Job Ready Assessment Blueprint

Computer Networking Fundamentals

Test Code: 4514 / Version: 01

General Assessment Information

Blueprint Contents

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Test Type: The Computer Networking Fundamentals industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Georgia, New York, Oklahoma, and Pennsylvania.
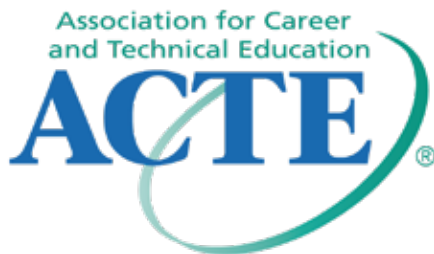
CIP Code

11.0901- Computer Systems
Networking and
Telecommunications

CTE — Learning that works for America

Career Cluster 11-
Information Technology

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15-1151.00-
Computer User
Support Specialists

Association for Career and Technical Education

ACTE

The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE
University of the State of New York - Regents Research Fund

In the lower division baccalaureate/associate degree category, 3 semester hours in Computer Networking Fundamentals, Computer Science, or Computer Information Systems.
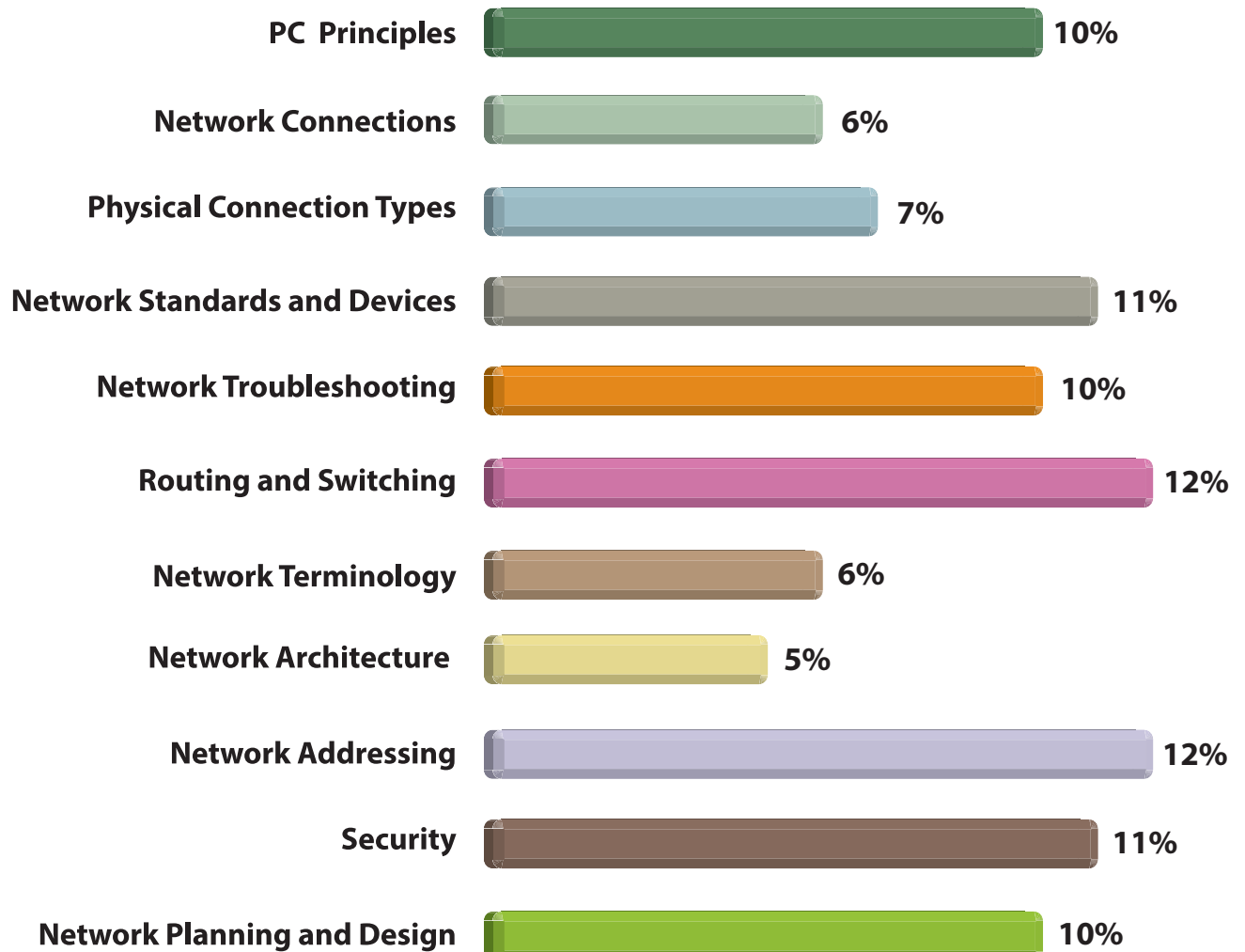
Written Assessment

NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours
Number of Questions: 194
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered

Area	Percentage
PC Principles	10%
Network Connections	6%
Physical Connection Types	7%
Network Standards and Devices	11%
Network Troubleshooting	10%
Routing and Switching	12%
Network Terminology	6%
Network Architecture	5%
Network Addressing	12%
Security	11%
Network Planning and Design	10%

Specific Standards and Competencies Included in this Assessment

PC Principles
- Identify physical and equipment safety and maintenance principles and practices
- Demonstrate understanding of storage methods (e.g., external, network attached, cloud)
- Exhibit understanding of memory
- Demonstrate uses of eSATA, Bluetooth®, and USB
- Identify different types and standards of processors
- Develop an understanding of various client operating systems

Network Connections
- Demonstrate understanding of Network Interface Cards (NICs)
- Identify different physical and logical characteristics of network connections
- Demonstrate use of remote access (e.g., Windows® terminal services, terminal emulation software, VPN, telephone connections, SSH)
- Exhibit understanding of wired and wireless communications and standards

Physical Connection Types
- Identify cable components and uses, including twisted pair and fiber
- Demonstrate understanding of signal characteristics and transmission among various media types

Network Standards and Devices
- Demonstrate understanding of OSI model layers
- Demonstrate familiarity with TCP/IP model
- Identify IEEE, EIA/TIA standards and common Port numbers
- Distinguish various types and uses of wired network devices
- Distinguish various types and uses of wireless network devices

Specific Standards and Competencies (continued)

Network Troubleshooting
- Utilize ping, ipconfig, tracert, and netstat commands
- Maintain and troubleshoot cabling
- Perform local and remote loopback
- Identify various troubleshooting methodologies (e.g., top-down, bottom-up, divide and conquer)
- Utilize, perform, and analyze a packet capture

Routing and Switching
- Explain the difference between static, dynamic, default, and gateway routes
- Demonstrate an understanding of WAN connection types
- Recognize and implement basic router operations and configurations
- Demonstrate understanding of switch operations and configurations (e.g., VLAN, interVLAN)
- Compare and contrast routed vs. routing protocols
- Differentiate between a collision domain and a broadcast domain

Network Terminology
- Demonstrate familiarity with various protocols and architecture terminology
- Demonstrate familiarity with DHCP and DNS
- Identify various network operating systems (e.g., Windows®, Linux®)
- Identify various network types

Network Architecture
- Exhibit understanding of physical and logical networking topologies (e.g., access, core, distribution)
- Exhibit understanding of various LAN, MAN, PAN, WLAN, and WAN topologies

Specific Standards and Competencies (continued)

Network Addressing
- Exhibit knowledge of IP network addressing (e.g., IPv4, IPv6)
- Differentiate between classful and classless IP addressing
- Demonstrate understanding of Media Access Control (MAC) addressing
- Convert binary, hexadecimal, and decimal numbering systems
- Create subnets from a network address

