

# Networking Essentials v1.0

## Scope and Sequence

**Last Updated November 2, 2016**

### Target Audience

The Cisco® Networking Essentials curriculum is designed for high school, college, and Cisco Networking Academy® students that are interested in completing an introductory networking course.

### Prerequisites

For proper skill building, the students should have a basic understanding of how to use a computer and browse the Internet.

### Target Certifications

There are no target certifications for this course.

### Curriculum Description

This course teaches the fundamentals of networking. It covers how devices communicate on a network, network addressing and network services, how to build a home network and configure basic security, the basics of configuring Cisco devices, and testing and troubleshooting network problems. The course has many features to help students understand these concepts:

- Rich multimedia content, including interactive activities, videos, games, and quizzes, addressing a variety of learning styles to help stimulate learning and increase knowledge retention.
- Hands-on labs and Packet Tracer simulation-based learning activities to help students develop critical thinking abilities and complex problem solving skills.
- Innovative assessments provide immediate feedback to support the evaluation of knowledge and acquired skills.
- Technical concepts are explained using language that works well for learners at an introductory level, and embedded interactive activities break up reading of the content and reinforce understanding.
- The curriculum encourages students to consider additional IT education, but also emphasizes applied skills and hands-on experience.
- Cisco Packet Tracer activities are designed for use with Packet Tracer 6.3 or later.

### Curriculum Objectives

The goal of this course is to introduce the student to networking, network service and device configuration, and Cisco routers and switches. The online course materials will assist the student in communicating their knowledge and desire to learn more about networking and pursue a networking career.

Upon completion of the Networking Essentials v1.0 course, students will be able to perform the following tasks:

- Explain how end-user devices and local networks interact with the global Internet.
- Explain the requirements for network connectivity.

- Build a small network using an integrated network router.
- Explain the importance of IP addressing.
- Explain how the protocols of the TCP/IP suite enable network communication.
- Configure an integrated wireless router and wireless clients to connect securely to the Internet.
- Configure basic network security.
- Build a simple computer network using Cisco devices.
- Troubleshoot common network issues found in home and small business networks.

### Minimum System Requirements

For the best learning experience, we recommend a class size of 12 to 15 students and a ratio of one Lab PC per student. At most, two students can share one Lab PC for the hands-on labs. Some lab activities require the student Lab PCs to be connected to a local network.

### Lab Hardware Requirements

- 2 PCs running Windows 10
- 1 Wireless NIC or USB dongle
- 1 CISCO1941/K9 Integrated Services Router Generation 2 (ISR-G2)
- 1 WS-C2960+24TC-L Cisco Catalyst switch
- 1 Wireless Router
- A smartphone or tablet as a host device
- Assorted Ethernet cables
- RJ-45 connectors
- RJ-45 crimping tool
- Wire cutter
- Wire stripper
- Ethernet cable tester (optional)
- DB-9 to RJ-45 console cable with DB-9 to USB adapter if necessary
- Mini-USB to USB-A cable

### Lab Software Requirements

- Tera Term

### Networking Essentials v1.0 Outline

This course provides a comprehensive introduction to networking devices, concepts, and skills. The course will help students learn key skills, abilities and knowledge. Students will learn how networks are set up, how devices are configured, how communication takes place on a network, and the basics of implementing network security best practices. Students will also be introduced to network troubleshooting.

## Chapter Outline

**Table 1.** Chapter Outline

Chapter /Section	Goals/Objectives
<b>Chapter 1. Ever Wonder How it Works?</b>	<b>Explain how end-user devices and local networks interact with the global Internet.</b>
1.1 Communicating in a Connected World	Explain the concept of network communication.
1.2 Local Networks	Explain the roles of devices in a network.
1.3 Building a Simple Network	Build a functioning network.
<b>Chapter 2. Networks in Our Daily Lives</b>	<b>Explain the requirements for network connectivity.</b>
2.1 Getting Online	Explain the basic requirements for getting online.
2.2 Other Network Considerations	Explain the importance of network representations.
2.3 Cabling and Media	Build an Ethernet cable.
<b>Chapter 3. Communicating on a Local Network</b>	<b>Build a small network using an integrated network router.</b>
3.1 Principles of Communications	Explain the importance of standards and protocols in network communications.
3.2 Talking the Language of Networking	Explain how protocol model layers represent network functionality.
3.3 How do Ethernet Networks Work?	Explain how communication occurs on Ethernet networks.
3.4 How are Networks Built?	Explain why routers and switches are important in a network.
3.5 Routing Across Networks	Configure devices on a LAN.
<b>Chapter 4. Network Addressing</b>	<b>Explain the importance of IP addressing.</b>
4.1 IPv4 Addresses and Subnet Masks	Explain the features of an IP address.
4.2 Types of IPv4 Addresses	Explain the features of the different types of IPv4 addresses.
4.3 How IPv4 Addresses are Obtained	Configure a DHCP server.
4.4 IPv4 Address Management	Explain the need for public and private addressing.
4.5 Addressing with IPv6	Explain the need for IPv6.
<b>Chapter 5. Providing Network Services</b>	<b>Explain how the protocols of the TCP/IP suite enable network communication.</b>
5.1 How Clients and Servers Work Together	Explain how clients access Internet services.
5.2 Transport Layer Protocols at Work	Explain how the protocols of the transport layer support network communications.
5.3 Application Protocols and Services	Explain the function of common Internet client/server applications.
<b>Chapter 6. Building a Home Network</b>	<b>Configure an integrated wireless router and wireless clients to connect securely to the Internet.</b>

Chapter /Section	Goals/Objectives
6.1 What Does a Home Network Look Like?	Compare different types of network connections.
6.2 How Does Wi-Fi Work?	Explain how Wi-Fi functions.
6.3 Setting Up Your Wireless Network	Connect wireless PC clients to a wireless router.
6.4 Choosing ISP Services	Compare the options available for connecting to the ISP.
6.5 Security Considerations on a Home Network	Configure a wireless LAN device to protect data and the network.
6.6 Mobile Devices in the Network	Explain how to configure mobile devices to use various wireless technologies.
<b>Chapter 7. Network Security</b>	<b>Configure basic network security.</b>
7.1 Am I at Risk?	Explain network security threats.
7.2 Methods of Attack	Explain other types of network security threats.
7.3 How Can I Protect My Network?	Explain how software tools can mitigate network security threats.
7.4 How Do Firewalls Protect Networks?	Configure a firewall to control network traffic.
<b>Chapter 8. Configuring Cisco Devices</b>	<b>Build a simple computer network using Cisco devices.</b>
8.1 Cisco LAN Devices	Explain the basic features of Cisco LAN switches.
8.2 Internetworking Devices	Explain the features of a Cisco small business router.
8.3 Exploring the Cisco IOS	Explain how to use the Cisco IOS.
8.4 Using Show Commands	Use common show commands to view device status.
8.5 Configuring a Cisco Network	Build a switch and router network.
<b>Chapter 9. Testing and Troubleshooting</b>	<b>Troubleshoot common network issues found in home and small business networks.</b>
9.1 What To Do When It Does not Work	Explain the steps to take when a new configuration does not work as expected.
9.2 Troubleshooting Issues in Networks	Troubleshoot network problems with common network utilities.
9.3 Identifying and Fixing Common Problems	Troubleshoot a network connectivity problem.
9.4 Working with Customer Support	Explain how to work with customer support.



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