Network Computer Technician –NCT
Competency Requirements

Certified Network Computer Technicians are expected to obtain knowledge of computer electronics basic concepts, Internet and networking technology applicable to various areas of the computer industry. Once the NCT has acquired these skills, abilities and knowledge, they will be able to enter employment in any part of the computer industry. With minimal training in areas unique to the specific products, the NCT should become a profitable and efficient part of the computer industry workforce. NCTs are not required to pass the Associate, basic electronics (CETa), technician examination. Journeyman NCTs may pass the Associate exam also, and by doing so, become a C.E.T. (showing the NCT specialty area.)

Network Computer Technicians must be knowledgeable and have abilities in the following technical areas:

I. - OPERATING SYSTEM

OS 1.0   FUNCTION, STRUCTURE, OPERATION, AND FILE MANAGEMENT
   1.1   Windows 7 – XP – Vista – 8, and Linux:
      1.1.1   Explain the primary functions of an OS
           1.1.1.1   Program execution
           1.1.1.2   Provides access to I/O devices
           1.1.1.3   Controlled access to files
           1.1.1.4   System access
           1.1.1.5   Virtual Machine
           1.1.1.6   Resource Manager
      1.1.2   Describe procedures for installing an OS
           1.1.2.1   Stand-alone
           1.1.2.2   Network
      1.1.3   Explain the function and importance of required and optional system files
      1.1.4   Explain how to configure an OS boot order
           1.1.4.1   Define Internal and External system commands
      1.1.5   Explain the differences and advantages of various file types and naming conventions:
           1.1.5.1   FAT32
           1.1.5.2   NTFS
           1.1.5.3   HPFS
      1.1.6   Explain the use of basic disk and OS Commands:
           1.1.6.1   Entering Commands
           1.1.6.2   Setting the system date and time.
           1.1.6.3   Displaying the OS version
           1.1.6.4   Controlling the Display
           1.1.6.5   Getting System Information
           1.1.6.6   Getting Help
           1.1.6.7   Redirectors
      1.1.7   Explain procedures for working with Directories:
           1.1.7.1   Directory Tree
           1.1.7.2   Root Directory and Subdirectories
           1.1.7.3   Changing to another directory
           1.1.7.4   Making a new directory
           1.1.7.5   Removing a directory
           1.1.7.6   Deleting a directory tree
           1.1.7.7   Naming directories
           1.1.7.8   Using filename extensions
           1.1.7.9   Using wildcard characters
           1.1.7.10 Listing a directory
           1.1.7.11 Using directory paths
           1.1.7.12 Setting the Search Path

1.1.8   Describe and list procedures for using file commands:
- 1.1.8.1   Creating/naming files
- 1.1.8.2   Displaying the contents of files
- 1.1.8.3   Copying files
- 1.1.8.4   Copying directories
- 1.1.8.5   Duplicating an entire disk
- 1.1.8.6   Renaming a file
- 1.1.8.7   Moving files
- 1.1.8.8   Renaming a directory
- 1.1.8.9   Deleting/recovering files
- 1.1.8.10 File attributes

1.1.9   Explain the need and use of File Management software
1.1.10 Explain how to properly format a hard disk in accordance with file type
1.1.11 Explain how to make a formatted disk bootable
1.1.12 Explain how to automate OS Commands
- 1.1.12.1 Terminate and Stay Resident programs (TSRs)
- 1.1.12.2 Recalling previous commands

1.2   Introduction to Microsoft and Linux
1.2.1   Explain the differences and system requirements between various OS's:
- 1.2.1.1   Windows 7
- 1.2.1.2   XP Home
- 1.2.1.3   XP Pro
- 1.2.1.4   Windows Vista
- 1.2.1.5   Windows 8
- 1.2.1.6   Red Hat
- 1.2.1.7   open SUSE
- 1.2.1.8   Knoppix

1.2.2   Identify procedures for starting an OS
- 1.2.2.1   Boot Process
- 1.2.2.2   Location of Key (MS only)
- 1.2.2.3   Logging on

1.3   Describe attributes and characteristics of using an OS
1.3.1   Windows 7, Windows Vista, Windows XP, Windows 8:
- 1.3.1.1   The Start Button and Taskbar
- 1.3.1.2   Deleted items
- 1.3.1.3   My Computer
- 1.3.1.4   Explorer
- 1.3.1.5   Shortcuts
- 1.3.1.6   Canceling a Print Job
- 1.3.1.7   Permissions

