

**STAT GU4207 / GR5207:
ELEMENTARY STOCHASTIC PROCESSES**

SPRING 2025

Instructor. Adam Quinn Jaffe (a.q.jaffe@columbia.edu)

Teaching Assistant(s). TBA

Lecture.

Time: MW 11:40 AM - 12:55 PM

Location: 301 Uris Hall

Course Summary. Introduction to theory and applications of stochastic processes. Topics include Markov chains (in discrete and continuous time), Poisson processes, Gaussian processes, and Brownian motion, as well as applications to physics, biology, and finance.

Webpage. The course webpage will be hosted on CourseWorks, to which you will be automatically added when you register for the course. Please contact the instructor or teaching assistant(s) if you are registered but cannot access the webpage.

Discussion. We will have an online discussion platform hosted on Ed, which can be accessed from the CourseWorks page. The instructor and teaching assistant(s) will check Ed periodically to answer questions, but students are encouraged to answer each other's questions as well.

Communication. All course announcements will be made on CourseWorks. If you have an individual question, please email the instructor or teaching assistant(s) and include "STAT GU4207" or "STAT GR5207" in the subject line. If you have a questions which other students may also have, please post on Ed.

Material.

- Discrete-time Markov chains (4 weeks)
- Poisson processes (2 weeks)
- Continuous-time Markov chains (2 weeks)
- Gaussian processes, Brownian motion (3 weeks)

Prerequisites. STAT GU4203 / GR5203 or equivalent

Textbook.

Primary text: *Introduction to Stochastic Processes with R* by Dobrow
Additional texts: *An Introduction to Stochastic Modeling* by Pinsky and Karlin
Introduction to Probability Models by Ross
Introduction to Stochastic Processes by Hoel, Port, and Stone

Homework. Due on Fridays, approximately weekly

Exams.

Midterm 1: Monday, February 24, 10:40 AM - 12:55 PM
Midterm 2: Monday, March 31, 10:40 AM - 12:55 PM
Final exam: Monday, May 12, 9:00 AM - 12:00 PM

Grading.

Raw scores will be calculated via

$$25\% \cdot H + 20\% \cdot M_1 + 20\% \cdot M_2 + 35\% \cdot F,$$

where

H = homework score
 M_1 = midterm 1 score
 M_2 = midterm 2 score
 F = final exam score.

Academic Integrity. Campus policies on academic integrity and academic misconduct are outlined in the website entitled [Understanding the Policy](#). Main issues include cheating, plagiarism, and more; at the same time, academic integrity also includes treating peers respectfully in class.

Accommodations. Students with disabilities requesting accommodations should notify the instructor as soon as possible so that arrangements can be made. Please consult [Disability Services](#) for more information.