

**Brooklyn College**  
**Department of Computer and Information Sciences**

**CISC 3345 [49.2] Computer Networks**

3 hours; 3 credits

A course on computer networks and protocols. Network topologies and switching mechanisms. Protocol concepts and characteristics. Network protocol architectures. Data link layer functions and protocols. Network layer concepts. Network access protocols. Local area networks and protocols. Internetworking. Transport layer functions and protocols. Application layer protocols. The World Wide Web. Network security. (Not open to students who are enrolled in or have completed CISC 3340 [Computer and Information Science 49].)

**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 (Sections 10.1-10.5):

Review Questions: 10.1 thru 10.7; HW Problems: 10.5, 10.6

- 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 19 (Sections 19.1-19.2): Review Questions: 19.1 thru 19.6

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 20: Review Questions: All; HW: 20.3, 20.5, 20.6, 20.7, 20.10, 20.13

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

Chapter 13 (Sections 13.1-13.5): Review Questions: 13.1 thru 13.6; HW: 13.5

- 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