Class Time: Tuesday, Thursday 2:00 pm – 3:15 pm
Class Venue: HH 211

**Course Description**

Discrete Event Systems comprise of discrete state spaces and event-driven transitions, and arise across various domains including computer and communication networks, automated manufacturing systems, air traffic control systems etc. This course will cover the fundamental concepts in modeling and analysis of Stochastic Discrete Event Systems, with an emphasis on understanding computer and communication networks.

The course begins with an in-depth introduction to stochastic timed automata, and their modeling and analysis techniques. Topics subsequently covered include Markov Chains, Queuing Theory, Controlled Markov Chains and Discrete Event Simulation. A unified modeling framework centered on stochastic modeling will be followed towards achieving a better understanding of complex systems. This course will cover dynamic programming concepts and their applicability towards performance evaluation and optimization of real-world systems. The course will also provide an understanding of computer simulation techniques to study sample paths in real-world systems.

**Prerequisites**

- **Required**
  - ECE 877 J Discrete Event Systems OR Instructor’s consent

- **Desirable**
  - ECE 754 Probabilistic Methods in Systems, CS 464 Introduction to Computer Networks

**Instructor**

Neeraj Jaggi
Assistant Professor
Office: JB 209
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Office Hours: Tuesday, Thursday 3:30 pm – 5:00 pm
Textbook


Reference Texts


Format and Grading Percentages

Primarily lecture based class. There will be reading assignments, 5 – 6 home works, a course project, and three exams.

Exams 55%
- Exam 1: 15 points;
- Exam 2: 15 points;
- Exam 3 (COMPREHENSIVE): 25 points;

Home Works 30%
- One homework per major topic
- Solution will be provided after submission deadline
- Each submission has equal weight

Research Course Project 15%

Exam Schedule

Since the exams will be held during class hours, you should not have any conflicts. However, if you do have a scheduled conflict for the exam period, see the instructor. There will be NO make-up exams. All exams will be open book/notes (no laptops allowed), but will be time constrained. Exams will typically consist of quantitative problems, modeling and design questions, multiple choice (true-false) questions and short answer questions and will focus on concepts. Tests 1 and 2 will cover the material covered until the previous lecture before the test. Test 3 will be comprehensive, but it will place extra emphasis on incremental material covered since the previous exam.

EXAM DATES:
- Exam 1: Feb 25th, 2010 (15%)
- Exam 2: April 1st, 2010 (15%)
- Exam 3: May 6th, 2009 (25%, comprehensive)
Tentative List of Topics

- Introduction to Stochastic Discrete Event Systems: Chapter 6
- Markov Chains: Chapter 7
- Introduction to Queuing Theory: Chapter 8
- Controlled Markov Chains: Chapter 9
- Discrete Event Simulation: Chapter 10
- Sensitivity Analysis: Chapter 11 (Time permitting)

General Policies

- The exams and home works will be based upon lectures and required reading.
- Our policy will be to return graded material within one week of handing it in. All issues regarding graded material should be resolved within one week of the date graded material is returned. Any graded material that is not picked up within two weeks will be discarded.
- All home works and other submissions must be submitted by the indicated deadline. Submissions after the deadline will not be graded. Exceptions will require a valid and documented reason. There will be no make-ups for home works.
- Blackboard would be used extensively for posting assignments and grades.
- Research Course Project is intended to give you a first hand, in-depth experience in researching a new area in networking. Groups of up to two students are allowed per project, but a more in depth study and report is expected from groups of two. You are allowed to choose from a variety of research topics. The research project would involve multiple mandatory paper readings. Your task includes critiquing the material, organizing it in a framework of your own, and making sound judgments about the past and future directions of work in the research area. Creativity and original ideas are highly encouraged. The project report should be a document no longer than 10 pages. It is expected that the course project should be of high quality, reflecting deep understanding and original thinking, and be written like a professional technical paper, and will be graded strictly.
- Academic Honesty: Please refer to the university’s academic honesty statements. While it is encouraged to interact with your colleagues, your submissions must be only your own work. Issues of academic dishonesty will be dealt with severely.