Course Description: In this course, we will study computer networks and distributed computing systems. We will discuss topics ranging from the transmission of data across physical communication media to contemporary distributed computing environments.

Prerequisites by topic:

1. Computer Organization and Architecture
2. Programming Language

Objective: The objective of this course is to introduce students to Computer Networks including LAN, MAN, WAN, Internetworking and their applications. Students will use COMNET III Simulation tool to evaluate different network designs and topologies.


Computer Networks, Prentice Hall, Tanenbaum, 1996

Instructor: Dr. Nizar Al-Holou, Professor

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Course Web page: http://eng-sci.udmercy.edu/personal/alholoun/

Office Hours: 3:00 – 6:00 P.M. T, TH

Lecture: 6:35 – 7:50 P.M. T, TH
Computer Usage: You will COMNET II in the ECE lab to simulate different network architectures and evaluate their performances. The reports must be submitted in hard and soft copy.

Grading:

1. Midterm Exam (10/19/99) 20%
2. Final (12/14/99) 35%
3. Project 30%
4. Homework and labs 15%

[No late homework or make-up exam exceptions make only under compelling circumstances]

Grading: 100-93% = A  78-79% = C+
92-90% = A-
73-77% = C
88-89% = B+
70-72% = C-
83-87% = B
60-69% = D
80-82% = B-
Below 60%=F

[Deadline to "Delete" a course is Oct 1, 1999 to "Withdrawal" from a course is November 24, 1999]

Topics:

1. Data Transmission
2. Transmission Media
3. Local Asynchronous Communication (RS-232)
4. Long-Distance Communication (Carriers and Modems)

5. Packet Transmission

6. Packets, Frames, And Error Detection

7. LAN Technologies and Network Topology

8. Hardware Addressing and Frame Type Identification

8. LAN Wiring, Physical Topology, And Interface Hardware

9. Extending LANs: Fiber Modems, Repeaters, Bridges, and Switches

10. WAN Technologies and Routing

11. Network Ownership, Service Paradigm, And Performance

12. Protocols and Layering


14. IP: Internet Protocol Addresses

15. Binding Protocol Addresses (ARP)

16. IP Datagrams and Datagram Forwarding

17. IP Encapsulation, Fragmentation, And Reassembly

18. The Future IP (IPv6)

19. Error Reporting Mechanism (ICMP)

20. TCP: Reliable Transport Service

21. Client-Server Interaction

22. The Socket Interface

23. Example of A Client and A Server

24. Naming With the Domain Name System

25. Electronic Mail Representation And Transfer
Project

The most significant work you will do in this course will be a semester project, which will count as 30% of your grade. The project consists of two phases:

Phase I:

- Select a home page for Data Communication and/or Networking classes, Network Infrastructure, Networking Company such as Lucent, SYSCO that relates to education
- Page overview
- Network Infrastructure
- Course Notes and Animations
- Programming Examples
- Student/ Research Projects

The sooner you select a home page, I'll reserve it for you. It must be done by 9-21-99.

The presentation is scheduled on 10-5-99 with a report.

Phase II

- Select a project for your group. The project should be about a network and may include:
  - Design issues, software implementation, evaluation and demonstration:
  - Development of Client and Server in Windows/Unix Environments,
  - Compression Algorithms,
  - Development of Routing Algorithm Using Graph Theory,
  - Fuzzy logic based routing,
  - Multimedia Development, or
  - Java Script that implement networking concepts or different routing algorithms
- Title and summary of Project is due 10/29/99
- Presentation and report is due 12-3-99

The report should include a hard copy, a softcopy in Microsoft word and HTML, and a copy of the presentation in Power Point.