

MANCHESTER REGIONAL HIGH SCHOOL

Cisco Networking Academy 1

REVISED  
SEPTEMBER 2017

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Mr. Jonathan Banta

### **Curriculum Committee for Cisco 1**

Mr. Jonathan Banta

Mr. Michael Yob

## **COURSE DESCRIPTION:**

The Cisco Internet Academy 1 curriculum introduces the architecture, structure, functions, components, and models of the Internet and computer networks. By the end of the course, students will be able to build simple LANs and implement IP addressing schemes. Using real Cisco hardware and simulation software, students will be able to configure routers and switches using RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

At the end of the two-year track, students should have necessary skills for acquiring two Cisco industry certifications, CCENT (Cisco Certified Entry Networking Technician) and CCNA (Cisco Certified Network Associate) – professional-level certifications held by workplace networking engineers. These courses create an authentic workplace experience for motivated student technicians.

## **COURSE DATA:**

|                   |           |
|-------------------|-----------|
| Length of Course: | Full Year |
| Credits:          | 5         |
| Periods Per Week: | 5         |
| Classification:   | Elective  |
| Prerequisite:     | None      |

## **EVALUATION:**

The purposes of evaluation are to provide information about student progress and to determine if students have learned the subject matter, which has been taught. Teachers will evaluate student progress by utilizing standardized tests, teacher-made quizzes and tests, oral questioning, class participation, homework, special projects, special exams, and other school records.

## **EVALUATION CRITERIA:**

Evaluation will be based on the following weighted components:

|                     |     |
|---------------------|-----|
| Formal tests .....  | 50% |
| Participation ..... | 20% |
| Labs.....           | 30% |

Grading structure: Benchmark for mastery of course content is 65%; content mastery for students with IEPs may be less than the Board of Education approved minimum for regular education students.

**A. COURSE TITLE:** Cisco Networking Academy I

**B. COURSE PROFICIENCIES:**

After completing a course in Cisco Networking Academy 1, the student should be able to:

- I. Understand the Basics of Computer Software.
2. Understand Basic Networking Terminology.
3. Understand the Binary Number System.
4. Understand Digital Bandwidth.
5. Understand a General Model of Communication in Terms of Layers.
6. Understand the OSI Model
7. Understand How the OSI Model Compares and Contrasts With the TCP/IP Model.
8. Understand Basic LAN Devices.
9. Understand the Evolution of Network Devices.
10. Understand the Basics of Data Flow Through LANs.
11. Understand the Building of LANs.
12. Understand the Basics of Electricity.
13. Understand the Basics of Digital Multimeters.
14. Understand Some of the Basics of Signals and Noise in Communications Systems.
15. Understand the Basics of the Encoding of Networking Signals.
16. Understand the Most Common LAN Media.
17. Understand Cable Specification and Termination.
18. Understand the Process of Making and Testing Cable.
19. Understand Layer 1 Components and Devices.
20. Understand Collisions and Collision Domains in Shared Layer Environments.
21. Understand the Basic Topologies Used in Networking.
22. Understand Layer 2 -LAN Standards.
23. Understand Layer 2 Naming -Hexadecimal Numbers.
24. Understand Layer 2 Naming- MAC Addressing.
25. Understand Framing.
26. Understand Media Access Control (MAC).
27. Understand the Basics of Token-Ring.
28. Understand the Basics of FDDI.
29. Understand the Details of Ethernet and IEEE 802.3.
30. Explain Layer 2 Devices in Detail.
31. Understand Effects of Layer 2 Devices on Data Flow.