1.3.2   Linux
- 1.3.2.1   Shells and Utilities
- 1.3.2.2   Basic Shell
- 1.3.2.3   Kernel
- 1.3.2.4   The Search Path
- 1.3.2.5   The Directory Path
- 1.3.2.6   Permission
- 1.3.2.7   Regular expressions and Metacharacters
- 1.3.2.8   Explain how to properly shut down an OS

OS 2.0 INSTALLATION, CONFIGURATION/UPGRADING AND MEMORY MANAGEMENT

    2.1   Explain memory management requirements for Windows 7, Windows XP, Windows Vista, Windows 8 and Linux:

        2.1.1   Main memory overview
        2.1.2   Optimizing memory
        2.1.3   Minimum and maximum memory allocation
        2.1.4   Upgrading memory
        2.1.5   System resources
        2.1.6   Virtual memory settings
        2.1.7   Optimizing your system

    2.2   Explain how to install, configure, and customize the following for Windows 7, Windows Vista, Windows XP, Windows 8 and Linux:

        2.2.1   Pre-Installation procedures
        2.2.2   Installation procedures
        2.2.3   Installing new applications
        2.2.4   Changing system settings
        2.2.5   The registry
        2.2.6   Customizing the OS at boot-up
        2.2.7   Hide control panel icons
        2.2.8   Hide the taskbar
        2.2.9   Recreate standard group folders
        2.2.10   Setting up a printer
        2.2.11   Changing or re-installing a printer driver
        2.2.12   Installing software
        2.2.13   Creating a new startup disk
        2.2.14   Installing hardware drivers
        2.2.15   Change and configuring video

OS 3.0 DIAGNOSING AND TROUBLESHOOTING

    3.1   Explain Operating System recovery methods and functions of an anti-virus:

        3.1.1   Data recovery software
        3.1.2   Backup utilities/software
        3.1.3   Anti-virus software
        3.1.4   Troubleshooting the OS boot configuration

    3.2   Identify and describe troubleshooting techniques:

        3.2.1   Installation troubleshooting
        3.2.2   Error messages
        3.2.3   Generic troubleshooting
        3.2.4   Improving overall performance:
        3.2.5   Troubleshooting specific startup errors
        3.2.6   Bypassing startup files
             3.2.6.1   Explain how to perform a clean boot
        3.2.7   Booting with Diagnostic Switches
        3.2.8   System Properties Troubleshooting
        3.2.9   Using Help Troubleshooters

    3.3   Explain how to resolve application compatibility issues:

        3.3.1   Windows 7
        3.3.2   Windows Vista
        3.3.3   Windows XP
        3.3.4   Windows 8
        3.3.5   Linux

    3.4   Explain how to determine proprietary driver corruption and failure determination:

        3.4.1   Printing Problems
        3.4.2   Video Problems

    3.5   Describe the methods of troubleshooting involved for programs that have not closed or terminated correctly

OS 4.0 NETWORKS
   4.1   List the fundamental requirements of network/server OS
   4.2   Describe the basic principles of a Network Operating Systems (NOS)
   4.3   Identify Windows 7, Windows XP, Windows Vista, Windows 8 and Linux client requirements for networking:
      4.3.1   Network Neighborhood
      4.3.2   LinNeighborhood
      4.3.3   Sharing Drives and Printers
      4.3.4   Security
      4.3.5   Network connections
   4.4   Describe Client-side advantages and disadvantages with Server/Network Installed Applications

OS5.0 ACTIVE DIRECTORY
   5.1   Describe the Active Directory hierarchal framework that holds and categorizes objects:
      5.1.1   Forests
      5.1.2   Trees
      5.1.3   Domains
   5.2   Compare the Flexible Single Master Operations (FSMO) roles
   5.3   Identify the naming categories used by Active Directory:
      5.3.1   Distinguished
      5.3.2   Relative Distinguished
      5.3.3   Canonical
      5.3.4   User Principle
   5.4   Describe the different levels of Trust
   5.5   Explain the Active Directory Application Mode (ADAM)
   5.6   Explain how to properly integrate Linux into Active Directory, while determining compatibility issues

