COE 540: Computer Networks

Instructor: Dr. Uthman Baroudi
Lecture: ST, 3:30 - 4:45 PM
Location: Bldg. 22-132
Office hours: SSMT: 11-11:50 AM (if it is Not suitable for you, please do not hesitate to call or e-mail me to set an appointment)
Office location: 22-144
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Catalog Description:

Computer Networks is a graduate level course that has the goal of teaching students current and important results from networking research. The course assumes you have taken an undergraduate introduction to TCP/IP networking. The course will then address two fundamental areas of computer networking: *performance, and protocols & algorithms*. Within those broad categories, we will discuss a cross section of topics that are of interest to networking researchers including topics such as peer-to-peer networking, queuing theory, routing, quality of service. You will be reading a number of classic and current papers on these subjects; my lectures, the text, and supporting materials will help provide the background and overview of the topics covered by these papers. This course will provide you with the opportunity to develop skills necessary to conduct academic research in the field of computer networks.

Textbook:
- Dimitri Bertsekas and Robert Gallager, *Data Networks*, second edition, 1992, Prentice Hall, Inc.
- M. Hassan and R. Jain, High Performance TCP/IP Networking, Prentice Hall Publishing Company, 2004

References:

- S. Keshav, an Engineering Approach to Computer Networking, Addison Wesley 1997.
- J. F. Kurose and K. W. Ross *Computer Networking: A Top-Down Approach featuring the Internet* , Prentice Hall Publishing Company, 2002
- Peterson L. & Davie, B. *Computer Networks: A Systems Approach*, Morgan Kaufmann Publishers, Inc., 1996
- Jean Walrand and Pravin Varaiya, *High-Performance Communication Networks*, 2000, Morgan Kaufmann, Inc
- Tanenbaum, Andrew S. , *Computer Networks 3rd ed.*, Prentice Hall Publishing Company
- diffserv (Differentiated Services working group) Internet Engineering Task Force (IETF)

intserv (Integrated Services working group)
Web Over Wireless (WOW)

Grading:

- Assignments 20%
- Project 25%
- Midterm (November 21st, 2006) 25%
- Final Exam (January 23rd, 2007) 30%
- A > 90, F < 60

Important Dates:
- Project proposal submission: September 24th , 2006
- Project progress report submission: December 6th, 2006
- Final project report submission: January 7th, 2007

Deadlines must be respected for all course duties; otherwise, penalty will be applied. 10% will be deducted for each day for three days ONLY and after that ZERO is granted.

Tentative Outline (Subject to Change)

Week No.		Topic
1	Introduction (Chapter 1)	Introduction to Computer Networks Basic Terminology. Protocols. Communication architecture. OSI Reference model. Examples of Networks.
2	Delay Models in Data Networks (chapter 3 + Slides)	Probability and Notion of a Stochastic Process
3	Continue	Introduction to performance analysis. Little Theorem.
4	Continue	Single queue models (M/M/1. M/M/m, M/M/m/K, M/G/1)
5	Continue	Network of queues
6	Point-to-Point Protocols. (chapter 2)	Data Link Layer. ARQ Strategies. Analysis of ARQ Strategies.
7	Continue	Point-to-Point protocols at the Network layer. Point-to-Point protocols at the Transport layer
8	Routing, Flow Models and Topological Design (Chapter 5)	Design issues in Routing. Shortest path algorithms. Routing algorithms.
9	Continue	Flow models, optimal routing and topological design.
10	Continue	Capacity assignment problem. Spanning Tree topology design
11	Flow and Congestion Control (Chapter 6)	Design issues of flow and congestion control. Window flow control schemes.
12	Continue	Rate control schemes.
13	Continue	Flow and congestion control in practice
14	Project Presentations	
15	Project Presentations	