COURSE OUTLINE

Section 1:

Course Title: Cisco CCNA I: Introduction to Networks

Course Code: CNET-1010

Course Description: Study of data communications, computer networking, and router configuration. Students examine the Open System Interconnection (OSI) model, the TCP/IP protocol suite, Ethernet local-area networks (LANs), networking devices such as routers, switches, and hubs. Practical hands-on projects develop skills in the construction and testing of computer networks; Internet Protocol (IP) addressing schemes; and router configuration. The learning outcomes of this course map to portions of the Cisco Certified Network Associate (CCNA) certification exam.

Grade Scheme: ☐ Pass/Fail ☒ Percentage Minimum Pass Mark: 60% (Some programs require a mark greater than 60% to meet graduation requirements).

Course Value: Outcome hours OR 3 Credit(s) 60 (15 class + 45 lab) Hours

Pre-requisites: NONE

Co-requisites: NONE

Section 2:

Learning Outcomes and Competencies

1. **Explain concepts of network hardware components necessary for network communication.**
   - 1.1 Describe the relationship between data transfer and bandwidth.
   - 1.2 Define propagation, attenuation, reflection, crosstalk, cancellation, latency, and encoding.
   - 1.3 List four types of media used in Local Area Networks (LANs).
   - 1.4 Explain the function of hubs, repeaters, network interface cards (NICs), bridges, switches, and routers.
   - 1.5 Define the six types of topology used in networking (bus, ring, dual-ring, star, extended-star, and mesh topology).
   - 1.6 Describe how the size of a broadcast and a collision domain affects network performance.
   - 1.7 Determine the size of broadcast and collision domains.

1.8 Compare and contrast a client-server network to a peer-to-peer network.

1.9 Define the major standards for text formatting, graphic images, sound, and movies.

2. Apply the Open Systems Interconnection (OSI) model to network communications.

2.1 Describe the seven layers in the OSI model.

2.2 List the order of encapsulation.

2.3 Apply the OSI model to network devices such as NICs, hubs, switches, and routers.

2.4 Determine which layer of the OSI model network devices such as NICs, hubs, switches, and routers operate.

2.5 Describe deterministic and non-deterministic categories of Media Access Control (MAC), including token passing and Carrier Sense Multiple Access/Collision Detection (CSMA/CD).

2.6 Describe the IEEE 802.X standards comparing them to the OSI model.

3. Apply the principles of the TCP/IP Protocol Suite to provide network connectivity.

3.1 Describe the four layers of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

3.2 Compare and contrast the TCP/IP protocol suite to the OSI model.

3.3 Describe commonly used Internet applications, including World Wide Web (WWW), Telnet, File Transfer Protocol (FTP), and e-mail.

3.4 Explain TCP ports and describe how they are assigned.

3.5 Describe the structure and function of an ARP request.

3.6 Explain the operation of the Dynamic Host Configuration Protocol (DHCP) and the Domain Name System (DNS).

3.7 Compare and contrast reliable communications versus best-effort communications.

3.8 Describe how the TCP protocol provides reliable communications.

3.9 Describe how a denial of service (DOS) attack works and how to protect against one.

4. Design a classfull subnetting scheme to make optimal use of assigned IP addresses.

4.1 Explain the difference between network and host addresses.

4.2 Describe the difference between Class A, B, C, D, and E addresses.

4.3 Explain NAT (network address translation) and its role in IP address conservation.

4.4 Differentiate between private and public IP addresses.

4.5 Convert between decimal (base-10), binary (base-2), and hexadecimal (base-16).

4.6 Determine the number of subnets and host addresses required.

4.7 Perform subnet calculations to meet current and future requirements.

5. Cable networking devices to industry standards.

5.1 Compare and contrast copper cable, fiber optic cable, and wireless media.

5.2 Select proper cabling when connecting networked devices.

5.3 Describe the role of the Telecommunications Industry Association/Electronic Industries Alliance (TIA/EIA) in cabling.

5.4 Describe the importance of TIA/EIA standards 568A and 568B.

5.5 Define Main Distribution Facility (MDF), Intermediate Distribution Facility (IDF), and Point of Presence (POP) in terms of a building's electrical/architectural layout.

5.6 Determine sources of noise on copper media.

5.7 Explain the terms: signal to noise ratio, crosstalk, attenuation, insertion loss, propagation delay, and impedance.

5.8 Explain logarithms and laws of exponents.

5.9 Solve exponential and logarithmic equations derived from cabling requirements.

5.10 Explain the use of decibels for signal to noise ratio, crosstalk, attenuation, and insertion loss.

5.11 Test network cables.

6. Explain the operation of a Cisco router.

6.1 Explain the function of router elements: RAM, Nonvolatile RAM, ROM, microprocessor, and interfaces.

6.2 Identify the main modes of the Cisco Internetwork Operating System (IOS) software.

6.3 Identify the ports and interfaces available on a router.

6.4 Describe the router startup sequence.

7. Configure a router to provide internetworking communications.

7.1 Login to a router using both the console and telnet.

7.2 Configure user mode, privileged mode, and telnet passwords.

7.3 Configure the router with a name and a login banner.

7.4 Use the context-sensitive help facility.

7.5 Use the command history and editing features.

7.6 Configure Ethernet interfaces and WAN interfaces with an IP address, a subnet mask, and an interface description.

7.7 Verify proper router configuration using show commands and debug commands.

8. Configure network clients to connect to a network.

8.1 Install network interface controller cards (NICs) in a PC.

8.2 Configure PCs with an IP address, subnet mask, and default gateway.

8.3 Connect client computers to a network using appropriate cables.

9. Troubleshoot network problems to maintain connectivity.

9.1 Describe the network testing process by layers of the OSI model.

9.2 List common network errors found at each layer of the OSI model.

9.3 Test connectivity using ping, trace route, and telnet.

9.4 Use network analysis tools such as packet capturing software to solve network problems.

Section 3:

Assessment Categories:	Theory Tests and Exams	35%
	Practical Tests and Exams	25%
	Labs and Assignments	30%
	Professionalism	10%

Research Component? ☐ Yes ☐ No

Section 4:

(For administrative use only)

Is this course new? ☐ Yes ☒ No

Is this course replacing an existing course(s)? ☐ Yes ☒ No

If this course is replacing another, please record the name and code of the old course:

Course equivalents: EET-1060

Note: See Quality Procedure A01 for more details.

Catalog Year of Original Course Implementation: 2014

Catalog Year of Current Version Implementation: 2015

Revision level: 2 **Version:** 2 **Date:** Nov/14 **Authorized by:** mlgj

Accreditation and or Supporting Documents: National Technology Benchmarks: Canadian Council of Technicians & Technologists; Discipline: Information Technology; Level: Technologist

Additional Information: Additional tutorial hours may be scheduled.

Subject matter expert(s): Rob Blanchard

Approved by: (Program Manager)

Paul Murnaghan Date Approved: **2014-12-16**

Approved by: (Curriculum Consultant)

Mary Lou Griffin-Jenkins Date Approved: **2014-12-16**