ISE 339
Stochastic Models and Applications
Spring 2017

Course description: An introduction to the theory, algorithms, approximations, and applications of stochastic processes. Topics studied include Markov chain and continuous time Markov process models and applications, renewal processes, Brownian Motion, analytical and numerical approximation methods, Markov decision processes. Application areas include inventory control, reliability, queueing, and decision analysis.

Prerequisites: ISE 230 or equivalent background

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Office Hours: T-R 12-2 PM and by appointment

Teaching Assistant: **Mertcan Yetkin** ***Email:*** **mey316**

Office Hours: TBD

Textbook: Sheldon M. Ross, Introduction to Probability Models, 11th Ed., Academic Press, 2014.

Grade Determination:		
	2 Midterm Exams	24% each
	Final Exam	32%
	Graded Assignments	20% (*lowest HW dropped*)

Course objectives:
Upon completion of this course, students will:

- understand the need for system models that capture random behavior to assess the risk of undesirable outcomes.
- be able to model a number of important industrial and service systems and analyze those models to improve system performance.
- be able to construct algorithmic solution strategies to explore system models that have been developed.

Course Outline:

Week	***Topic***	***Readings***
1	Preliminaries / "Conditioning"	Ch 1-2 (review), Ch 3.1-3.5, 3.7
2-3	Markov Chains	Ch 4.1-4.5 (review)
4-5	Markov Chains	Ch 4.6-4.11
	*** *EXAM 1* ***	
6-7	Poisson Process and Generalizations	Ch 5
7	Continuous-time Markov Chains	Ch 6.1-6.5 (review)
8-9	Continuous-time Markov Chains	Ch 6.6-6.8
	****EXAM 2****	
10-11	Renewal Theory and Applications	Ch 7.1-7.8
12-13	Queueing Theory and Modeling	Ch 8.1-8.3 (review), 8.4-8.9
14	Brownian Motion	Ch 10.1-10.5
finals period	*** *FINAL EXAM* ***	

Accommodations for Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center 212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

Principles of Equitable Community: Lehigh University endorses The Principles of our Equitable Community (http://www4.lehigh.edu/diversity/principles). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.