

LEBANESE AMERICAN UNIVERSITY
School of Arts and Sciences
Division of Computer Science and Mathematics
Spring 2007
CSC430 : Computer Networks
(MWF 14:00, BB 1003)

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Office Hours: MWF 11:00 – 13:00

Catalog Description

Introduces the structure, implementation, and theoretical underpinnings of computer networks. Topics include network standards; the ISO 7-layer reference model and its instantiation in TCP/IP; circuit switching and packet switching; streams and datagrams; physical layer networking concepts; data link layer concepts; internetworking and routing; transport layer services; nature of the client-server relationship; web protocols; building web applications: protocols at the application layer; database-driven web sites; remote procedure calls; lightweight distributed objects; the role of middleware; support tools; security issues in distributed object systems; enterprisewide web-based applications; security issues and firewalls; wireless and mobile computing; mobile Internet protocol; emerging technologies.

Purpose

To provide students with theoretical and practical base in computer communications and to introduce them to the design principles, implementation issues, and performance considerations of computer networks.

Objectives

The objectives of this course are to give students:

- An understanding of the fundamental principles of computer networking
- An understanding of internetworking principles and how the Internet protocols, routing, and applications operate
- An overview of the main and evolving technologies used in computer networks
- The necessary background in computer networks that allows students to practice in this field and that forms the foundation for advanced courses in networking
- Hands-on experience in network monitoring using sniffer tools and in network programming using sockets, rpc, or rmi

Learning Outcomes

At the end of this course, students will learn:

- The basic principles of computer networking such as network requirements and performance issues
- The OSI reference model and the TCP/IP model
- The main local area network technologies such as Ethernet, token ring, and PPP

- The main design issues of data link protocols, e.g.: encoding, framing, medium access control, and error detection/correction
- Basic models of switched networks: datagram-based and virtual circuit-based
- Packet switching technologies such as Frame Relay and ATM
- The operation of bridges and the spanning-tree protocol
- The operation of the ARP protocol
- Internetworking principles and how the Internet Protocol can be used to build a scalable and heterogenous internetwork
- The Internet addressing scheme emphasizing CIDR and subnetting
- Basic design principles of IPv6
- The operation of DHCP and ICMP protocols
- Routing principles and algorithms such as distance vector and link-state
- Routing protocols used in the Internet such as RIP, OSPF, and BGP
- The operation of the transport layer protocols UDP and TCP
- The principles of TCP flow control and congestion control
- The application-layer protocols such as DNS, Email, FTP and Web

Lecture Material and Schedule

No. of lectures	Topic	Chapter
6	Introduction to computer networks and the Internet	1
2	Performance metrics	1
6	Network applications: web, ftp, email, DNS, P2P	2
2	Socket programming	2
9	Transport layer protocols and principles: TCP, UDP	3
3	Internetworking	4
6	Routing algorithms and routing in the internet	4
6	Link layer and local area networks	5
2	Topics on advanced computer networks: multimedia networking, security, wireless and mobile networks	

Teaching Method Lectures; tutorials; home assignments

Prerequisites CSC326 – Operating Systems

Textbook Kurose and Ross: Computer Networking: A Top-Down Approach Featuring the Internet. 3rd ed., Addison Wesley, 2005

<u>Grading Policy</u>	Participation	3%
	Assignments	12%
	Quiz I (Week 6)	25%
	Quiz II (Week 11)	25%
	Final Exam	35%

Policy on Cheating

Students caught cheating on an exam receive a grade of zero on the exam in their first cheating attempt in the course and receive a warning. Students caught cheating for the second time in the same course will receive a grade of “F” in the course and a second warning.

University Attendance Policy

Missing one third of classes implies that you will have to drop the course.

Remarks

- **Participation:** This includes class attendance. You are expected to attend all classes. You are responsible for the work done and for the announcements made during your absence. The participation grade will be based on the following: You get 3 for less than two absences, 2 for two and three absences, 1 for four and five absences, and 0 for more than 5 absences. In case you have a valid excuse for not attending a class session, you have to send the instructor an email **within three days** to explain your case.
- **Deadlines** for the assignments **must be respected**. Late submissions will not be accepted.
- **Make-ups and Incomplete:** students are not automatically entitled to make-ups; F will be given until reasons (in writing) are presented and approved. Students should present their written reason **within one week after the exam date** otherwise it will not be accepted.