Digital Communication Networks – 3CR

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Course description

The objective of this course is to introduce the concepts of computer network technology and the principles that make it work. Concepts will be illustrated by studying technologies used in wide area networks, metropolitan area networks and local area networks. Students will also be introduced to fundamental network protocols and Internet Protocol Family. This course is primarily concept oriented. No computer programming assignments are planned. Students will also learn how to use simple network diagnostic software tools.

Prerequisites by topics

Good knowledge of data structures used in computer programming, elements of programming in C/C++; EE221 satisfies these requirements.

Textbooks and/or other required material

1. *Data Communications and Networking, 3rd ed.* by B. A. Forouzan, Mc Graw Hill, ISBN: 0-07-292354-7
2. *TCP/IP Protocol Suite, 2ed* by B. A. Forouzan, Mc Graw Hill, ISBN : 0-072-46060-1

Course Objectives

1. Learn the top-down concept of computer networks, seven layer OSI model, and Internet model
2. Learn the concept of digital communication and data transmission
3. Learn the concept of packet- cell- and frame-based digital communication
4. Lear the concept of connection set up and routing
5. Learn the basics of the most common Internet protocols: HTTP, SMTP, POP3
6. Acquire a better understanding of the computer networks via numerous homework assignments

Topics Covered

1. Basic Concepts, The OSI Model, The Internet Model
2. Signals, Principles of Encoding and Modulation
3. Digital Transmission: Interfaces and Modems
4. Serial Port Access, Telephone Modem Control
5. Digital Transmission: Media, Multiplexing, Error Detection and Correction
6. Data Link Control: asynchronous, synchronous, bit-oriented
7. Local Area Networks, Metropolitan Area Networks, Wide Area Networks
8. Packet Switching
9. Examples: Point-to-Point Protocol , ISDN, X.25, Frame Relay, ATM, SONET/SDH
10. Networking and Internetworking devices
11. Transport Layer
12. Upper OSI Layers
13. TCP/IP Protocols, TCP/IP, UDP, Client-Server architecture
14. Examples of selected upper level protocols (SMTP, POP3, HTTP, TIME, ECHO, FTP, Telnet)

Teaching History

1. Offered for the first time in Spring 2000 as a generic Computer Networks course
2. Lectures Recorded last time in Spring 2004 – Voice annotated PowerPoint, via BlackBoard.Bradley.edu or on two CD-R
3. Currently planned to be taught only as prerecorded self-paced tutorial in summer and interim semesters
4. This course overlaps about 40% with Embedded TCP/IP