

Virginia Western Community College
TEL 150
Internetworking I

Prerequisites

none

Course Description

Introduces the functions of each layer of the ISO/OSI reference model, data link and network addresses, data encapsulation, different classes of IP addresses and subnetting and the functions of the TCP/IP network-layer protocols.

Semester Credits: 4 Lecture Hours: 3 Lab/Clinical/Internship Hours: 3

Required Materials**Textbook:**

CCNA routing and Switching Portable Command Guide, Authors: Scott Empson, 4th ed. ISBN: 9781587205880

All reading material is located on netacad.com

Other Required Materials:

Packet Tracer Software (available from the class website)

Course Outcomes

At the completion of this course, the student should be able to:

- Explain network technologies.
- Explain how devices access local and remote network resources.
- Implement basic network connectivity between devices.
- Design an IP addressing scheme to provide network connectivity for a small to medium-sized business network.
- Describe router hardware.
- Explain how switching operates in a small to medium-sized business network.
- Configure monitoring tools available for small to medium-sized business networks.
- Configure initial settings on a network device.

Topical Description

Ch.	Introduction to Networks		Objectives
1	Explore the Network		
	1.1	Globally Connected	Explain how multiple networks are used in everyday life.
	1.2	LANs, WANs, and the Internet	Explain how topologies and devices are connected in a small to medium-sized business network.
	1.3	The Network as a Platform	Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
	1.4	The Changing Network Environment	Explain trends in networking that will affect the use of networks in small to medium-sized businesses.
2	Configure a Network Operating System		
	2.1	IOS Bootcamp	Explain the features and functions of the Cisco IOS Software.
	2.2	Basic Device Configuration	Configure initial settings on a network device using the Cisco IOS Software.
	2.3	Address Schemes	Given an IP addressing scheme, configure IP address parameters on devices to provide end-to-end connectivity in a small to medium-sized business network.
3	Network Protocols and Communications		
	3.1	Rules of Communication	Explain how rules facilitate communication.
	3.2	Network Protocols and Standards	Explain the role of protocols and standards organizations in facilitating interoperability in network communications.
	3.3	Data Transfer in the Network	Explain how devices on a LAN access resources in a small to medium-sized business network.
4	Network Access		
	4.1	Physical Layer Protocols	Explain how physical layer protocols and services support communications across data networks.
	4.2	Network Media	Build a simple network using the appropriate media.
	4.3	Data Link Layer Protocols	Explain the role of the data link layer in supporting communications across data networks.
	4.4	Media Access Control	Compare media access control techniques and logical topologies used in networks.

5	Ethernet		
	5.1	Ethernet Protocol	Explain the operation of Ethernet.
	5.2	LAN Switches	Explain how a switch operates.
	5.3	Address Resolution Protocol	Explain how the address resolution protocol enables communication on a network.
6	Network Layer		
	6.1	Network Layer Protocols	Explain how network layer protocols and services support communications across data networks.
	6.2	Routing	Explain how routers enable end-to-end connectivity in a small to medium-sized business network
	6.3	Routers	Explain how devices route traffic in a small to medium sized business network.
	6.4	Configuring a Cisco Router	Configure a router with basic configurations.
7	IP Addressing		
	7.1	IPv4 Network Addresses	Explain the use of IPv4 addresses to provide connectivity in small to medium-sized business networks.
	7.2	IPv6 Network Addresses	Configure IPv6 addresses to provide connectivity in small to medium-sized business networks.
	7.3	Connectivity Verification	Use common testing utilities to verify and test network connectivity.
8	Subnetting IP Networks		
	8.1	Subnetting an IPv4 Network	Implement an IPv4 addressing scheme to enable end-to-end connectivity in a small to medium-sized business network
	8.2	Addressing Schemes	Given a set of requirements, implement a VLSM addressing scheme to provide connectivity to end users in a small to medium-sized network.
	8.3	Design Considerations for IPv6	Explain design considerations for implementing IPv6 in a business network.
9	Transport Layer		
	9.1	Transport Layer Protocols	Explain how transport layer protocols and services support communications across data networks.

	9.2	TCP and UDP	Compare the operations of transport layer protocols in supporting end-to-end communication.
10	Application Layer		
	10.1	Application Layer Protocols	Explain the operation of the application layer in providing support to end-user applications.
	10.2	Well-Known Application Layer Protocols and Services	Explain how well-known TCP/IP application layer protocols operate.
11	Build a Small Network		
	11.1	Network Design	Explain how a small network of directly connected segments is created, configured and verified.
	11.2	Network Security	Configure switches and routers with device hardening features to enhance security.
	11.3	Basic Network Performance	Use common show commands and utilities to establish a relative performance baseline for the network.
	11.4	Network Troubleshooting	Troubleshoot a network.

Notes to Instructors

- All instructors are to use a combination of Packet Tracer and hands on labs (via classroom equipment or the Netlab+ online lab server)
- Assignments consist of labs, quizzes, chapter tests, skills based exam, and a final exam