Networking Academy

Networking Essentials 2.0 Scope and Sequence

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Introduction

Every day, more people around the world are working from home and attending school from home. This means that many people are using a variety of networks to connect to the internet. Do you know what it takes to connect multiple devices using a local network? Do you know how to connect the network to the internet?

The Cisco Networking Academy's Networking Essentials 2.0 course provides learners with a broad foundational understanding of networking. It is suitable for anyone interested in a career in IT, or a related career pathway. Networking Essentials 2.0 is self-paced. The primary emphasis is on networking knowledge with a small amount of basic skills that are useful for a home or SOHO network.

Target Audience

The Cisco® Networking Essentials curriculum is designed for high school, college, and Cisco Networking Academy® students who 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.

Course 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:

- The course is comprised of 20 modules. Each module is comprised of topics.
- Modules emphasize critical thinking, problem solving, collaboration, and the practical application of skills.
- Each module contains practice and assessment activities such as a Check Your Understanding activity, a lab, or an activity using our network simulation tool, called Cisco® Packet Tracer. These topic-level activities provide feedback and are designed to indicate a learner's mastery of the skills needed for the course. Learners can ensure their level of understanding well before taking a graded quiz or exam.
- The language used to describe these concepts is designed to be easily understood by learners at a high school level.

- Assessments and practice activities are focused on specific competencies to increase retention and provide flexibility in the learning path.
- Multimedia learning tools, including videos, and quizzes, address a variety of learning styles and help stimulate learning and promote increased knowledge retention.
- Labs and Cisco® Packet Tracer simulation-based learning activities help students develop critical thinking 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 the latest version of Packet Tracer.

Course Objectives

The Networking Essentials 2.0 course is designed for people who want to learn the knowledge and skills they need to work in Information Technology (IT) and networking. These course materials will assist you in developing the skills necessary to do the following:

- Explain the concept of network communication.
- Explain the basic requirements for getting online.
- Create a simulated network using Cisco® Packet Tracer.
- Build a simple home network.
- Explain the importance of standards and protocols in network communications.
- Explain how communication occurs on Ethernet networks.
- Create a fully connected LAN.
- Explain the features of an IP address.
- Explain the DHCP address assignment process.
- Explain the principles of IPv4 and IPv6 address management.
- Explain how clients access internet services.
- Explain the function of common application layer services.
- Configure an integrated wireless router and wireless client to connect securely to the internet.
- Connect wireless PC clients to a wireless router.
- Explain how to use security best practices to mitigate attacks.
- Configure basic network security.
- Explain how to create a console connection to a Cisco device.
- Explain how to use the Cisco IOS.
- Build a simple computer network using Cisco devices.
- Troubleshoot basic network connectivity issues.

Equipment Requirements

- 1 PC running Windows 10

- 1 Wireless NIC or USB dongle
- A smartphone or tablet as a host device
- 1 Ethernet cable
- 1 wireless home router

Networking Essentials 2.0 Outline

Listed below are the current set of modules and their associated competencies outlined for this course. Each module is an integrated unit of learning that consists of content, activities and assessments that target a specific set of competencies. The size of the module will depend on the depth of knowledge and skill needed to master the competency.

Networking Essentials 2.0

Module Title/ Topic Title	Objective
Module 1. Communications in a Connected World	**Explain the concept of network communication.**
1.1 Network Types	Explain the concept of a network.
1.2 Data Transmission	Describe network data.
1.3 Bandwidth and Throughput	Explain the network transmission speed and capacity.
1.4 Clients and Servers	Explain the roles of clients and servers in a network.
1.5 Network Components	Explain the roles of network infrastructure devices.
Module 2. Online Connections	**Explain the basic requirements for getting online.**
2.1 Wireless Networks	Describe the different types of networks used by cell phones and mobile devices.
2.2 Local Network Connections	Describe the requirements for host connectivity.
2.3 Network Documentation	Explain the importance of network documentation.
Module 3. Explore Networks with Packet Tracer	**Create a simulated network using Packet Tracer.**
3.1 Packet Tracer Network Simulator	Describe the purpose and function of Packet Tracer.
3.2 Packet Tracer Installation	Install Packet Tracer on a local device.
3.3 The Packet Tracer User Interface	Investigate the Packet Tracer user interface.
3.4 Packet Tracer Network Configuration	Configure a Packet Tracer network.
Module 4. Build A Simple Network	**Build a simple home network.**
4.1 Network Media Types	Describe common types of network cables.
4.2 Ethernet Cabling	Describe Ethernet twisted-pair cables.
4.3 Coaxial and Fiber-Optic Cabling	Describe coaxial and fiber-optic cabling.

