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.
- I can analyze relevant research and communicate my findings
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
  - LAN standards (IEEE standards 802 for LANs)
  - Interconnecting LANs
  - LAN Hardware (server platforms, backup devices, LAN adapters, printers, etc.)
  - LAN system software, LAN application software
  - LAN selection criteria

- Metropolitan Area Networks (MANs) and Wide Area Networks (WANs)
  - Network routing
  - Public data networks
  - Circuit-switched data network
  - Packet-switched data network
  - Internet protocol
  - ISDN
  - Electronic mail

- Network Architecture
  - Layered approach
  - Hierarchical approach

- Network Interconnections (Internetworking)
  - LAN-to-LAN connections and LAN-to-Host connections
  - Repeaters, Bridges, Routers, and Gateways
  - Interconnection utilities