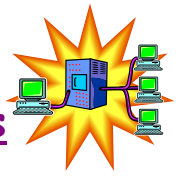
ECE 5660 Fundamentals of Networks  Spring 2012

Course Description:

Introductory course in tools and techniques for modeling and performance evaluation of communication networks, synthesis of network protocols, analysis of network protocols' operation, and performance evaluation of network protocols. Analytical tools studied include: Advanced Probability Theory, Discrete- and Continuous-time Markov Chains, Renewal Theory, and Fundamental and Intermediate Queueing Theory. We will also cover simulation techniques, and (time permitting) algorithmic tools from graph theory. Basic mechanisms used in designing practical wireless and wired communication systems will be used as examples. Discussion of some papers will help students learn the best practices, as well as common mistakes, occurring in modeling and performance evaluations of communication networks.

Pre-requisite: ECE 3100 or equivalent (essential - absolutely no exceptions)

Recommended (optional) pre-/co-requisities: ECE 4110 and ECE 4450

Course Instructor: Prof. Zygmunt J. Haas, 324 Rhodes Hall, haas@ece.cornell.edu
Office Hours: Tuesdays, 3:00pm - 4:30pm (or by appointment)

Course TA: none

Course URL: http://people.ece.cornell.edu/haas/ece5660/

Course Schedule:

Lectures: Tuesdays, Thursdays, 11:40am-12:55pm; Room: Phillips 407

Course Text:

- D. Bertsekas and R. Gallager, "Data Networks," second edition, Prentice Hall 1992
- References to technical articles, to be provided during the course

Additional (Optional) Text:

- A. Papoulis and S.U. Pillai, "Probability, Random Variables and Stochastic Processes," fourth edition, McGraw Hill, 2002

Grading Policy:

Homework sets:	25%	
Prelim:	35%	(T.B.A)
Final exam:	40%	(Tuesday, May 15, 2012, 7:00pm - 9:30pm)
Total:	100%	

1. All of the above three components are essential for the final grade.
2. No one is exempt from the exams. If you have missed an exam due to a legitimate reason, you need to reschedule a makeup exam as soon as possible.

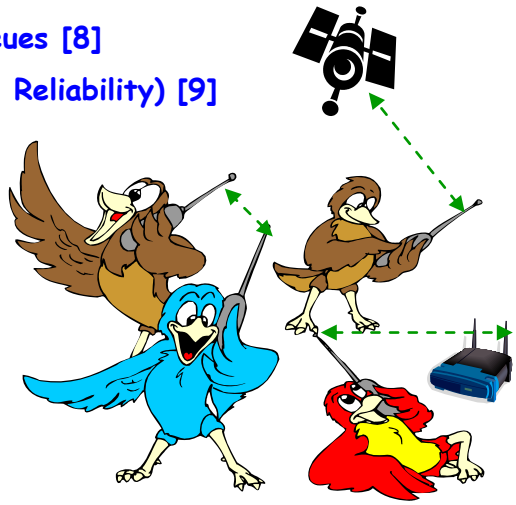
3. If you did not turn in up to 2 homework sets due to a legitimate reason, the turned-in assignments will carry a total of the 25% of the final score.
4. Any final score component missed not due to a legitimate reason will count as no credits in the final score calculation.
5. See the course web site for what constitute a legitimate reason.
6. Note: Independent work is assumed in all the grading components of the course, including homework sets.
7. Each student in this course is expected to abide by the Cornell University Code of Academic Integrity (http://cuinfo.cornell.edu/Academic/AIC.html). Any work submitted by a student in this course used as part of a grading component, will be the student's own work. All outside assistance should be clearly specified and acknowledged.

Reading Assignments: assigned weekly; if not specified otherwise, the source is the course textbook

Homework Assignments: There will be 6-7 homework sets. Each assignment is due in class 2 weeks after its distribution (usually on Tuesdays). Some assignments may require computer use.

Tentative Syllabus [relevant textbook chapter(s)]:

1. Probability Refresher [1-3]
2. Introduction to Performance Evaluation of Communication Networks […]
3. Poisson Process and Exponential Distribution [5]
4. Discrete-Time Markov Chains [4]
5. Continuous-Time Markov Chains [6]
6. Renewal Theory [7]
7. Fundamental Queuing and Loss Models [8]
8. Intermediate Queuing Theory and Networks of Queues [8]
9. Performance Evaluation of Quality-of-Service (incl. Reliability) [9]
10. Advanced System Modeling Concepts […]
11. Simulation as a Performance Evaluation Tool [11]
12. Summary of the Course and Future Directions […]



ZJH; January 15, 2012