Security
- Identify and troubleshoot basic organizational and acceptable use policies
- Implement and maintain device security procedures
- Explain the defense in-depth approach to security (e.g., DMZ, Bastion Host)
- Identify and troubleshoot network security attacks and breaches
- Identify and troubleshoot viruses, worms, and other forms of malware
- Install and maintain appropriate firewalls, including NAT
- Explain general cryptography concepts

Network Planning and Design
- Exhibit understanding of analysis and planning concepts
- Compare and contrast principles of logical and physical design
- Identify various forms of power protection, backups, and UPS
- Explain the appropriate use and benefits of thin clients
- Install, maintain, and troubleshoot physical and wireless networks according to design specifications
- Describe various access methods (e.g., ISP, DSL, broadband/cable, satellite, wireless, mobile)
- Explain the principles of virtualization

Sample Questions

Use _____ to achieve transfer rates much higher than those of USB 2.0 FireWire® 400.
      A. ATA
      B. SATA 150
      C. eSATA
      D. Flash

Ethernet uses _____ to ensure packet delivery.
      A. token passing
      B. multicasting
      C. collision detection
      D. broadcasting

Performing a loopback test on a router will check the _____ first.
      A. LAN routing tables
      B. total number of packets lost
      C. WAN interface operability
      D. IP address of the LAN interface

The purpose of the Domain Name Service (DNS) is to
      A. supply valid IP addresses as requested by network hosts
      B. centrally manage the mapping of host names to IP addresses
      C. authenticate IP addresses before passing data packets to other network devices
      D. facilitate dynamic addressing

The NIC is installed on
      A. the system board
      B. a port in the modem
      C. the CPU
      D. a CD-ROM drive

Sample Questions (continued)

User IDs, passwords, and access rights are all considered part of
   A. physical security
   B. personal information
   C. login requirements
   D. logical security

The data-link layer uses _____ to organize, or group, bits of data.
   A. frames
   B. packets
   C. headers
   D. trailers

A common interior routing protocol is
   A. BGP
   B. UDP
   C. RIP
   D. VPN

Which <u>best</u> describes a hybrid topology?
   A. star
   B. bus
   C. extended star
   D. star-wired ring

The purpose of a surge protector is to protect computer equipment from
   A. sags
   B. blackouts
   C. brownouts
   D. spikes

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 2 hours
Number of Jobs: 2

Areas Covered:

39% Select and Connect Equipment to Set Up a Simple LAN with Two Workstations
Participant will select appropriate equipment, assign a private Class C address and subnet, record the results, verify IP connectivity, verify that the network was created, and leave the IP connectivity results on screen for evaluator review.

61% Set Up a Workgroup, Create Users, Create Shares and Install a Printer
Participant will name the workstations, make each workstation a member of workgroup named NOCTI, create users, create folders/directories, create a share, grant control permission to folders/directories, attempt to access folders/directories, install printer, assign printer rights, and verify correct set-up/functionality.
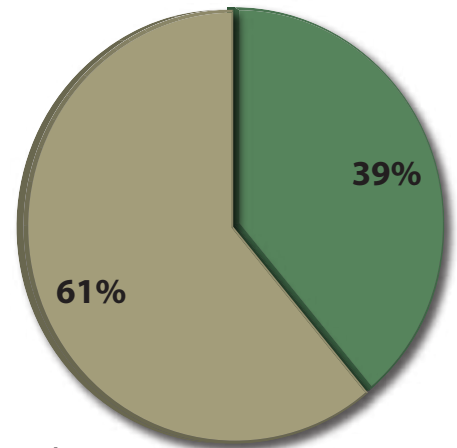
Sample Job

Wireless Configuration

Maximum Time: 1 hour

Participant Activity: Participant will name the workstations, make each workstation a member of workgroup named NOCTI, create two users, create two folders/directories, create a share, grant full control permission to folders/directories, log in and attempt to access folders/directories, install printer, assign printer rights, verify correct set-up/functionality and notify evaluator when finished.