CIS 49.2: Computer Networks
Text: Data and Computer Communications, 8th 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 10 (Sections 10.1-10.5):
      - 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
   Review Questions: 10.1 thru 10.7; HW Problems: 10.5, 10.6

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

Final Exam (Cumulative)