32. Understand Basic Ethernet 10 Base-T Troubleshooting.
33. Understand Basic Network Design and Documentation Issues.
34. Understand the Process of Planning Structured Cabling- Wiring Closets.
35. Understand the Process of Planning Structured Cabling- Horizontal and Backbone Cabling.
36. Understand Network Power Supply Issues.
37. Understand How to Plan the Project.
38. Understand RJ-45 Jack and Outlet Installation.
39. Understand the Basics of Cable Installation.
40. Understand the Installation of Structured Cable Runs.
41. Demonstrate Stringing, Running, and Mounting Cable.
42. Understand the Basics of Wiring Closets and Patch Panels.
43. Understand the Range of Equipment for Testing Structured Cabling Projects.
44. Understand Why It Is Necessary to Have a Network Layer.
45. Understand Path Determination.
46. Understand the Purpose and Operation of IP Addresses within the IP Header.
47. Understanding and Working with IP Address Classes.
48. Understand the Purpose of Reserved Address Space.
49. Understand the Basics of Subnetting.
50. Understand How to Create a Subnet.
51. Understand the Characteristics of Layer 3 Devices.
52. Understand How Network Layer Services Are Used to Achieve Network-to-Network Communications.
53. Understand Advanced ARP Concepts.
54. Understand Routable Protocols.
55. Understand Routing Protocols.
56. Understand the Function of Other Network Layer Services in Internet Communication.
57. Understand ARP Tables.
58. Understand RIP and IGRP.
59. Understand Protocol Analyzer Software.
60. Understand Layer 4 - Transport Layer.
61. Understand TCP and UDP.
62. Identify TCP Connection Methods.
63. Understand the Basics of the Session Layer.
64. Understand the Basics of the Presentation Layer.
65. Understand the Basics of the Application Layer.
66. Understand Client-Server Applications.
67. Understand Domain Name Services.
68. Understand Various Network Applications.
69. Understand Application Layer Examples: E-mail.
70. Understand Application Examples: Telnet.
71. Understand Application Examples: FTP.
72. Understand Application Example: HTTP.
73. Understand Application Example: Redirectors.

## **STUDENT OUTCOMES**

The student will be able to:

### **Unit 1: Basics of Computing- 3 Weeks**

Understand the Basics of Computer

Hardware.

1. Understand the Basics of Computer Software.
2. Understand Basic Networking Terminology.
3. Understand the Binary Number System.
4. Understand Digital Bandwidth.

### **STANDARDS:**

TECH: 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.E.2, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

### **UNIT II: OSI Model- 3 Weeks**

- 2.1. Understand a General Model of Communication in Terms of Layers.
- 2.2. Understand the OSI Model
- 2.3. Understand How the OSI Model Compares and Contrasts With the TCP/IP Model.

### **STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

### **UNIT III: Local Area Networks -- 3 Weeks**

- 3.1. Understand Basic LAN Devices.
- 3.2. Understand the Evolution of Network Devices.
- 3.3. Understand the Basics of Data Flow Through LANs.
- 3.4. Understand the Building of LANs.

### **STANDARDS:**

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

### **UNIT IV: Electronics and Signal- 3 Weeks**

- 4.1. Understand the Basics of Electricity.
- 4.2. Understand the Basics of Digital Multimeters.

4.3. Understand some of the Basics of Signals and Noise in Communications Systems.

4.4. Understand the Basics of the Encoding of Networking Signals.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT V: Layer 1 Media, Connections, and Collisions- 3 Weeks**

5.1. Understand the Most Common LAN Media.

5.2. Understand Cable Specification and Termination.

5.3. Understand the Process of Making and Testing Cable.

5.4. Understand Layer 1 Components and Devices.

5.5. Understand Collisions and Collision Domains in Shared Layer Environments.

5.6. Understand the Basic Topologies Used in Networking.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT VI: Layer 2 Concepts- 3 Weeks**

6.1. Understand Layer 2 -LAN Standards.

6.2. Understand Layer 2 Naming -Hexadecimal Numbers.

6.3. Understand Layer 2 Naming - MAC Addressing.

6.4. Understand Framing.

6.5. Understand Media Access Control (MAC).

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT VII: Layer 2 Technologies- 3 Weeks**

