

COMPUTER NETWORKING

CS 450

Catalog Description

PREREQUISITE: *CS 350*. Study of computer interconnection and protocols with emphasis on network layers, error detection/correction, data transmission and compression, and topologies.

Course Objectives

- To develop an understanding of basic computer networking terminologies and concepts.
- To understand the practical realities of data transmissions and their implications in computer networks.
- To understand the concepts of addressing and routing of data packets.
- To be able to implement basic networking applications such as client-server communication, email and web browsing services, and chat facility.
- To understand the concept of internetworking of heterogeneous computer systems.

Course Materials

- Textbook
 - Title: Computer Networks 4th Edition
 - Author: Andrew S. Tanenbaum
 - Publisher: Prentice-Hall
 - Date: 2003
- Software
 - Netbeans 6
 - Java Software Development Kit
- Other Materials
 - Lecture notes, project descriptions, homework problems, and frequently asked questions (FAQ) about the course materials are **freely accessible through the Web**

Detailed Course Outline

Topic		Lecture Hours
I	Introduction to Computer Networks	3
a	Network hardware. LAN, WAN, Internet	0.5
b	Network Software. Service Primitives	0.5
c	Reference Models. OSI, TCP/IP	1
d	Laboratory Project I: UTP Cabling and Network Packet Analysis	1
II	Network Programming and Applications.	1
a	Java Network API	0.5
b	UDP Programming	0.5
III	The Physical Layer	9
a	Theoretical basis	1
b	Transmission Media. Magnetic, Twisted pair, optical, coaxial cable	1
c	Wireless Transmission, microwave, infrared, lightwave, radio	1
d	Communication satellites. GEO, LEO, MEO	1
e	Public Switched Telephone Network. ADSL, Modems, Trunks and multiplexing	0.5
f	Mobile Phone System. 0.5 st , 2 nd , 3 rd generation	1
g	Cable system. Cable modem, spectrum allocation	0.5
h	Transmission security, TEMPEST security and policy	2
i	Laboratory Project II: LAN Design and Implementation	1
IV	The Data Link Layer	3
a	Framing	0.5
b	Flow control	0.5
c	Error Detection and Correction	1
d	Data Link Protocols	1
V	MAC Sublayer	7

Topic		Lecture Hours
a	Channel allocation problem	1
b	Multiple access protocols: ALOHA, CSMA, WDMA, CSMA/CA	1.5
c	Ethernet. Encoding, Fast and Gigabit Ethernet, 802.2	1
d	Wireless LANs. 802.11 protocol stack and frame	1
e	Bluetooth. Architecture, protocol, layers	1
f	Broadband wireless. 802.16 protocol, frame, layers	0.5
g	Data Link Layer Switching. Spanning tree, bridges, routers, hubs, gateways, VLANs	1
VI	The Network Layer	8
a	Design issues	1
b	Routing algorithms	1
c	Congestion controls	1
d	Quality of service. Label switching and MPLS	0.5
e	Multicast Programming	0.5
f	Internetworking	0.5
g	Tunneling	0.5
h	Fragmentation	0.5
i	Virtual Circuits and Datagram subnets	0.5
j	IP Protocol	0.5
k	Mobile IP	0.5
l	Laboratory Project III: WLAN Design and Implementation	1
VII	The Transport Layer	6
a	TCP/IP Protocols	1
b	Flow control	1
c	Multiplexing	0.5
d	Congestion control	1
e	TCP service models	0.5
f	Performance issues	1
g	TCP/Connection Oriented Programming	1
VII	Research Paper presentation	1

Course Policy

Grading Policy

Test 1	25%
Test 2	25%
Research Paper/Presentation	10%
Homeworks/Projects	15%
Final Exam	25%

Grading scale (Percentage)

A	90 - above
B	80 - 89
C	70 - 79
D	60 - 69
F	below 60

Make-up Exams

To take a make-up exam, a student must have a legitimate reason for having missed the exam. No student, regardless of the reason, may take more than one make-up exam. It is the responsibility of the student to request a make-up exam. No make-up will be given on any missed pop test. Be prepared to take the makeup exam as soon as you return to class.

Late Assignments

All homework assignments are to be turned in at the beginning of class on the due date. Late homework will be charged 10% deduction per day.

Other Course Policies

Any individual who qualifies for reasonable accommodations under the Americans With Disabilities Act or Section 504 of the Rehabilitation Act of 1973 should contact the Instructor immediately.

Course Syllabus

The syllabus for this course can be downloaded [here](#) in PDF format.