

SYS 6005: Stochastic Systems

Fall 2009

INSTRUCTOR: Randy Cogill
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Office Hours: Wednesday, 6:30PM-8:30PM in Olsson 111C

LECTURES: Tuesdays and Thursdays 2:00-3:15 in Mechanical Engineering Building, room 339

PREREQUISITES: APMA 3110, APMA 3120, or equivalent background in applied probability and statistics.

HOME PAGE: <http://people.virginia.edu/~rlc9s/sys6005/>

TEXTBOOK: *Introduction to Probability, 2nd Edition*, Dimitri P. Bertsekas and John N. Tsitsiklis, Athena Scientific, 2008. ISBN: 978-1-886529-23-6

ASSIGNMENTS: This course will require completion of nine homework assignments and two take-home exams. Each of these assignments will be weighed in your final grade as follows: Homework 50%, Midterm 25%, Final 25%.

Homework assignments will receive one of four grades: 0, 1, 2, or 3. These grades are assigned as follows:

- 3: Work is nearly perfect. Aside from possible typographical errors, could be used as an answer key.
- 2: Work contains some small errors. We believe that you will have a full understanding of the material after you review the answer key.
- 1: Work contains some significant errors. We believe that you need to re-read the course notes or textbook to gain a full understanding of the material.
- 0: No work was handed in, or work is entirely incorrect.

You should attempt to solve all problems on each assignment, even if your solutions to some problems are incomplete. Homework assignments may be completed individually or in groups of up to three students. Every student must turn in an assignment. When turning in an assignment,

please indicate the names of students you worked with on the assignment. You will be allowed to turn in one homework assignment up to 24 hours late.

The midterm and final will be take-home exams. **These exams must be completed individually.** Any discussion of the exam or sharing of work will be considered an honor code violation. **Anyone who cheats or commits an honor violation in this course will receive a failing grade for the course regardless of grades on other assignments.** If you have questions about the honor policy, it is your responsibility to ask the instructor for clarification.

COURSE OUTLINE:

Lecture No.	Date	Day	Topic	Assignment
1	8/25	Tu	Course Overview	
2	8/27	Th	Probabilistic Models	
3	9/1	Tu	Probabilistic Models	HW 1 out
4	9/3	Th	Probabilistic Models	
5	9/8	Tu	Discrete random variables	HW 1 due, HW 2 out
6	9/10	Th	Discrete random variables	
7	9/15	Tu	General random variables	HW 2 due, HW 3 out
8	9/17	Th	General random variables	
9	9/22	Tu	Estimation and detection	HW 3 due, HW 4 out
10	9/24	Th	Estimation and detection	
11	9/29	Tu	Probability bounds	
12	10/1	Th	The weak law of large numbers	HW 4 due
	10/6	Tu	NO CLASS: READING DAY	
	10/8	Th	MIDTERM EXAM DUE	
13	10/13	Tu	Intro to Markov chains	HW 5 out
14	10/15	Th	Linear algebra review	
15	10/20	Tu	Steady-state analysis of Markov chains	
16	10/22	Th	Steady-state analysis of Markov chains	HW 5 due, HW 6 out
17	10/27	Tu	Steady-state analysis of Markov chains	
18	10/29	Th	Markov chain examples	
19	11/3	Tu	Transient analysis of Markov chains	HW 6 due, HW 7 out
20	11/5	Th	Transient analysis of Markov chains	
21	11/10	Tu	The weak LLN for Markov chains	
22	11/12	Th	Hidden Markov models	HW 7 due, HW 8 out
23	11/17	Tu	Hidden Markov models	
	11/19	Th	Poisson processes	
24	11/24	Tu	Poisson processes	HW 8 due, HW 9 out
25	11/26	Th	NO CLASS: THANKSGIVING	
26	12/1	Tu	Continuous-time Markov processes	
27	12/3	Th	Continuous-time Markov processes	HW 9 due
	12/8	Tu	FINAL EXAM DUE	