7.1. Understand the Basics of Token-Ring.

7.2. Understand the Basics of FDDI.

7.3. Understand the Details of Ethernet and IEEE 802.3.

7.4. Explain Layer 2 Devices in Detail.

7.5. Understand Effects of Layer 2 Devices on Data Flow.

7.6. Understand Basic Ethernet 10Base-T Troubleshooting.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2



**UNIT VIII: Design and Documentation- 3 Week**

- 8.1. Understand Basic Network Design and Documentation Issues.
- 8.2. Understand the Process of Planning Structured Cabling- Wiring Closets.
- 8.3. Understand the Process of Planning Structured Cabling- Horizontal and Backbone Cabling.
- 8.4. Understand Network Power Supply Issues.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,  
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT IX: Structured Cabling Project- 3 Weeks**

- 9.1. Understand How to Plan the Project.
- 9.2. Understand RJ-45 Jack and Outlet Installation.
- 9.3. Understand the Basics of Cable Installation.
- 9.4. Understand the Installation of Structured Cable Runs.
- 9.5. Demonstrate Stringing, Running, and Mounting Cable.
- 9.6. Understand the Basics of Wiring Closets and Patch Panels.
- 9.7. Understand the Range of Equipment for Testing Structured Cabling Projects.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.1.12.F.1, 8.2.12.A.2, 8.2.12.B.4, 8.2.12.C.4, 8.2.12.C.5,  
8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT X: Layer 3 Routing and Addressing- 3 Weeks**

- 10.1. Understand Why It Is Necessary to Have a Network Layer.
- 10.2. Understand Path Determination.
- 10.3. Understand the Purpose and Operation of IP Addresses within the IP Header.
- 10.4. Understanding and Working with IP Address Classes.
- 10.5. Understand the Purpose of Reserved Address Space.
- 10.6. Understand the Basics of Subnetting.
- 10.7. Understand How to Create a Subnet.

**STANDARDS :**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT XI: Layer 3 Routing Protocols- 2 Weeks**

- 11.1. Understand the Characteristics of Layer 3 Devices.
- 11.2. Understand How Network Layer Services Are Used to Achieve Network-to-Network Communications.
- 11.3. Understand Advanced ARP Concepts.

- 11.4. Understand Routable Protocols.
- 11.5. Understand Routing Protocols.
- 11.6. Understand the Function of Other Network Layer Services in Internet Communication.
- 11.7. Understand ARP Tables.
- 11.8. Understand RIP and IGRP.
- 11.9. Understand Protocol Analyzer Software.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT XII: Layer 4-The Transport Layer-2 Weeks**

- 12.1. Understand Layer 4 -Transport Layer.
- 12.2. Understand TCP and UDP.
- 12.3. Identify TCP Connection Methods.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT XIII: Layer 5-the Session Layer-2 Weeks**

- 13.1. Understand the Basics of the Session Layer.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT XIV: Layer 6 -the Presentation Layer- 2 Weeks**

- 14.1. Understand the Basics of the Presentation Layer.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**UNIT XV: Layer 7 -the Application Layer- 2 Weeks**

- 15.1. Understand the Basics of the Application Layer.
- 15.2. Understand Client-Server Applications.
- 15.3. Understand Domain Name Services.
- 15.4. Understand Various Network Applications.
- 15.5. Understand Application Layer Examples: E-mail.
- 15.6. Understand Application Examples: Telnet.

- 15.7. Understand Application Examples: FTP.
- 15.8. Understand Application Example: HTTP.
- 15.9. Understand Application Example: Redirectors.

**STANDARDS:**

TECH: 8.1.12.A.3, 8.2.12.C.1, 8.2.12.E.4

LIT: RST.9-10.7, RST.11-12.2

**References for Cisco Networking Academy 1**

Cisco Networking academy Website (also student text, workbook, and labs)  
<http://www.netacad.com>

