

Introduction to Computer Networking for Non-Techies

Instructor: Alton Hardin

Course Curriculum

Section 1: Course Introduction

- Course Introduction and Overview
- Beginner-Friendly Labs
- Course Lecture PDFs
- Instructor Introduction
- Udemy Q&A and Video Replayer Playback Speed
- Udemy Mobile App for iOS & Android - Download & Take Course Videos On the Go!
- Student Exercise: Introduce Yourself

Section 2: Overview and Benefits of Computer Networks

- What Is a Computer Network?
- Some Basic Computer Networking Rules
- Types of Networks (by Size)
- Peer-to-Peer vs. Client-Server Architecture
- Why Build a Computer Network?
- Student Exercise: Benefits of Computer Networks

Section 3: Course Primer: How Computer Networks Work

- Section Introduction
- Introduction to Computer Networking Protocols
- Introduction to the OSI Model
- Introduction to the TCP/IP Model
- Introduction to MAC Addresses
- Introduction to IP Addresses
- IP versus MAC Addresses
- Duplex Communication
- Network Transmission Types
- Introduction to Ethernet
- **Lab #1:** Installing Cisco Packet Tracer
- Cisco Packet Tracer on Mac OS
- **Lab # 2:** Connecting two PCs Together
- ✓ **How Computers Work Quiz**

Section 4: Network Topologies

- Section Introduction
- Physical vs. Logical Topologies
- Wired Network Topologies
- Wireless Network Topologies
- **Lab # 3:** Create Physical Wired Topologies
- ✓ **Network Topologies Quiz**

Section 5: Networking Devices

- Section Introduction
- Network Interface Cards (NICs)
- Hubs
- Switches
- Wireless Access Points
- Wireless Range Extenders
- Routers
- Modems
- All-in-One SOHO Devices
- Media Converters
- Firewalls
- DHCP Servers
- VoIP Endpoints
- **Lab # 4:** Creating a Simple Home LAN
- ✓ **Network Devices Quiz**

Section 6: Network Cabling

- Section Introduction
- Types of Network Cabling
- Ethernet Standards
- Coaxial Cabling
- Twisted Pair Copper Network Cabling
- Wiring Standards: 568A & 568B and Cable Types
- **Live Demonstration:** Creating a Network Cable
- Plenum-Rated Cabling
- Fiber Optic Network Cabling
- Networking Cable Selection Criteria
- 1. **Lab # 5:** Exploring Network Cabling
- ✓ **Network Cabling Quiz**

Section 7: The OSI Model

- Section Introduction
- OSI Layer 7 - The Application Layer
- OSI Layer 6 - The Presentation Layer
- OSI Layer 5 - The Session Layer
- OSI Layer 4 - The Transport Layer
- OSI Layer 3 - The Network Layer
- OSI Layer 2 - The Data Link Layer
- OSI Layer 1 - The Physical Layer
- OSI Model Data Encapsulation and De-Encapsulation
- ✓ **OSI Model Quiz**

Section 8: Planning a Network

- Section Introduction
- Why We Plan
- The Overall Process
- Understanding the Business
- Establishing a Business Need
- Defining Specific Areas of Improvement
- Buy-in and Resources
- Hidden Costs
- Other Considerations
- Planning Questions
- The Next Steps
- Q&A Discussion Board Student Exercise

Section 9: Introduction to TCP/IP

- Section Introduction
- What is TCP/IP?
- TCP/IP Protocols
- Network Access Methods
- ✓ **Section Quiz**

Section 10: TCP/IP Network Layer Protocols

- Address Resolution Protocol (ARP)
- **ARP Live Demo:** ARP Command on Windows, Linux, and Mac
- The Internet Protocol (IP)
- Internet Control Message Protocol (ICMP)
- **Ping Live Demo:** Ping Command on Windows and Mac
- ✓ **TCP/IP Network Layer Protocols Quiz**

Section 11: TCP/IP Transport Layer Protocols

- Understanding Protocols, Ports and Sockets
- TCP vs UDP
- Closing TCP Sessions
- ✓ **TCP/IP Transport Layer Protocols Quiz**

Section 12: Common TCP/IP Application Layer Protocols

- Management Protocols
- Remote Communication Protocols
- File Transfer Protocols
- Email Protocols
- Web Browser Protocols
- ✓ **TCP/IP Application Layer Protocols Quiz**

Section 13: Understanding IPv4 Addresses & Binary Math

- Section Introduction
- Understanding IPv4 Addresses & Binary Math
- Binary Math Basics
- ✓ **Binary Math Student Exercise Worksheet**

Section 14: A Deeper Dive into IPv4 Addresses and Subnet Masks

- IP Address Classification and Subnet Masks
- The Power of 2's
- Public versus Private IP Addresses
- Public versus Private IP Addresses Visualized
- The Loopback IP Address
- **Lab # 6: Assigning Static IP Addresses to LAN**
- ✓ **IPv4 Addresses and Subnet Masks Quiz**

