

COE 441: Local Area Networks

Instructor: Dr. Uthman Baroudi
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Lecture: SSMTW 10:30 AM – 11:30 AM
Location: Bldg. 22-130
Office hours: Sat-Sun-Mon-Tue. 12:00 PM – 1:00 PM

Course Objectives:

The objectives of this course are:

- Students gain an in-depth understanding of different technologies for local area networks (LANs),
- Student will be able pursue his study in advanced networking courses, and
- Prepare students for easy transfer from academia into practical life (i.e. summer training, Coop, etc.)

Learning Outcomes:

The course focuses on current LANs and MANs and the newer and evolving high-speed technologies and protocols. At the end of the course a student will:

- Understand Basic network topologies and transmission media;
- Be able to understand fundamental concepts of networks & their topologies.
- Understand Logical Link Control services;
- Understand Traditional LAN technologies (Ethernet, Token Ring);
- Understand High speed LAN/MAN technologies, e.g., Fast Ethernet, G-Ethernet, FDDI; Fiber Channel;
- Understand Wireless LANs;
- Understand LAN/MAN bridging, switching
- Understand basic concepts in network management

Catalog Description

Topics covered include LAN media, topology, media access control (MAC), data link and physical layer protocols and internetworking. The IEEE 802 LAN standards are used as the basis for understanding LAN technology. An in-depth analysis is presented of the basic IEEE LAN standards: IEEE 802.2 logical link control protocol and the MAC protocols for the contention bus (802.3) and token ring (802.5) networks. An analysis of the MAC protocols for high speed LANs is presented including the ANSI X3T9.5 Fiber Distributed Data Interface (FDDI) LAN and the IEEE standards for 100 Mbps LANs: 802.3u Fast Ethernet. The newest standard for very high speed Ethernet, the 802.3z Gigabit Ethernet is explored. New and emerging techniques for wireless LANs will be discussed including 802.11b/a. Fiber-based LAN technologies are presented including ATM LAN Emulation (LANE) and Fibre Channel. Virtual local area networks (VLAN) and virtual private networks (VPN) are explored. Finally, basic network management and general performance figures evaluation for local area networks and design issues are discussed.

Prerequisite: COE 442

Textbook:

William Stallings, *Local Area Networks*, Sixth Edition, Prentice-Hall, 2000

References:

- P. Miller and M. Cummins, *LAN Technologies Explained*, Digital Press, 2000
- B. Forouzan, *Local Area Networks*, McGraw-Hill, 2003
- J. Kadamabi, et al, *Gigabit Ethernet*, Prentice-Hall Publisher, 1998

Grading policy:

- Assignments 15 %
- Quizzes 20 % (**every SATURDAY**)
- Two Major exams (15 % each)
 - 1st Major Exam on July 13th, 2004
 - 2nd Major Exam on August 2nd, 2004
- Final Exam 35 %

Proposed Outline (Subject to Change)

Week No.	Date	Topic
1	26.06.04	Introduction: LANS, protocols, LAN design issues, Layered models (Chapter 1, 2 & 3)
2	03.07.04	LAN Technologies and Transmission media: Bus, Ring, Star technologies (Chapter 4)
	05.07.04	LAN protocols: MAC & LLC (Chapter 5 & 6)
3	10.07.04	LAN protocols (Continued)
	13.07.04	LAN standards: Ethernet family (IEEE 802.3) (Chapter 7) 1st Exam
4	17.07.04	LAN standards: Token ring (IEEE 802.5) (Chapter 8)
	19.07.04	LAN standards: Fiber Channels (Chapter 9)
5	24.07.04	Wireless LANs (Chapter 10)
6	31.07.04	VLAN (handout)
	02.08.04	VPN (handout) 2nd Exam
7	07.08.04	Bridging (Chapter 12)
	10.08.04	Introduction to Network Management (Chapter 13)
8	14.08.04	LAN Performance Figures & design issues (Chapter 14)

Computer Usage

Students are expected to have access to UNIX and PCs laboratories to run the programming assignments. Network simulators such as NS and OPNET shall be used to design, analyze, and evaluate network's performance.

Design Aspect(s)

As a partial fulfillment of the course, students shall carry out network design projects.