

Fall 2008

EE465

Probabilistic Methods in Computer Systems Modelling

Non-DEN:

Lecture: TuTh 11:00pm - 12:20pm, SSL 150

DEN:

Lecture: TuTh 12:30pm - 1:50pm, OHE 100B

Discussions: (pick one of the two)

M 10:00am -10:50am, OHE 120

F 11:00am -11:50am, GFS 116

Course Description

Probabilistic tools are among the most useful for modelling real systems and doing performance analysis. This course is designed to provide students with the ability to understand and conduct computer systems modelling and performance analysis. To establish the necessary background, the course starts with an introduction to basic probability tools and concepts. It then builds up to more advance topics that are particularly useful in modelling, such as Markov models, single queues, and networks of queues. Further, the course will cover basic methods for conducting simulations. Several case studies will be analyzed throughout the course, including some topics related to Internet modelling.

Instructor

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Teaching Assistants

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Office hours: Wed 11-1

Grader

Wei-Cherng Liao

Please direct all questions about HW grading to the grader exclusively between 12 and 12:30 on Mondays at EEB 106.

Grading

Homework 15%

Simulation project 10%

Midterm 30%

Final 45%

Extra credit: 5% towards the midterm and final exam score from a number of in-class 5-min quizzes

Topics

Basic Probability: random variables, conditional probability and expectation

Markov Chains: discrete and continuous-time

Stochastic Processes: Poisson

Queueing Theory: single queues, network of queues

Simulation: generating random variables, programming a simulation

Topics in Internet Modelling: heavy-tailed distributions, long and short range dependence

Textbooks

Introduction to Probability Models, 9th edition (8th edition also ok), Sheldon M. Ross (required)

Other recommended textbooks:

Another textbook that has almost all the material of the course: Probability and Random Processes for Electrical Engineering, Alberto Leon-Garcia

Two textbooks that have only parts of the material of the course, but are good for those that do not remember well their undergraduate probability class and find the required textbook too hard:

Introduction to Probability, Dimitri P. Bertsekas and John N. Tsitsiklis

A first course in probability, Sheldon M. Ross

Exams

Midterm: 10/16, in class

Final: Tuesday, December 16, in class.

As per university schedule, the time for the non-DEN section is 8:00am - 10:00am, and for the DEN section is 11:00am - 1:00pm. A minor adjustment will take place to have adjacent time-slots. I will offer you 30 minutes bonus time, and have the non-DEN final 8:00am -10:30am, and

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the DEN final 10:30am – 1:00pm. (The 10:00am to 11:00am time slot is free of any conflicts with other finals, so you don't have to worry about this minor adjustment.)