let you discuss your homeworks with friends, but whatever you turn in must be **your own work and not identical to someone else you worked with**. Students found cheating on exams or homework will receive a score of zero for that exam or assignment, and according to UT policy, **will be reported to the Office of Student Conduct and Academic Integrity**.

Campus Safety
Please note the following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, `http://www.utexas.edu/safety`:

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

- Students requiring assistance in evacuation should inform the instructor in writing during the first week of class.

- In the event of an evacuation, follow the instruction of faculty or class instructors.

- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

- Behavior Concerns Advice Line (BCAL): 512-232-5050

- Further information regarding emergency evacuation routes and emergency procedures can be found at: `http://www.utexas.edu/emergency`.