



# COURSE SYLLABUS

Cisco Certified Network Associate

**CCNA<sup>o</sup>** (Exam 640-802)



50 Cragwood Rd, Suite 350  
South Plainfield, NJ 07080

Victoria Commons, 613 Hope Rd Building #5,  
Eatontown, NJ 07724

130 Clinton Rd,  
Fairfield, NJ 07004

## Avtech Institute of Technology Course

Instructor:

Course Duration:

Date/Time:

Training Location:

## Course Description

In this course students will learn the process and procedures needed to implement, troubleshoot repair and maintain a Cisco network. Students will have the opportunity to apply and enhance their skills through hands-on projects that simulate real-life scenarios. This course aids in the preparation for the **CCNA Exam 640-802**.

The 640-802 Cisco Certified Network Associate (CCNA) is the composite exam associated with the Cisco Certified Network Associate certification. Candidates can prepare for this exam by taking the Interconnecting Cisco Networking Devices Part 1 (ICND1) v1.0 and the Interconnecting Cisco Networking Devices Part 2 (ICND2) v1.0 courses. This exam tests a candidate's knowledge and skills required to install, operate, and troubleshoot a small to medium size enterprise branch network.

The topics include connecting to a WAN; implementing network security; network types; network media; routing and switching fundamentals; the TCP/IP and OSI models; IP addressing; WAN technologies; operating and configuring IOS devices; extending switched networks with VLANs; determining IP routes; managing IP traffic with access lists; establishing point-to-point connections; and establishing Frame Relay connections.

## Learning Objectives

### 1. Describe how a network works

- 1.1. Describe the purpose and functions of various network devices
- 1.2. Select the components required to meet a network specification
- 1.3. Use the OSI and TCP/IP models and their associated protocols to explain how data flows in a network
- 1.4. Describe common networked applications including web applications
- 1.5. Describe the purpose and basic operation of the protocols in the OSI and TCP models
- 1.6. Describe the impact of applications (Voice Over IP and Video Over IP) on a network
- 1.7. Interpret network diagrams
- 1.8. Determine the path between two hosts across a network
- 1.9. Describe the components required for network and Internet communications
- 1.10. Identify and correct common network problems at layers 1, 2, 3 and 7 using a layered model approach
- 1.11. Differentiate between LAN/WAN operation and features

## **2. Configure, verify and troubleshoot a switch with VLANs and Interswitch Communications**

- 2.1. Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts
- 2.2. Explain the technology and media access control method for Ethernet networks
- 2.3. Explain network segmentation and basic traffic management concepts
- 2.4. Explain basic switching concepts and the operation of Cisco switches
- 2.5. Perform and verify initial switch configuration tasks including remote access management
- 2.6. Verify network status and switch operation using basic utilities (including: ping, traceroute, telnet, SSH, arp, ipconfig), SHOW & DEBUG commands
- 2.7. Identify, prescribe, and resolve common switched network media issues, configuration issues, auto negotiation, and switch hardware failures
- 2.8. Describe enhanced switching technologies (including: VTP, RSTP, VLAN, PVSTP, 802.1q)
- 2.9. Describe how VLANs create logically separate networks and the need for routing between them
- 2.10. Configure, verify, and troubleshoot VLANs
- 2.11. Configure, verify, and troubleshoot trunking on Cisco switches
- 2.12. Configure, verify, and troubleshoot interVLAN routing
- 2.13. Configure, verify, and troubleshoot VTP
- 2.14. Configure, verify, and troubleshoot RSTP operation
- 2.15. Interpret the output of various shows and debug commands to verify the operational status of a Cisco switched network
- 2.16. Implement basic switch security (including: port security, trunk access, management VLAN other than VLAN1, etc.)

## **3. Implement an IP addressing scheme and IP Services to meet network requirements in a medium-size Enterprise branch office network**

- 3.1. Describe the operation and benefits of using private and public IP addressing
- 3.2. Explain the operation and benefits of using DHCP and DNS
- 3.3. Configure, verify and troubleshoot DHCP and DNS operation on a router (including CLI/SDM)
- 3.4. Implement static and dynamic addressing services for hosts in a LAN environment
- 3.5. Calculate and apply an addressing scheme including VLSM IP addressing design to a network
- 3.6. Determine the appropriate classless addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment
- 3.7. Describe the technological requirements for running IPv6 in conjunction with IPv4 (including: protocols, dual stack, tunneling, etc).

