

Spring 2012 IE 576: Applied Stochastic Processes

Time: 11:00 AM - 12:20 PM Tuesday, Thursday

Place: Room Norton 214, North Campus

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

INSTRUCTOR

Jun Zhuang, 403 Bell Hall

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Office hours: 9:30-10:30 AM Tuesday, 10:00-11:00 AM Wednesday

TEACHING ASSISTANT

Ms. Peiqiu Guan, 435 Bell Hall

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Office hours: 3:00 PM-4:00 PM Monday, 4:00 PM-5:00 PM Wednesday

REFERENCES

There is one required textbook but the all of the followings are recommended. Course slides will be distributed through UBLearns.

- ★ *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, 2008, Wiley-Interscience.
- ★ *Introduction to Probability Models*, By Sheldon M. Ross, The ninth edition, 2006, Academic Press.
- ★ *Markov Decision Processes*, By Martin L. Puterman, 1994, J. Wiley and Sons.
- ★ *Essentials of Stochastic Processes*, By Rick Durrett, 2001, Springer.

COURSE DESCRIPTION

Continuation of IE 575 (Stochastic Methods). Topics include limit theorems, classical and Bayesian statistical inferences, discrete-time and continuous-time Markov chains, simple Markov queueing networks, 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 5-7 homework 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 of the 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., \LaTeX , 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.

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. If you ever have any questions or concerns regarding the policy, particularly as it related to this course, see the instructor.

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

Week	Date	Course Material	Note
No. 1	01/17	Introduction and Chapter 5.1-5.2	First day of class
	01/19	Chapter 5.3–5.5	
No. 2	01/24	Chapter 8.1	
	01/26	Chapter 8.2	HW 1 Due
No. 3	01/31	Chapter 8.3	
	02/02	Chapter 8.4	
No. 4	02/07	Chapter 9.1	
	02/09	Chapter 9.2	HW 2 Due
No. 5	02/14	Chapter 9.3	
	02/16	Chapter 9.4	
No. 6	02/21	Chapter 7.1	
	02/23	Chapters 7.2-7.3	HW 3 Due
No. 7	02/28	Chapter 7.4	
	03/01	Chapter 7.5	
No. 8	03/06	Review for Mid-term Exam 1	Review for Mid-term Exam 1
	03/08	Mid-term Exam 1	Mid-term Exam 1
No. 9	03/13	Spring Break	Spring Break
	03/15	Spring Break	Spring Break
No. 10	03/20	Queuing Chapters 1, 2.1	
	03/22	Queuing Chapters 2.2-2.5	HW 4 Due
No. 11	03/27	Queuing Chapters 2.6-2.9	
	03/29	Queuing Chapters 2.10-2.12	
No. 12	04/03	Queuing Chapters 3.1-3.2	
	04/05	Queuing Chapter 3.3	HW 5 Due
No. 13	04/10	Queuing Chapters 3.4	
	04/12	Queuing Chapter 3.5	
No. 14	04/17	Dynamic Programming I	
	04/19	Dynamic Programming II	HW 6 Due
No. 15	04/24	Review for Mid-term Exam 2	Review for Mid-term Exam 2
	04/26	Mid-term Exam 2	Mid-term Exam 2