CS 5290: DATA COMMUNICATION AND NETWORKS

Semester Hours: 3.0  
Contact Hours: 3

Coordinator: Sankardas Roy

Text: Data and Computer Communication

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Year: 2013

SPECIFIC COURSE INFORMATION

Catalog Description:
Data communication concepts; network topologies; transmission media; network access control; communication protocols; network architecture; LANs, MANs, and WANs; internetworking. Prerequisite: CS 3270

Course type: ELECTIVE

SPECIFIC COURSE GOALS

• I can define and describe network architecture (layered approach and hierarchical approach).
• I can describe wireless communications.
• I can describe analog and digital signals and their role in data transmission
• I can describe transmission impairments (distortion and noise limitations on system performance).
• I can describe the multiplexing of signals for data transmission.
• I can describe contention protocols.
• I can describe data compression and related techniques.
• I can describe data integrity and related techniques.
• I can describe data security and related techniques.
• I can describe the features of flow control and related techniques.

LIST OF TOPICS COVERED

• Data Communication Concepts
- Networks and open system standards: the OSI reference model
- Network topologies and the physical layer
  - Bus/Tree topology, ring topology, star topology
- The future of data communications

- Transmission Media and Transmission Technologies
  - The electrical interface
  - Metallic media
  - Optical fiber media
  - Wireless media (line-of-sight media)
  - Baseband and broadband transmission
  - Transmission bandwidth (link capacity)
  - Codes
  - Analog and digital signals
  - Modulation and demodulation, modems and modem standards
  - Transmission impairments (distortion and noise limitations on system performance)

- Data Transmission
  - Transmission modes
    - Simplex, half-duplex, full-duplex communications
    - Serial and parallel transmission
    - Synchronous transmission
    - Asynchronous transmission
  - Interface standards
  - Multiplexing of signals
  - Data compression

- Protocol Concepts - Media Access Control
  - Protocol basics
  - MAC protocols (CSMA/CD and Token passing)

- Data Security and Integrity
  - Error detection and correction
  - Encryption and decryption
  - Viruses, worms, and hacking
• Local Area Networks
  o LAN standards (IEEE standards 802 for LANs)
  o Interconnecting LANs
  o LAN Hardware (server platforms, backup devices, LAN adapters, printers, etc.)
  o LAN system software, LAN application software
  o LAN selection criteria
• Metropolitan Area Networks (MANs) and Wide Area Networks (WANs)
  o Network routing
  o Public data networks
  o Circuit-switched data network
  o Packet-switched data network
  o Internet protocol
  o ISDN
  o Electronic mail
• Network Architecture
  o Layered approach
  o Hierarchical approach
• Network Interconnections (Internetworking)
  o LAN-to-LAN connections and LAN-to-Host connections
  o Repeaters, Bridges, Routers, and Gateways
  o Interconnection utilities