- 3.8. Describe IPv6 addresses
- 3.9. Identify and correct common problems associated with IP addressing and host configurations

#### **4. Configure, verify, and troubleshoot basic router operation and routing on Cisco devices**

- 4.1. Describe basic routing concepts (including: packet forwarding, router lookup process)
- 4.2. Describe the operation of Cisco routers (including: router bootup process, POST, router components)
- 4.3. Select the appropriate media, cables, ports, and connectors to connect routers to other network devices and hosts
- 4.4. Configure, verify, and troubleshoot RIPv2
- 4.5. Access and utilize the router to set basic parameters.(including: CLI/SDM)
- 4.6. Connect, configure, and verify operation status of a device interface
- 4.7. Verify device configuration and network connectivity using ping, traceroute, telnet, SSH or other utilities
- 4.8. Perform and verify routing configuration tasks for a static or default route given specific routing requirements
- 4.9. Manage IOS configuration files. (including: save, edit, upgrade, restore)
- 4.10. Manage Cisco IOS.
- 4.11. Compare and contrast methods of routing and routing protocols
- 4.12. Configure, verify, and troubleshoot OSPF
- 4.13. Configure, verify, and troubleshoot EIGRP
- 4.14. Verify network connectivity (including: using ping, traceroute, and telnet or SSH)
- 4.15. Troubleshoot routing issues
- 4.16. Verify router hardware and software operation using SHOW & DEBUG commands.
- 4.17. Implement basic router security

#### **5. Explain and select the appropriate administrative tasks required for a WLAN**

- 5.1. Describe standards associated with wireless media (including: IEEE WI-FI Alliance, ITU/FCC)
- 5.2. Identify and describe the purpose of the components in a small wireless network. (Including: SSID, BSS, ESS)
- 5.3. Identify the basic parameters to configure on a wireless network to ensure that devices connect to the correct access point
- 5.4. Compare and contrast wireless security features and capabilities of WPA security (including: open, WEP, WPA-1/2)
- 5.5. Identify common issues with implementing wireless networks. (Including: Interface, miss-configuration)

**6. Identify security threats to a network and describe general methods to mitigate those threats**

- 6.1. Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats
- 6.2. Explain general methods to mitigate common security threats to network devices, hosts, and applications
- 6.3. Describe the functions of common security appliances and applications
- 6.4. Describe security recommended practices including initial steps to secure network devices

**7. Implement, verify, and troubleshoot NAT and ACLs in a medium-size Enterprise branch office network**

- 7.1. Describe the purpose and types of ACLs
- 7.2. Configure and apply ACLs based on network filtering requirements.(including: CLI/SDM)
- 7.3. Configure and apply an ACLs to limit telnet and SSH access to the router using (including: SDM/CLI)
- 7.4. Verify and monitor ACLs in a network environment
- 7.5. Troubleshoot ACL issues
- 7.6. Explain the basic operation of NAT
- 7.7. Configure NAT for given network requirements using (including: CLI/SDM)
- 7.8. Troubleshoot NAT issues

**8. Implement and verify WAN links**

- 8.1. Describe different methods for connecting to a WAN
- 8.2. Configure and verify a basic WAN serial connection
- 8.3. Configure and verify Frame Relay on Cisco routers
- 8.4. Troubleshoot WAN implementation issues
- 8.5. Describe VPN technology (including: importance, benefits, role, impact, components)
- 8.6. Configure and verify a PPP connection between Cisco routers

**Interconnecting Cisco Networking Devices Part 1 (ICND1) v1.0**

1. Describe how networks function, identifying major components, function of network components and the Open System Interconnection (OSI) reference model.
2. Using the host-to-host packet delivery process, describe issues related to increasing traffic on an Ethernet LAN and identify switched LAN technology solutions to Ethernet networking issues.
3. Describes the reasons for extending the reach of a LAN and the methods that can be used with a focus on RF wireless access.
4. Describes the reasons for connecting networks with routers and how routed networks transmit data through networks using TCP / IP.
5. Describe the function of Wide Area Networks (WANs), the major devices of WANs, and configure PPP encapsulation, static and dynamic routing, PAT and RIP routing.

