Brooklyn College
Department of Computer and Information Sciences

CISC 3345 [49.2] Computer Networks
3 hours; 3 credits


Textbook

Required Textbook: Data and Computer Communications, 8th ed, by - W. Stallings (Pearson /Prentice-Hall)

Reference Textbook: Computer Networking with Internet Protocols and Technology by - W. Stallings (Pearson /Prentice-Hall)

Syllabus

1. Introduction to Computer Networks
   Chapter 1:
   Chapter 10 (Sections10.1-10.5):
   - Station Interconnection
   - Switched Communications Networks
   - Circuit Switching vs. Packet Switching Networks
   - Packet Switching Alternatives
   - Frame Relay and ATM Networks
   - Broadcast Networks: Satellite Networks, Radio Networks, LANs
   - The Internet
   - Intranets and Extranets

2. Protocols
   Chapter 2: Review Questions: 2.1 thru 2.8; HW Problems: 2.2, 2.5, 2.6
   - Protocol Concepts & Functions
   - The OSI Reference Model
   - The TCP/IP Protocol Architecture
   - Protocol Implementation
   - TCP/IP Sample Configuration
   - Traditional vs, Multimedia Internet Applications

3. Internetworking
Chapter 18: Review Questions: All; HW: 18.2, 18.3, 18.6, 18.10, 18.12, 18.22
Chapter 21 (Section 21.6) Review Question: 21.15; HW: 21.13
Chapter 15 (section 15.4): Review Questions: 15.10
- Requirements
- Approaches: Routers, Bridges, etc.
- Internet Protocols: IP, ICMP
- IPv6, ICMPv6
- Internet Routing: ARP, RIP, OSPF, EGP, BGP
- Virtual Private Networks
- IP Security (IPSec) Standards

4. Transport Protocols
Chapter 7 (Reference Text - Section 7.3):
Chapter 24 (Section 24.4): Review Questions: 24.7, 24.8; HW: 24.4
- Transport Layer Issues
- The Transmission Control Protocol (TCP)
- TCP Mechanisms, Policies, and Traffic Control
- The User Datagram Protocol (UDP)
- Real-Time Transport Protocol (RTP)

Exam #1

5. Application Protocols
Chapter 23 (Section 23.1):
  Review Questions: 23.1 thru 23.6; HW: 23.1, 23.2, 23.12
Chapter 3 (Reference Text): Link to Review Questions and HW
  Review Questions: 3.1 thru 3.11; HW: 3.1, 3.2
Chapter 2 (Appendix):
Chapter 22: Review Questions: 22.2 thru 22.4; HW: 22.3, 22.4
  - The Client-Server Paradigm
  - Directory Services: DNS
  - Remote Login: TELNET
  - File Transfer: FTP
  - Trivial File Transfer Protocol (TFTP)
  - Electronic Mail: SMTP, MIME, POP
  - Network Management: SNMP

6. Web Protocols:
Chapter 23 (Section 23.2): Review Questions: 23.7 thru 23.9
  - Universal Resource Locators (URLs)
  - Hypertext Transfer Protocol (HTTP)
  - Hypertext Markup Language (HTML)
  - XML, XSL, XHTML
  - Common Gateway Interface (CGI)
  - Active Web Pages: Java Technology & Java Applets

7. Multimedia Protocols
Chapter 24 (Sections 24.2-24.3): Review Questions: 24.2 thru 24.6
- Real-Time Traffic
- Session Initiation Protocol (SIP)
- VoIP (Voice over IP) and other Multimedia Applications

8. The Network Layer
   Chapter 10 (Sections 10.5-10.6): HW: 10.8, 10.9, 10.10
   - Network Layer Issues
   - Virtual Circuit vs. Datagram Service
   - Network Access Protocols: X.25

9. Frame Relay Networks
   Chapter 10 (Section 10.7): Review Questions: 10.8, 10.9
   - Frame Relay vs. Traditional Packet Switching
   - Frame Relay Protocol Architecture
   - Frame Relay Data Transfer
   - Frame Relay Congestion Control

10. ATM (Asynchronous Transfer Mode) Networks
    Chapter 11: Review Questions: All
    Chapter 8 (Section 8.2 pp.255-258)
    - ATM Protocol Architecture
    - ATM Logical Connections
    - ATM Cells
    - Transmission of ATM Cells
    - ATM Service Categories

Exam #2

11. Local Area Networks
    Chapter 15: Review Questions: All; HW: 15.3, 15.4, 15.5
    Chapter 16 (Sections 16.1-16.2, Appendix A, B):
        Review Questions: 16.1 thru 16.7; HW: 16.3
    Chapter 7 (Sections 7.1-7.2, Appendix 7A): Review Questions: 7.2 thru 7.11
    - LAN Topologies: Bus, Ring, Star
    - LAN Transmission Media: Twisted Pair, Coaxial Cable, Fiber Optic Cable
    - LAN Protocol Architecture: The IEEE 802 Architecture
    - The Logical Link Control (LLC)
    - Flow Control and Error Control Mechanisms
    - Medium Access Control (MAC) Protocols: CSMA/CD, etc.
    - Shared Media vs. Switched LANs
    - Layer 2 vs. Layer 3 Switches
    - High Speed LANs: Fast Ethernet, Gigabit Ethernet, etc.

12. Wireless Networks
    Chapter 9: Review Questions: All
    Chapter 17: Review Questions: All
    - Wireless Lan Applications
- Wireless LAN Technology
- Spread Spectrum Technology
- IEEE 802.11 Architecture and Services
- IEEE 802.11 MAC Layer
- IEEE 802.11 Physical Layer
- Security Considerations