CISC 3340: Computer Networks and Protocols
Text: Data and Computer Communications, 10th ed.
Reference Text: Computer Networking with Internet Protocols and Technology
by - W. Stallings (Pearson/Prentice-Hall)

Course Outline

1. Introduction to Computer Networks
Chapter 1:
Chapter 9: Review Questions: 9.1 thru 9.10; HW Problems: 9.7 thru 9.14
- Telecommunications Basics
- A Communications Model
- Station Interconnection
- Switched Communications Networks
- Circuit Switching vs. Packet Switching Networks
- Packet Switching Alternatives
- Frame Relay Networks
- Asynchronous Transfer Mode Networks (ATM Networks)
- Broadcast Networks: Satellite Networks, Radio Networks, LANs
- The Internet
- Intranets and Extranets

2. Data Transmission Fundamentals
Chapter 3: Review Questions: 3.1 thru 3.10;
     HW Problems: 3.1 thru 3.10, 3.15, 3.16, 3.18, 3.19, 3.21
Appendix A,D:
- Data, Signals, and Transmission
- Analog vs. Digital
- Channel Types: Simplex, Half-Duplex, Full-Duplex
- Parallel vs. Serial Transmission
- Asynchronous vs. Synchronous Transmission
- Time Domain Concepts
- Frequency Domain Representation of Signals
- Bandwidth
- Filters
- Transmission Impairments: Attenuation, Delay Distortion, Noise, Echo
- Channel Capacity

3. Data Encoding
Chapter 5: Review Questions: 5.1 thru 5.11; HW: 5.7, 5.8, 5.9, 5.10, 5.19, 5.20
Chapter 8: Review Questions: 8.1 thru 8.7; HW: 8.1, 8.7, 8.8, 8.9, 8.12, 8.13
Chapter 16: (Section 16.1): Review Question: 16.1
- Digital Data <---> Digital Signals (Transceivers)
- Digital Data <---> Analog Signals (Modems)
- Analog Data <---> Digital Signals (Codecs)
- Speech Encoding: PCM, ADPCM
- Analog Data <---> Analog Signals
- Muliplexing: FDM & TDM
- DSL Lines: T-1, E-1, ISDN, ADSL, xDSL
- ISDN BRI and PRI Channels and Services

Examination #1:   exam#1 outline

4. Protocols
Chapter 2: Review Questions: 2.1 thru 2.11; HW Problems: 2.2, 2.5, 2.6, 2.7
Appendix E: The OSI Model
Appendix O: TCP/IP Example
- Protocol Concepts & Functions
- A Simple Protocol Architecture
- The TCP/IP Protocol Architecture
- Protocol Implementation
- TCP/IP Sample Configuration
- Traditional vs, Multimedia Internet Applications

5. Internetworking
Chapter 14:   Review Questions: All; HW:14.2, 14.3, 14.6, 14.9, 14.10, 14.12, 14.22
Chapter 21: Review Questions: All; HW:21.5, 21.9, 21.14. 21.15
Chapter 22: Review Questions: All, HW:22.3, 22.4, 22.5
Chapter 23: Review Questions: All, HW 23.2
Chapter 27 (Section 27.1) Review Question: 27.1; HW: 27.1
Chapter 11 (section 11.3): Review Question: 11.8
- Principles of Internetworking
- Approaches
- Internet Protocols: IP, ICMP
- IPv6, ICMPv6
- Internet Routing: ARP, RIP, OSPF, EGP, BGP
- Virtual Private Networks
- IP Security (IPSec) Standards
- Multicasting
- Mobile IP
- Integrated Services Architecture
- Resource Reservation Protocol (RSVP)
- Differentiated Services
- Multiprotocol Label Switching

6. Transport Protocols
Chapter 15: Review Questions: All; HW: 15.3, 15.5, 15.6, 15.7, 15.10, 15.13, 15.15,
                              15.16, 15.17, 15.18
Chapter 7 (Reference Text - Section 7.3):
Chapter 25 (Section 25.4): Review Questions: 25.6, 25.7; HW: 25.3, 25.4
- Transport Layer Issues
- The Transmission Control Protocol (TCP)
- TCP Mechanisms, Policies, and Traffic Control
- The User Datagram Protocol (UDP)
- Real-Time Transport Protocol (RTP)

7. Application Protocols

Chapter 24: Review Questions: All; HW: 24.2, 24.3, 24.4, 24.9, 24.10, 24.11
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): HW: 2.13, 2.15
Appendix R:
- The Client-Server Paradigm
- Directory Services: DNS
- Remote Login: TELNET, SSH
- File Transfer: FTP
- Trivial File Transfer Protocol (TFTP)
- Electronic Mail: SMTP, MIME, POP
- Universal Resource Locators (URLs)
- Hypertext Transfer Protocol (HTTP)

8. Cellular Wireless Networks

Chapter 10: Review Questions: All
- Principles of Wireless Networks
- Cellular Network Generations (3G, 4G, 5G)
- LTE-Advanced

Exam #2

9. Wireless LAN Networks

Chapters 11: Review Questions: All
Chapters 12: Review Questions: 12.1 thru12.4
Chapters 13: Review Questions: All; HW 13.1
Chapter 17 (reading only): Review Question: All
- Legacy LAN Networks: Ethernet, ...
- Wireless LAN Technology
- Spread Spectrum Technology
- IEEE 802.11 Architecture and Services
- IEEE 802.11 MAC Layer
- IEEE 802.11 Physical Layer
- IEEE 802.11 Security Considerations

10. Computer and Network Security

Chapters 26: Review Questions: All; HW: 26.1, 26.3, 26.5
Chapters 27: Review Questions: All
- Computer Security Concepts
- Threats, Attacks, and Assets
- Intruders
- Malicious Software Overview: Viruses, Worms, Bots, etc.
- VPNs and IPsec
- SSL and TLS
- WiFi Protected Access
- Intrusion Detection
- Firewalls
- Malware Defense

Final Examination