6. Use the command-line interface to discover neighbors on the network and managing the router's startup and configuration

### Interconnecting Cisco Networking Devices Part 2 (ICND2) v1.0

1. Review how to configure and troubleshoot a small network.
2. Expand the switched network from a small LAN to a medium-sized LAN with multiple switches, supporting VLANs, trunking, and spanning tree.
3. Describe routing concepts as they apply to a medium-sized network and discuss considerations when implementing routing on the network.
4. Configure, verify, and troubleshoot OSPF.
5. Configure, verify, and troubleshoot EIGRP.
6. Determine how to apply ACLs based on network requirements, and to configure, verify, and troubleshoot ACLs on a medium-sized network.
7. Describe when to use NAT or PAT on a medium-sized network, and configure NAT or PAT on routers.
8. Identify and implement the appropriate WAN technology based on network requirements

### **Prerequisite**

Microsoft Office Skills, introductory programming or multimedia courses, and introductory electronics

### **Contact Hours**

\_\_\_\_\_ Contact Hours (Lecture \_\_\_\_ Hours / Lab \_\_\_\_ Hours)

### **Semester Credit Hours**

\_\_\_\_\_ Semester credit hours

### **Text / Lab Books**

Recommended:

**CCNA<sup>o</sup>** Cisco Certified Network Associate Study Guide

Todd Lammle [www.lammle.com](http://www.lammle.com)

ISBN 0-7821-4392-X

Recommended Training:

- Interconnecting Cisco Networking Devices Part 1 (ICND1) v1.0
- Interconnecting Cisco Networking Devices Part 2 (ICND2) v 1.0

**Additional Resources:**

- Check the List of learning Partners for a Cisco Learning Partner nearest you,
- A variety of Cisco Press titles may be available for this exam. These titles can be purchased through the [Cisco Marketplace Bookstore](#), directly from Cisco Press

**Teaching Strategies**

A variety of teaching strategies may be utilized in this course, including but not limited to, lecture, discussion, written classroom exercises, written lab exercises, performance based lab exercises, demonstrations, quizzes and examinations. Some quizzes may be entirely or contain lab based components. A mid-course and end course examination will be given.

**Method of Evaluating Students**Grade Distribution

Class Attendance	10
Mid Term	30
Finals	50
Special Projects Makeup projects	10
<b>Total</b>	<b>100%</b>

**Grading Policy**

At the end of each course, each student is assigned a final grade as follows:

Point Range	Interpretation	Grade	Quality Points
90 – 100	Excellent	A	4.0
80 – 89	Very Good	B	3.0 – 3.9
70 – 79	Average	C	2.0 – 2.9
60 – 69	Poor	D	1.0 – 1.9
Below 60	Failure	F	0
N/A	Withdrawal	W	0
N/A	Pass	P	0
N/A	Incomplete	I	0

A student earning a grade of D or above is considered to have passed the course and is eligible to pursue further studies. A student receiving a grade of F has failed the course. A failed course

must be repeated and passed to meet Avtech Institute's graduation requirements, in addition to an overall program GPA of 2.0.

## Requirements for Successful Completion of the Course

At a minimum, students must achieve the following:

- A passing grade of **D** or above
- Completion of all required examinations
- Submission of all required lab exercises and projects and;
- Adherence to the school attendance policy.

## Equipment Needed

Industry standard desktop computer for lab exercises.

Equipment Breakdown Lab room

Videos and Projector

## Library Assignments

To be determined by the instructor.

## Portfolio Assignment

Student program outcome portfolios are required to demonstrate student competencies. In conjunction with your course structure, please select a project/paper that best demonstrates what you have learned in this course and add it to your program portfolio.

## Course Policies

### Disruptive Behavior

Disruptive behavior is an activity that interferes with learning and teaching. Inappropriate talking during class, surfing inappropriate website, tardiness, cheating, alcohol or drug use, use of cell phone, playing loud music during class, etc. all disrupt the learning process.

### Copyright Infringement

Specific exemptions to copyright infringement are made for student use in the context of learning activities. Graphic design students often download images from the Internet, or scan images from publications. As long as this work is for educational purpose, and subject to faculty permission, this is not a problem.

### Plagiarism

Faculty cannot tolerate the *misrepresentation of work as the student's own*. This often involves the use by one student or another student's design, whether voluntarily or involuntarily. In the event that plagiarism is evident and documented, all students involved in the conscious decision to misrepresent work must receive an F as the grade for the project. A second occurrence may

result in suspension for the rest of the quarter, and return to the school only after a review by the Academic Standards Committee.

## **Attendance**

### **Attendance and Lateness**

In education and the workplace, regular attendance is necessary if individuals are to excel. There is a direct correlation between attendance and academic success. Attendance is mandatory. All students must arrive on time and prepared to learn at each class session. At the faculty member's discretion, students may be marked absent if they arrive more than 15 minutes late to any class. More than five absences in a class that meets twice per week or more than two absences in a class that meets once per week may result in a failure.

## **Make-Up Work**

### **Late Projects and Homework**

All projects and homework must be handed in on time. Homework should be emailed to your instructor if you are going to miss a class. Work that is submitted one week late will result in the loss of one full grade; and work that is submitted two weeks late will result in the loss of two full grades; more than two weeks late you will receive a failing grade on the project.