Textbook:


Goals:

The aim of this course is to provide the student with a deep understanding of the principles, structure, and operation of computer networks. The student completing this course should have a strong knowledge of the protocols and mechanisms used in the Internet, and of the design and operation of both wide-area and local-area computer/communication networks. The course will also involve implementation of simple protocols using application-level network programming.

Required Background:

- **Pre-requisites:** CISC 260 (Machine Organization and Assembly Language) or CPEG 222 (Microprocessor Systems) is an essential pre-requisite.
  
- Knowledge of basic probability theory is helpful.
  
- Good programming skills in the C or C++ languages are required.

Students cannot get credit for more than one of CISC 250, CPEG 419, CISC 450, CISC 650, CPEG 651, and ELEG 651.
Contents:

1. Introduction: Network architectures and protocols; protocol layering; the Internet and OSI Reference Models; the role of standardization in network protocols. 2.5 weeks.

2. The Application Layer (Selected topics): Basic services; qualities of service; network programming; HTTP, Domain Name System (DNS). 2 weeks.

3. The Transport Layer: Basic principles; reliable data transfer; pipelined protocols; connection management; flow and congestion control in the Transport Layer; the TCP and UDP protocols. 3.5 weeks.

4. The Network Layer: Service models; data plane: the IPv4 and IPv6 protocols; control plane: routing algorithms. 3 weeks.

5. The Data Link Layer and Local Area Networks: Data link functions; error detection and correction; multiple access protocols; CSMA, CSMA/CD and ALOHA protocols; Ethernet; hubs, bridges, and switches. 2 weeks.

Notes:

1. No classes on Labor Day (Monday Sept. 3) and during the Thanksgiving Break (Nov. 19 - 23).

2. Mid-Term Exam: Monday October 29.

3. Final Exam: In Finals week according to University’s Final Exam schedule (exact date to be announced).