Section 15: Introduction IPv4 to Subnetting

- Introduction to Subnetting
- Subnetting Reference Tables
- Subnetting a Class C Network #1
- Visualizing Subnetting a Class C Network #1
- Subnetting a Class C Network #2
- Visualizing Subnetting a Class C Network #2
- **Lab # 7: Create Two LANs on Different Subnets**
- ✓ **Subnetting Quiz**

Section 16: IP Addressing Version 6 (IPv6) Fundamentals

- Section Introduction
- Disadvantages of IPv4 and IPv6 Solutions
- IPv6 Addressing
- IPv6 Transmission Types
- Types of Ipv6 Addresses
- IPv4 to IPv6 Translation & Compatibility
- IPv6 Neighbor Discovery Protocol
- ✓ **IPv6 Fundamentals Section Quiz**

Section 17: Assigning IP Addresses

- Section Introduction
- Static vs. Dynamic IP Address Assignment
- IPv4 Dynamic IP Address Assignment
- **Live Demo:** IPv4 DHCP and APIPA
- **Live Demo:** Windows Server 2016 DHCP Server
- **Lab # 8:** Utilizing DHCP to Assign IP Addresses to LAN
- ✓ **Assigning IP Addresses Section Quiz**

Section 18: DNS Fundamentals

- Section Introduction
- DNS Overview and Hierarchy
- Common DNS Record Types
- **Live Demo:** NSLookup Command
- **Lab # 9:** DNS and Web Server Configuration
- ✓ **DNS Fundamentals Section Quiz**

Section 19: Understanding Switches

- Section Introduction
- Refresher on Switches
- Collision Domains
- Broadcast Domains
- CSMA/CD
- Managed versus Unmanaged Switches
- How a Switch Learns MAC Addresses
- Virtual LANs (VLANs)
- Layer 3 Switches
- Port Mirroring
- Power over Ethernet (PoE)
- **Lab # 10:** Setting up Two Departmental VLANs
- ✓ **Understanding Switches Section Quiz**

Section 20: Understanding Routers

- Section Introduction
- Refresher on Routers
- The Routing Process
- Static versus Dynamic Routing
- IGPs & EGPs
- Interior Gateway Protocols (IGPs)
- Border Gateway Protocol (BGP)
- Routing Tables and AD
- The Default Route
- **Lab # 11: Configuring Routers with RIP**
- ✓ **Understanding Routers Section Quiz**

Section 21: Network Segmentation

- Section Introduction
- Network Address Translation (NAT)
- Demilitarized Zone (DMZ)
- Port Forwarding
- Access Control Lists (ACLs)
- ✓ **Network Segmentation Section Quiz**

Section 22: Wireless Networking and IoT

- Section Introduction
- Overview of Wireless Networking
- Understanding Service Set Types
- Wireless Frequencies and Channels
- 802.11 Standards and MIMO
- Deploying Wireless Networks
- Wireless Network Vulnerabilities & Security
- Internet of Things (IoT)
- **Lab # 12: Adding a Wireless Access Point to a LAN**
- ✓ **Wireless Networking Section Quiz**

Section 23: Wide Area Networking

- Section Introduction
- WAN Connection Types
- WAN Transmission Mediums
- WAN Termination Concepts
- WAN Broadband Services
- Dial-Up
- T-Carrier & E-Carrier Digital Signal Lines
- DSL
- Cable Broadband

- Metropolitan Ethernet
- WAN Protocols
- ✓ **Wide Area Networking Section Quiz**

Section 24: Network Security

- Section Introduction
- The CIA Triad
- Least Privilege
- Acceptable Use Policy
- Defense in Depth
- Intranet, Extranet and the Internet
- VPN
- Firewalls
- Web Proxy Servers
- Network Intrusion Detection & Prevention
- **Lab # 13: Configure Server Firewall to Block ICMP Requests**
- ✓ **Network Security Section Quiz**

Section 25: Designing a Network

- Designing a Network
- Step 1: Identify the Uses of the Network
- Step 2: List Which Tasks Execute on Which Computers
- Step 3: Select the Type of Network: Centralized or Not?
- Step 4: Select the Proper Equipment
- Step 5: Draw the Network
- Step 6 & 7: Write the Specifications & Build It!

Section 26: Follow-Along Case Study Network Design Scenarios

- Section Introduction
- Case Study Analysis Instructions
- Case Study #1: H&M Law Firm Walk-Through
- Case Study #1: H&M Law Firm Network Design Proposal Analysis
- Case Study #2: San Bernardo Dentistry Walk-Through
- Case Study #2: San Bernardo Dentistry Analysis

Section 27: Conclusion

- Congratulations!
- Bonus Lecture: Your Free IT Course!