

# Math 180C, Introduction to Stochastic Processes II, Fall 2021

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**Course Web Page:** <http://www.math.ucsd.edu/~jschwein/180C.html>

**Overview of the course:** Stochastic processes are used to model systems that evolve over time in some way that involves randomness. Stochastic processes have become important in fields such as biology, engineering, and economics. This course, which is a continuation of Math 180B, provides an introduction to stochastic processes. The course will focus on continuous-time Markov chains, renewal theory, queueing theory, and Brownian motion.

**Course Modality:** Math 180C will be taught in-person. However, to accommodate international students who are unable to enter the United States and students who are unable to attend lectures for a period of time due to COVID-19 protocols, all lectures and discussion sections will be podcasted. Also, students may schedule one-on-one meetings with the instructor or TA over Zoom if they have questions about the course. To ensure academic integrity, it is important for all students to be physically present for exams, if possible. However, international students who are unable to enter the United States will be permitted to take their exams remotely and be proctored over Zoom. Likewise, students who are unable to attend an exam because they have tested positive for COVID-19, they are experiencing symptoms of COVID-19, or they need to quarantine because they have potentially been exposed to COVID-19, will be permitted to take the exam remotely and be proctored over Zoom. It is possible that some lectures or discussion sections will need to switch to a remote format if university policies change, or if the instructor or TA is required to quarantine due to COVID-19 protocols. The course content, assignment deadlines, exam dates, and course grading policies will be unaffected by any such changes.

**Textbook:** No textbook for the course is strictly required. However, most students will find it helpful to have an additional reference to consult besides their lecture notes. One good reference is *An Introduction to Stochastic Modeling* by Mark Pinsky and Samuel Karlin. The books *Essentials of Stochastic Processes* by Richard Durrett and *Introduction to Stochastic Processes with R* by Robert Dobrow are available online through the UCSD library web site.

**Exams:** There will be two midterm exams and a final exam. The midterm exams will be held in class on Monday, October 25, and Monday, November 22. The final exam will be held at 11:30 AM on Thursday, December 9.

**Homework:** Homework assignments will be due each week, usually on Fridays. You will upload your homework solutions to Gradescope by midnight on the due date. You should write your homework solutions neatly and carefully and provide full justification for your answers.

**Grading:** Homework will count for 35 percent of the final grade. Each midterm will count for 15 percent, and the final exam will count for 35 percent. All ten homework scores will count towards your homework grade; no homework scores will be dropped. Consequently, any missed assignments will most likely have a negative impact on your final course grade. After your average is calculated, letter grades will be assigned based on your performance relative to the class. The numerical averages that correspond to particular letter grades are not determined in advance. In particular, you should not assume that the cutoff for an A will be 90 percent, or the cutoff for a B will be 80 percent. The cutoffs will depend on the distribution of scores in the class.

**Regrade Requests:** Regrade requests will be handled through Gradescope. You should submit any regrade request within three days of the time when the graded work is made available to you. While we will correct errors in the grading, we will not modify the grading rubric or negotiate over partial credit after graded papers are returned to students. Regrade requests should be made only to point out errors in grading, not to dispute the number of points deducted for a particular mistake.

**Lateness policy:** Late homework will not be accepted. If you complete the homework before the deadline but have problems submitting the work in Gradescope, then the work may be accepted late for a two-point penalty. To avoid the penalty, email a copy of your homework to the instructor before the deadline. Other accommodations will be made only under unusual circumstances that are beyond the student's control, such as serious illness or a family emergency. Likewise, make-up exams will be given only under unusual circumstances that are beyond the student's control. In such cases, you must notify the instructor as soon as possible. Please understand that accepting late work in less extreme cases is unfair to other students.

**Office Hours:** The instructor and TAs will hold regular in-person office hours. The times of these office hours will be listed on the course web page. You may ask about homework problems during office hours, in which case the instructor or TA will try to determine the source of your difficulties and guide you on the right path. However, because the purpose of homework is to provide you with practice at solving problems yourself, please do not expect the instructor or TA to provide answers or solutions to homework problems during office hours. The instructor also encourages students who are unable to attend office hours for any reason to make one-on-one appointments to meet over Zoom.

**Email:** The instructor will endeavor to reply promptly to email questions related to the course. Asking questions about homework over email is permitted, but it is important to explain how you have been approaching a problem and where you are having difficulties. The instructor will not simply provide a hint in response to a comment such as, "I'm stuck on problem 5". Please refrain from asking the TA about homework problems over email.

**Time commitment:** According to university policy, "The value of a course in units shall be reckoned at the rate of one unit for three hours' work per week per term on the part of a student." (See <http://www.ucsd.edu/catalog/front/UgrdDegReq.html>.) Math 180C is a four-unit course, so you should expect to spend about 12 hours per week on the course.

## Academic Integrity Policy

It is essential that all students adhere to the UCSD Policy on Integrity of Scholarship. Cases of academic dishonesty will be reported to the Academic Integrity Office, and students found to be responsible for a policy violation will be subject to academic and administrative sanctions. Students are expected to obey the following rules:

- **Exams:** You will be allowed to use one  $8\frac{1}{2} \times 11$  page of notes on exams, and you may write on both sides of the page if you wish. You are allowed to use a calculator, but you may not share a calculator with other students. All devices that could be used for communication or internet access, such as cell phones, must be put away and out of view during the exam. You must stop working immediately when time is called.
- **Homework Assignments:** You may consult other students in the class, the instructor, or the TAs (but no one else) while formulating ideas on homework problems. However, you must write your final homework solutions independently based on your own understanding. This means that you may not show another student your solution or answer to a problem, and you may not copy or paraphrase the work of another student or use another student's solution as the basis for your own. Here are some more specific guidelines:
  - Two students who both think they have solved a problem may discuss the general method they used but should not compare answers.
  - A student who has solved a problem may provide a small verbal hint about the general method they used to a student who has tried and failed to solve the problem, but must refrain from providing the answer or showing anyone else their solution in writing.
  - Two students who have both tried and failed to solve a problem may discuss the problem together. If they succeed in coming up with a solution, they must each individually write down a solution to the problem at a later time, without referring to anything that was written during their meeting.

Finally, if you discuss homework problems with other students, you must acknowledge this help on your homework and indicate on which problems you received help.

- **Online Sources:** Although you may search for general course topics on the internet, you may not seek help on homework problems online. In particular, you may not make use of web sites that help students with homework problems or provide online tutoring. Soliciting homework answers or solutions from online tutoring websites is a serious form of academic misconduct known as contract cheating, which, when discovered, typically results in suspension from the university.
- **Social Media:** Discussing homework problems in any way over Discord or any other social media site is strictly prohibited.
- **Course Materials:** Some old Math 180C exams will be provided in Canvas. However, you may not acquire other materials, such as homework solutions, from previous Math 180C courses. You may not post your homework or exam solutions, or any solutions provided by your instructor, online or show such materials to future Math 180C students.

To ensure that you become familiar with the academic integrity policy, you are required to complete an academic integrity quiz in Canvas by midnight on Wednesday, September 29.