CCNA 1: Network Fundamentals
CISCO Networking Academy Program

COURSE DESCRIPTION

*Networking Basics* is the first of four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 1 introduces Cisco Networking Academy Program students to the networking field. The course focuses on the following:

- Network terminology
- Network protocols
- Local-area networks (LANs)
- Wide-area networks (WANs)
- Open System Interconnection (OSI) model
- Cabling
- Cabling tools
- Routers
- Router programming
- Ethernet
- Internet Protocol (IP) addressing
- Network standards

In addition, the course provides instruction and training in the proper care, maintenance, and use of networking software, tools, and equipment.

COURSE OBJECTIVES

The CCNA certification indicates knowledge of networking for the small office, home office (SOHO) market, and the ability to work in small businesses or organizations using networks that have fewer than 100 nodes. Upon successful completion of the course, the student will be able to:

- Install and configure Cisco switches and routers in multiprotocol internetworks using LAN and WAN interfaces
- Provide Level 1 troubleshooting service
- Improve network performance and security
- Perform entry-level tasks in the planning, design, installation, operation, and troubleshooting of Ethernet and TCP/IP networks.

Furthermore, students will be able to perform tasks related to the following:

- Networking mathematics, terminology, and models
- Networking media such as copper, optical, and wireless
- Testing and cabling LANs and WANs
- Ethernet Operation and 10/100/1000/10 G versions of Ethernet
- Ethernet Switching
- IP addressing and subnetting
- IP, TCP, UDP, and application layer protocols
WHO SHOULD ATTEND

The target audience is anyone who desires a practical, technical introduction to the field of networking. This includes high school students, university and college students, and lifelong-learning students who are interested in careers as network technicians, network engineers, network administrators, and network help-desk staff.

COURSE DURATION

The course is designed for 70 contact hours. Approximately 35 hours will be designated to lab activities and 35 hours will be spent on curriculum content.

REGISTRATION

Registration: مرکز نجاح زعیتی للتميز في تكنولوجيا المعلومات/جامعة بيرزيت
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COURSE OUTLINE

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Labs use a “model Internet” to allow students to analyze real data without affecting production networks. Packet Tracer (PT) activities help students analyze protocol and network operation and build small networks in a simulated environment. At the end of the course, students build simple LAN topologies by applying basic principles of cabling, performing basic configurations of network devices such as routers and switches, and implementing IP addressing schemes.

Chapter 1. Living in a Network-Centric World

1.0 Chapter Introduction
1.1 Communicating in a Network-Centric World
1.2 Communication – An Essential Part of Our Lives
1.3 The Network as a Platform
1.4 The Architecture of the Internet
1.5 Trends in Networking
1.6 Chapter Labs
1.7 Chapter Summary
1.8 Chapter Quiz

Chapter 2. Communicating Over the Network

2.0 Chapter Introduction
2.1 The Platform for Communications
2.2 LANs, WANs, and Internetworks
2.3 Protocols
2.4 Using Layered Models
2.5 Network Addressing
2.6 Chapter Labs
2.7 Chapter Summary
2.8 Chapter Quiz

Chapter 3. Application Layer Functionality and Protocols

3.0 Chapter Introduction
3.1 Applications – The Interface Between the Networks
3.2 Making Provisions for Applications and Services
3.3 Application Layer Protocols and Services Examples
3.4 Chapter Labs
3.5 Chapter Summary
3.6 Chapter Quiz

Chapter 4. OSI Transport Layer
4.0 Chapter Introduction
4.1 Roles of the Transport Layer
4.2 The TCP Protocol – Communicating with Reliability
4.3 Managing TCP Sessions
4.4 The UDP Protocol – Communicating with Low Overhead
4.5 Chapter Labs
4.6 Chapter Summary
4.7 Chapter Quiz

Chapter 5. OSI Network Layer
5.0 Chapter Introduction
5.1 IPv4
5.2 Networks – Dividing Devices into Groups
5.3 Routing – How Our Data Packets are Handled
5.4 Routing Processes: How Routes are Learned
5.5 Chapter Labs
5.6 Chapter Summary
5.7 Chapter Quiz

Chapter 6. Addressing the Network – IPv4
6.0 Chapter Introduction
6.1 IPv4 Addresses
6.2 Addresses for Different Purposes
6.3 Assigning Addresses
6.4 Is It On My Network?
6.5 Calculating Addresses
6.6 Testing the Network Layer
6.7 Chapter Labs
6.8 Chapter Summaries
6.9 Chapter Quiz

Chapter 7. Data Link Layer
7.0 Chapter Introduction
7.1 Data Link Layer – Accessing the Media
7.2 Media Access Control Techniques
7.3 Media Access Control Addressing and Framing Data
7.4 Putting It All Together
7.5 Chapter Labs
7.6 Chapter Summary
7.7 Chapter Quiz

Chapter 8. OSI Physical Layer
8.0 Chapter Introduction
8.1 The Physical Layer – Communication Signals
8.2 Physical Signaling and Encoding: Representing
8.3 Physical Media – Connecting Communication
8.4 Chapter Labs
8.5 Chapter Summary
8.6 Chapter Quiz

Chapter 9. Ethernet
9.0 Chapter Introduction
9.1 Overview of Ethernet
9.2 Ethernet – Communication through the LAN
9.3 The Ethernet Frame
9.4 Ethernet Media Access Control
9.5 Ethernet Physical Layer
9.6 Hubs and Switches
9.7 Address Resolution Protocol (ARP)
9.8 Chapter Labs
9.9 Chapter Summary
9.10 Chapter Quiz

Chapter 10. Planning and Cabling Networks

10.0 Chapter Introduction
10.1 LANs – Making the Physical Connection
10.2 Device Interconnections
10.3 Developing an Addressing Scheme
10.4 Calculating the Subnets
10.5 Device Interconnections
10.6 Chapter Labs
10.7 Chapter Summary
10.8 Chapter Quiz

Chapter 11. Configuring and Testing Your Network

11.0 Chapter Introduction
11.1 Configuring Cisco Devices – IOS Basics
11.2 Applying a Basic Configuration Using Cisco IOS
11.3 Verifying Connectivity
11.4 Monitoring and Documenting Networks
11.5 Chapter Labs
11.6 Chapter Summary
11.7 Chapter Quiz