ECE 440/640: Performance Analysis of Local Computer Networks Fall 2009
Tentative Syllabus

General Information

Instructor:	Kuang-Ching Wang (kwang@clemson.edu) 308 Fluor Daniel Building, (864) 656-0846 Office Hours: Mondays 2 pm – 3 pm. Thursdays 2 pm – 3 pm. Other times by appointment.
Lecture:	Tuesday, Thursday 12:30 – 1:45pm, 219 Riggs
Course webpage:	http://bb.clemson.edu
Prerequisites:	ECE 272 and ECE 317/Math 400 or equivalent
Required textbook:	Joseph Hammond and Peter O'Reilly, Performance Analysis of Local Computer Networks, Addison Wesley, 1986, ISBN 0-201-11530-1. The book is out of print. University Bookstore sells a photocopied version. Used ones are also available from bookstores on Internet.
Optional supplement:	1. W. Stallings, Local and Metropolitan Area Networks, 6th ed., Prentice Hall, 2000. 2. A. Tannenbaum, Computer Networks, 3rd ed., Prentice Hall, 1996

Course Description

Computer networks are an important communication infrastructure for now and the future. Among the wide range of networking technologies, local computer networks are closest to the end users and their performances largely determine user satisfaction. Local computer networks can be built in various ways utilizing a number of different wired and wireless technologies. Nevertheless, their operation and performance characteristics can be captured in a few simple models applicable to statistical analyses. Effective use of the analytical models allows one to evaluate local computer networks and to systematically determine the most effective local computer network solutions for specific purposes.

Offered in fall 2009, this course introduces methods of modeling and performance analysis of local computer networks to senior undergraduate students and entry graduate students. Building on random process concepts and basic probability, basic queueing models are constructed and their performances are analyzed. The effect of performance requirements on the choice of network solutions is considered, standard architectures and protocols are examined, and practical examples are discussed in the course.

As one of the required courses for ECE undergraduate students, the course places a significant emphasis on students' ability to perform statistical analysis. By the end of the course, students are expected to be able to:

- Identify standard architectures and protocols of local computer networks.
- Utilize standard network models and probabilistic traffic models to analyze local computer networks.
- Carry out mathematical calculations required in statistical analyses, including calculus, probability functions, logical and numerical algebra.
- Determine suitable models, performance measures, and design factors of local computer networks.

Tentative outline

1.	**Review of probability**	(notes, 0.5 weeks)
2.	**Introduction to Networks**	(Chap.1, 0.5 weeks)
3.	**Protocols and network architecture**	(Chap.10, 1 week)
4.	**Introduction to local area networks**	(Chap.5, 1 week)
5.	**Data flow in networks and queues**	(Chap.3, 2.5 weeks)
6.	**Principles of medium access control**	(Chap.6 and notes, 2 weeks)
7.	**Token passing methods**	(Chap.7 and 8, 3 weeks)
8.	**Random access techniques**	(Chap.9, 2.5 weeks)
9.	**Recent developments in LAN technology**	(notes, 1 week)
10.	**Exams**	(1 week)

Evaluation

Probability review quiz	2%
Homework	10%
First exam	23%
Second exam	25%
Final exam	40%

ECE 640 students will have additional homework, exam questions, and reading assignments beyond those given to ECE 440 students.

Class Handouts

Homework assignments, solutions, and supplemental class notes will either be provided in class or made available on-line through Blackboard (http://bb.clemson.edu/). It is the responsibility of each student to check the course webpage prior to each lecture for any assignments, solutions, notes, and other announcements posted therein.

Homework policy

Discussion among classmates on assignments and projects is allowed and encouraged. However, all homework and project reports handed in must be developed and written up by individual students unless otherwise specified. No copying of solutions from others is allowed, even if the solutions are obtained as a result of collaboration. Each assignment must be turned in at the start of class on the day it is due if not specified otherwise. Late assignments are no accepted, unless formally documented excuse for emergent reasons such as accidents is provided prior to the due date and instructor permission is obtained. The instructor retains the right to deny late turn-in requests that are avoidable with cautious planning. For accepted late assignments, the instructor retains the right to deduct 20% penalty for each additional day late.

Exam Policy

No make-up exams will be given unless an acceptable reason is presented to the instructor at least one week prior to the exam date. We have a quiz, two in-class exams, and a final exam scheduled by the University. The final exam must be taken at the University scheduled time.

Re-grade Policy

Any re-grade request of an assignment or exam must be submitted in writing on a separate piece of paper within one day of return of the graded item. Students should not write any comments or

marks on the graded item in question, or the re-grade will not be considered. The instructor retains the right to refuse a re-grade request turned in after the announced period.

Attendance Policy

Regular class attendance is strongly recommended. A student is responsible for all materials covered in class. Students are responsible for taking notes of materials taught in lectures, which may cover useful supplemental examples and illustrations that are not found outside lectures. Class cancellations will be announced in advance at the earliest possible time. In unusual circumstances that the instructor or a guest lecturer does not show up within 15 minutes, students may assume the class cancelled and leave.

Academic Honesty

The official statement of Clemson University on Academic Integrity: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form." Students suspected of violating academic integrity will be reported.

Disability Services

The official statement of Clemson University on disability services: "It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation."