

CMPS 409 – Advanced Computer Networking

Coordinator: Dr. Ming-Hsing Chiu

Last Updated: 2/12/2008

Current Course Description: Advanced computer networking. Topics include security, optimization, custom modules, protocols, information flow management, disaster recovery, wireless application, and legal and ethical issues.

Minimum Topics:

- Computer Networks and the Internet
- Application Layer
- Transport Layer
- The Network Layer
- The Link Layer and Local Area Networks
- Wireless and Mobile Networks
- Multimedia Networking
- Security in Computer Networks
- Network Management

Learning Objectives: After completing the course a student will understand:

- The concept of network edge and network core;
- Delay, loss, and throughput in packet-switched network;
- History of the computer networking and the Internet;
- Principle of Network applications;
- The Web , HTTP, FTP and e-mail;
- The concept and programming of DNS and Web server;
- Socket programming with TCP and UDP;
- Transport-layer services and principles of congestion control;
- Internet Protocol and Routing in the Internet;
- Link-layer services and Local area network;
- Wireless access protocol, CDMA;
- Wireless LAN, Cellular Internet access and mobility management;
- Multimedia Networking Applications, streaming stored Audio and Video;
- Principles of cryptography, securing e-mail, securing TCP and network-layer;
- The infrastructure for network management; and
- The Internet standard management framework.

Relevance to Program Learning Outcomes and Evaluation:

a An ability to apply knowledge of computing and mathematics appropriate to the discipline

Justification: Discussion of standards of IP

b An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

Justification: Program interaction with TCP/IP and UDP is presented.

c	An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
	<i>Justification:</i> Students are challenged to program socket interactions to solve problems. Students have demonstrated the ability to circumvent firewalls preventing access to their sites.
d	An ability to function effectively on teams to accomplish a common goal
	<i>Justification:</i> Team orientation to software projects with sockets.
e	An understanding of professional, ethical and social responsibilities
	<i>Justification:</i> Discussion
g	An ability to analyze the impact of computing on individuals, organizations and society, including ethical, legal, security and global policy issues
	<i>Justification:</i> Students encounter these problems when writing socket programs
h	Recognition of the need for, and an ability to engage in, continuing professional development
	<i>Justification:</i> Lots of talk about the IETF
i	An ability to use current techniques, skills, and tools necessary for computing practice
	<i>Justification:</i> TCP/IP standards development allows access to these ideas

Units Covered:

- NC1 Introduction to net-centric computing (2/2)
- NC2 Communication and networking (6/7)
- NC3 Network security (3/3)
- NC4 The Web as an example of client-server computing (3/3)
- NC5 Building Web applications (7/0)
- NC6 Network management (3/0)
- NC8 Multimedia data technologies (2/0)
- NC9 Wireless and mobile computing (3/0)
- PF2 Algorithms and problem-solving (2/6)
- PF5 Event-driven programming (2/4)
- PL6 Object-oriented programming (2/10)