



Competency Tests

The Department of Computer Science offers a Competency Tests for CIT 247. This test is designed for students who have backgrounds in computer programming, web development, or networking, but who have no recent equivalent college-level coursework in these areas.

All tests are graded pass / no-pass; results will be emailed to the student within one business day of completing the test.

Note: No college credit is awarded; this test is merely to indicate that a student has sufficient background in the area so that he or she will not be required to complete the corresponding elementary course.

Networking Fundamentals (CIT 247)

For CIT 247, we use the following materials:

- *Cisco CCNA Routing and Switching 200-120 Official Cert Guide Library* by Wendell Odom, ISBN 1-58714-387-9

This is a two-book set. The first book, ICND1, is what we use for CIT 247. (ICND2 is used for CIT 447.) For the CIT 247 placement test, students are expected to know most of the ICND1 material. The ICND1 book prepares readers for a CCENT certification. That exam is called the ICND1 exam. Any other materials or courses used to prepare for the ICND1 exam would be good preparation as well.

The CIT 247 competency exam has a 90 minute time limit.

According to <https://learningnetwork.cisco.com/community/certifications/ccna/icnd1>, the ICND1 exam topics are:

Describe the operation of data networks

- Describe the purpose and functions of various network devices
- Select the components required to meet a given network specification
- Use the OSI and TCP/IP models and their associated protocols to explain how data flows in a network
- Describe common networking applications including web applications
- Describe the purpose and basic operation of the protocols in the OSI and TCP models
- Describe the impact of applications such as Voice Over IP on a network
- Interpret network diagrams
- Determine the path between two hosts across a network
- Describe the components required for network and Internet communications
- Identify and correct common network problems at layers 1, 2, 3 and 7 using a layered model approach
- Differentiate between LAN/WAN operation and features

Implement a small switched network

- Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts
- Explain the technology and media access control method for Ethernet technologies
- Explain network segmentation and basic traffic management concepts
- Explain the operation of Cisco switches and basic switching concepts
- Perform, save and verify initial switch configuration tasks including remote access management
- Verify network status and switch operation using basic utilities (including: ping, traceroute, telnet, SSH, arp, ipconfig), SHOW & DEBUG commands
- Implement and verify basic security for a switch (port security, deactivate ports)
- Identify, prescribe, and resolve common switched network media issues, configuration issues, autonegotiation, and switch hardware failures

Implement an IP addressing scheme and IP services to meet network requirements for a small branch office

- Describe the need and role of addressing in a network
- Create and apply an addressing scheme to a network
- Assign and verify valid IP addresses to hosts, servers, and networking devices in a LAN environment
- Explain the basic uses and operation of NAT in a small network connecting to one ISP
- Describe and verify DNS operation
- Describe the operation and benefits of using private and public IP addressing
- Enable NAT for a small network with a single ISP and connection using SDM and verify operation using CLI and ping
- Configure, verify and troubleshoot DHCP and DNS operation on a router (using both CLI and SDM)
- Implement static and dynamic addressing services for hosts in a LAN environment
- Identify and correct IP addressing issues

Implement a small routed network

- Describe basic routing concepts (including: packet forwarding, router lookup process)
- Describe the operation of Cisco routers (including: router bootup process, POST, router components)
- Select the appropriate media, cables, ports, and connectors to connect routers to other network devices and hosts
- Configure, verify, and troubleshoot and interior gateway routing protocol.
- Access and utilize the router CLI to set basic parameters
- Connect, configure, and verify the operational status of a device interface
- Verify device configuration and network connectivity using ping, traceroute, telnet, SSH or other utilities
- Perform and verify routing configuration tasks for a static or default route given specific routing requirements
- Manage IOS configuration files (including: save, edit, upgrade, restore)
- Manage Cisco IOS
- Implement password and physical security
- Verify network status and router operation using basic utilities (including: ping, traceroute, telnet, SSH, arp, ipconfig), SHOW & DEBUG commands

Explain and select the appropriate administrative tasks required for a WLAN

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

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

- Explain today's increasing network security threats and the need to implement a comprehensive security policy to mitigate the threats
- Explain general methods to mitigate common security threats to network devices, hosts, and applications
- Describe the functions of common security appliances and applications
- Describe security recommended practices including initial steps to secure network devices
- Implement and verify WAN links
- Describe different methods for connecting to a WAN
- Configure and verify a basic WAN serial connection