Module Title/ Topic Title	Objective
4.4 Twisted Pair Operation	Explain how a twisted-pair cable transmits and receives signals.
4.5 Verify Connectivity	Verify connectivity in a simple routed network.
Module 5. Communication Principles	**Explain the importance of standards and protocols in network communications.**
5.1 The Rules	Describe network communication protocols.
5.2 Communication Standards	Describe network communication standards.
5.3 Network Communication Models	Compare the OSI and TCP/IP models.
5.4 Ethernet	Explain the OSI model Layer 1 and Layer 2 functions in an Ethernet network.
Module 6. Network Design and the Access Layer	**Explain how communication occurs on Ethernet networks.**
6.1 Encapsulation and the Ethernet Frame	Explain the process of encapsulation and Ethernet framing.
6.2 Hierarchical Network Design	Explain the function at each layer of the 3-layer network design model.
6.3 The Access Layer	Explain how to improve network communication at the access layer.
6.4 Broadcast Containment	Explain why it is important to contain broadcasts within a network.
Module 7. Routing Between Networks	**Create a fully connected LAN.**
7.1 The Need for Routing	Explain the need for routing.
7.2 The Routing Table	Explain how routers use tables.
7.3 Create a LAN	Build a fully connected network.
Module 8. The Internet Protocol	**Explain the features of an IP address.**
8.1 Purpose of an IPv4 Address	Explain the purpose of an IPv4 address.
8.2 Binary Conversion of an IPv4 Address	Calculate numbers between decimal and binary systems.
8.3 The IPv4 Address Structure	Explain how IPv4 addresses and subnets are used together.
8.4 Classful IPv4 Addressing	Describe the different IPv4 address classes.
8.5 Public and Private IPv4 Addresses	Describe the public and private IPv4 address ranges.
8.6 Unicast, Broadcast, and Multicast Addresses	Compare unicast, multicast, and broadcast addresses.
Module 9. Dynamic Addressing with DHCP	**Explain the DHCP address assignment process.**

Module Title/ Topic Title	Objective
9.1 Static and Dynamic Addressing	Compare static and dynamic IPv4 addressing.
9.2 DHCPv4 Configuration	Configure a DHCPv4 server to dynamically assign IPv4 addresses.
Module 10. IPv4 and IPv6 Address Management	**Explain the principles of IPv4 and IPv6 address management.**
10.1 Network Boundaries	Describe network boundaries.
10.2 Network Address Translation	Explain the purpose of Network Address Translation in small networks.
10.3 IPv4 Issues	Explain why IPv6 addressing will replace IPv4 addressing.
10.4 IPv6 Features	Explain features of IPv6,
Module 11. Transport Layer Services	**Explain how clients access internet services.**
11.1 The Client Server Relationship	Explain client and server interaction.
11.2 TCP and UDP	Compare TCP and UDP transport layer functions.
11.3 Port Numbers	Explain how TCP and UDP use port numbers.
Module 12. Application Layer Services	**Explain the function of common application layer services.**
12.1 Network Application Services	Describe common network applications.
12.2 Domain Name System	Describe DNS.
12.3 Web Clients and Servers	Describe HTTP and HTML.
12.4 FTP Clients and Servers	Describe FTP.
12.5 Virtual Terminals	Describe Telnet and SSH.
12.6 Email and Messaging	Describe email protocols.
Module 13. Build a Home Network	**Configure an integrated wireless router and wireless client to connect securely to the internet.**
13.1 Home Network Basics	Describe the components required to build a home network.
13.2 Network Technologies in the Home	Describe wired and wireless network technologies.
13.3 Wireless Standards	Describe Wi-Fi.
13.4 Wireless Traffic Controls	Explain how wireless traffic is controlled.
13.5 Set Up a Home Router	Configure a wireless LAN device.
Module 14. Connect to the Internet	**Configure Wi-Fi settings on mobile devices to connect to the internet.**
14.1 ISP Connectivity Options	Describe ISP connectivity options.
14.2 Network Virtualization	Explain the purpose and characteristics of network virtualization.

Module Title/ Topic Title	Objective
14.3 Mobile Device Connectivity	Explain how to configure mobile devices for wireless connectivity.
Module 15. Security Considerations	**Explain how to use security best practices to mitigate attacks.**
15.1 Security Threats	Describe different types of network security threats.
15.2 Social Engineering Attacks	Describe social engineering attacks.
15.3 Malware	Describe various types of malicious software.
15.4 Denial of Service	Describe denial of service attacks.
15.5 Security Tools	Explain how security tools and software updates mitigate network security threats.
15.6 Antimalware Software	Explain how antimalware software mitigates data loss and service disruptions.
Module 16. Configure Network and Device Security	**Configure basic network security.**
16.1 Wireless Security Measures	Describe basic ways to address wireless security vulnerabilities.
16.2 Implement Wireless Security	Configure user authentication.
16.3 Configure a Firewall	Configure firewall settings.
Module 17. Cisco Switches and Routers	**Compare in-band and out-of-band management access.**
17.1 Cisco Switches	Describe Cisco LAN switches.
17.2 Switch Boot Process	Describe the Cisco LAN switch boot process.
17.3 Cisco Routers	Describe Cisco small business routers.
17.4 Router Boot Process	Describe the Cisco router boot process.
Module 18. The Cisco IOS Command Line	**Use the Cisco IOS.**
18.1 IOS Navigation	Use the correct commands to navigate the Cisco IOS modes.
18.2 The Command Structure	Explain how to navigate the Cisco IOS to configure network devices.
18.3 View Device Information	Use show commands to monitor device operations.
Module 19. Build a Small Cisco Network	**Build a simple computer network using Cisco devices.**
19.1 Basic Switch Configuration	Configure initial settings on a Cisco switch.
19.2 Configure Initial Router Settings	Configure initial settings on a router.
19.3 Secure the Devices	Configure devices for secure remote management.
19.4 Connect the Switch to the Router	Build a network that includes a switch and router.

Module Title/ Topic Title	Objective
Module 20. Troubleshoot Common Network Problems	Troubleshoot basic network connectivity issues.
20.1 The Troubleshooting Process	Describe some of the approaches used to troubleshoot networks.
20.2 Physical Layer Problems	Describe the process of detecting physical layer problems.
20.3 Troubleshooting Commands	Troubleshoot using network utilities.
0.4 Troubleshoot Wireless Issues	Troubleshoot a wireless network problem.
20.5 Common Internet Connectivity Issues	Explain common internet connectivity problems.
20.6 Customer Support	Explain how to use outside sources and internet resources for troubleshooting.