

Spring 2017 IE 576: Applied Stochastic Processes

Time: 2:00 PM - 4:50 PM Friday

Place: Talbert 113, North Campus

Web: Please use [UBlearns](#) to to assess all course information

INSTRUCTOR

Jun Zhuang, 317 Bell Hall

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Office hours: 1:00-3:00 PM Wednesday

TEACHING ASSISTANT

Mr. Vineet Madasseri Payyappalli, Office TBA

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Office hours: 9:00 AM - 11:00 PM Thursday

REFERENCES

There is one required textbook but the all of the following are recommended.

- ★ *Introduction to Probability* (required), By Dimitri P. Bertsekas and John N. Tsitsiklis, Second edition, ISBN: 978-1-886529-23-6, 2008, Athena Scientific.
- ★ *Fundamentals of Queueing Theory* (highly recommended), By Donald Gross, John F. Shortle, James M. Thompson, and Carl M. Harris, Fourth edition, 2008, Wiley-Interscience.
- ★ *Introduction to Probability Models*, By Sheldon M. Ross, Eleventh edition, 2014, Academic Press.
- ★ *Markov Decision Processes*, By Martin L. Puterman, First edition, 2005, Wiley-Interscience.
- ★ *Essentials of Stochastic Processes*, By Rick Durrett, Third edition, 2016, Springer.

COURSE DESCRIPTION

Continuation of IE 575 (Stochastic Methods). Topics include discrete-time and continuous-time Markov chains, simple Markov queueing networks, Bayesian and classical statistical inferences, and an introduction to dynamic programming.

Prerequisites: IE 575 Stochastic Methods or equivalent.

COURSE GRADING

Homework = 40%; Mid-term Exam I = 30%; Mid-term Exam II = 30%. To qualify for a particular letter grade, the minimum course average shown after that grade will be needed: A (90); A- (86); B+ (82); B (78); B- (74); C+ (70); C (66); C- (62); D+ (58); D (54); and F (less than 54). I reserve the right to lower these cutoffs (i.e., give higher grades than indicated) under some circumstances. Therefore, class average will not be lower than a B+. However, I will not raise the cutoffs.

HOMEWORK

There will be about 5-6 homeworks in this semester. Homework must be turned in by the end of the class period in which it is due. Provide your full name and student ID number for each homework that you submit. Late homework will not be accepted, except in extenuating circumstances (e.g., family emergency, illness, etc.), with official documents.

You are encouraged to join with other students in discussing the course, including homework. This is especially useful if you have first tried to solve the problem on your own, and focus on understanding the reasons for any differences between your answer and someone else's approach, rather than just copying the answer that someone else got. Note, however, that when you write up the work that you hand in, you should do so on your own. You are strongly recommended to turn in a computer-generated (e.g., L^AT_EX, MS Word) homework if possible.

ATTENDANCE

Although positively correlated with your homework and exam grades, attendance at the lectures will not be directly included in your final grade. However, attendance is fundamental to the course, so if you don't come to class, you are giving yourself a disadvantage. Absenteeism can also be a sign of illness or other serious problems; don't hesitate to email or call to discuss the reasons for any absences. If you need help, please let me know, and I will try to connect you with the appropriate campus resources.

PROFESSIONALISM

Students are expected to use professional style throughout the class and in all communications, including emails to faculty and teaching assistants/graders. This includes the use of salutations and closings (including clear identification of the author) and correct grammar. Students are expected to refrain from use of cell phones or other electronic devices unless they are clearly linked to class purposes (e.g., note-taking). Cell phones must remain off or muted. We reserve the rights of increasing the grades by up to 4% for students demonstrating great professionalism.

OFFICE HOURS

To be fair to all of the students and to the colleagues that we work with, please cooperate with us in respecting the office hours of the TA and the professor. However, individual appointments can be made, if the posted office hours are insufficient or inconvenient. You may email the instructor or TA at any time to discuss your questions by email, or to set up an appointment. I will respond as soon as possible, but you should be aware that I do not always check my email on the evenings and weekends, or when I am traveling. If you need to reach me on an urgent basis, (e.g., before an exam), you can also try leaving a message on my voice mail with information on when and how I can reach you by phone.

UNIVERSITY POLICY ON ACADEMIC INTEGRITY

All work must be your own. Plagiarism is never allowed. If any student is found in violation of maintaining academic integrity, sanctions will be imposed. This can be as severe as receiving an 'F' in the course. Especially flagrant violations will be considered under formal review proceedings, which can call for harsher

sanctions including expulsion from the University. All students are expected to be familiar with and abide by the University's academic integrity policies, available in the Undergraduate Catalog: <http://undergrad-catalog.buffalo.edu/policies/course/integrity.shtml> or the Graduate School Policies and Procedures Manual: <http://grad.buffalo.edu/study/progress/policylibrary.html#preamble>. Plagiarism detection software may be used by individual instructors or the institution to aid in determining the originality of student work. If you ever have any questions or concerns regarding the policy, particularly as it related to this course, see the instructor.

ACCESSIBILITY RESOURCES

If you require classroom or testing accommodations due to a disability, please contact the University's Accessibility Resources Office <http://www.student-affairs.buffalo.edu/ods/>, located at 25 Capen Hall. AR can be reached by phone at (716) 645-2608 or by email at stu-accessibility@buffalo.edu. Please inform me as soon as possible about your needs so that we can coordinate your accommodations.

COURSE OUTLINE ****This outline is subject to change****

Week	Date	Course Material	Note
No. 1	02/03	Introduction and Module 1: Stochastic Processes	First day of class
No. 2	02/10	Module 1: Stochastic Processes	
No. 3	02/17	Module 1: Stochastic Processes	HW 1 Due
No. 4	02/24	Module 1: Stochastic Processes	
No. 5	03/03	Module 2: Queuing Theory	
No. 6	03/10	Module 2: Queuing Theory	HW 2 Due & Review for Exam 1
No. 7	03/17	Exam 1	
No. 8	03/24	Spring Break	Spring Break
No. 9	03/31	Module 3: Bayesian Statistical Inference	
No. 10	04/07	Module 3: Bayesian Statistical Inference	HW 3 Due
No. 11	04/14	Module 3: Bayesian Statistical Inference	
No. 12	04/21	Module 4: Classical Statistics	HW 4 Due
No. 13	04/28	Module 4: Classical Statistics	
No. 14	05/05	Module 5: Dynamic Programming	HW 5 Due & Review for Exam 2
No. 15	05/12	Exam 2	