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Course Objectives:

Review of stochastic processes useful in the modeling of complex systems. Introduction to Stochastic Processes. Discrete Time Markov Chains fundamentals and applications on performance analysis. The exponential distribution and The Poisson Process. Continuous and Time Markov Chains fundamentals. Applications in Queueing Theory. Performance Analysis of Queueing Systems.

Recommended preparation: ISE 220 or equivalent.

Textbook. Ross, S. M., Introduction to Probability Models, 11th ed, Academic Press, 2014.

Suggested reference: Ross, S. M., Stochastic Processes, 2nd ed, Wiley 1995

Course Outline

Week	Topics	Hw	Chapter
1	Review of conditional probability and conditional expectation.		2,3
2	Computing Expectations and Probabilities by conditioning. Compound Random Variables.	1	3
3	Introduction to Stochastic Processes. Discrete time Markov chains. Chapman-Kolgomorov equations. Examples.		4
4	Discrete time Markov chains. Limiting Probabilities and the Stationary distribution. Examples.	2	4
5	Discrete Time Markov chains. First passage times.		4
6	The exponential distribution. Properties.		5
7	Poisson processes.	3	5
8	Generalizations of the Poisson Process.		5
9	Review and Midterm Exam.		2,3,4,5
10	Continuous Time Markov chains. Kolmogorov differential equations. Examples.	4	6
11	Continuous Time Markov chains. Birth and Death processes. The Transition Probability Function. Applications.		6
12	Continuous Time Markov chains. Limiting Probabilities.	5	6
13	Queueing Theory. Introduction. Steady-State probabilities. Examples		8
14	Queueing Theory. Exponential models. Examples.	6	8
15	The System M/G/1 and variations. Multiserver Queues.		8
16	Review and Final Exam.		all

Grading Policy:

Assignments 30%
 Midterm 30%
 Final Exam 40%

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Students with Disabilities. Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776