II. - HARDWARE

HW 1.0 INSTALLATION, CONFIGURATION AND UPGRADING
   1.1   List common characteristics and functions for basic computer operation:
      1.1.1   Hardware versus software
      1.1.2   Basic Hardware Components
      1.1.3   Types of Computers
      1.1.4   How Computers Work
   1.2   Identify the following PC Features:
      1.2.1   Chip package types
      1.2.2   RAM vs. ROM
      1.2.3   Floppy disk drives
      1.2.4   Hard disk drives
      1.2.5   Power supply
      1.2.6   Keyboard
      1.2.7   Mouse
      1.2.8   Monitor
      1.2.9   CD-ROM or DVD/HDDVD-ROM
   1.3   Explain the use of specific and non-specific hardware and software related tools:
      1.3.1   Hand Tools
      1.3.2   Spare Parts
      1.3.3   Documentation
      1.3.4   Drive setup software
      1.3.5   Disk maintenance software
      1.3.6   Rescue disk software
   1.4   Identify and determine procedures for disassembling/reassembling a PC:
      1.4.1   General PC disassembly
      1.4.2   General PC reassembly
      1.4.3   Common reassembly mistakes

    1.5   Explain the installation and configuration of ports, cards and peripherals:
        1.5.1   Configuring new circuit boards
        1.5.2   Resolving device conflicts
            1.5.2.1   I/O range
            1.5.2.2   IRQ
        1.5.3   Configuring adapters with software
        1.5.4   Plug and Play (PnP)
        1.5.5   Serial ports
        1.5.6   Parallel ports
        1.5.7   High-speed interface
            1.5.7.1   Universal Serial Bus (USB)
            1.5.7.2   Fire wire
    1.6   Define IDE/EIDE, SCSI and SATA
    1.7   Explain procedures for installing and managing hard disks, floppy disks, and DVD/HDDVD-ROM drives:
        1.7.1   Hard disk (and floppy disk) preventive maintenance
        1.7.2   Caring for floppy disks
        1.7.3   Caring for CD/DVD-ROM discs
        1.7.4   How a floppy disk works
        1.7.5   Installing a floppy disk drive
        1.7.6   IDE, EIDE, SATA hard disk installation
        1.7.7   Installing a second IDE drive
        1.7.8   SCSI drive installation
        1.7.9   Hard disk software installation
        1.7.10   Installing a second SATA drive
        1.7.11   Installing a CD-ROM or (DVD/HDDVD-ROM) drive
        1.7.12   Installing a Blu-ray drive
    1.8   Explain the operational characteristics of a CD-ROM, DVD/HDDVD-ROM and Blu-ray
    1.9   Explain modem technology and standards
    1.10   List specifications for CRT and LCD displays
    1.11   Explain the differences in power supplies and power protection devices:
        1.11.1   Form factor (ATX vs. BTX, etc.)
        1.11.2   Uninterruptible Power Supplies (UPS)
        1.11.3   Surge suppressors
        1.11.4   Batteries

HW 2.0 DIAGNOSING AND TROUBLESHOOTING
    2.1   Explain how performance utilities and diagnostic tools are used:
        2.1.1   Digital Multi-Meter (DMM)
        2.1.2   Diagnostic software
    2.2   Describe the following troubleshooting basics:
        2.2.1   General troubleshooting rules
        2.2.2   Boot process
        2.2.3   POST error codes
        2.2.4   Clean boot
        2.2.5   Troubleshooting process
        2.2.6   Common problems
    2.3   Examine the steps to properly troubleshoot the following monitor problems:
        2.3.1   Menu
        2.3.2   Image distortion, color and size
        2.3.3   Power
    2.4   Explain how to determine hard drive, floppy drive and CD/DVD-ROM installation problems
    2.5   Explain how to troubleshoot modems:
        2.5.1   Internal
        2.5.2   External
    2.6   Explain how to identify various problems associated with power supplies
    2.7   Explain how to troubleshoot a printer

HW 3.0 SAFETY AND PREVENTIVE MAINTENANCE
 3.1 Explain the reasons for safety in the following areas:
  3.1.1 Electrical safety
  3.1.2 Electrostatic Discharge (ESD)
  3.1.3 Electromagnetic Interference (EMI)
  3.1.4 Fire safety
  3.1.5 Physical safety
  3.1.6 Fiber optics cable
  3.1.7 Magnets
  3.1.8 CD-ROM or DVD-ROM safety and maintenance issues

HW 4.0 MOTHERBOARD/PROCESSORS/MEMORY
 4.1 Identify the following functions of Motherboard Components:
  4.1.1 Central Processing Unit (CPU)
  4.1.2 Numeric Processing Unit (NPU)
  4.1.3 Basic Input/Output System (BIOS)
  4.1.4 CMOS
  4.1.5 Main memory (RAM)
  4.1.6 System timer (system clock)
  4.1.7 Real time clock/calendar
  4.1.8 Expansion bus
  4.1.9 Expansion cards
  4.1.10 I/O ports
  4.1.11 North Bridge/Memory Controller Hub
  4.1.12 South Bridge/Input Output Controller Hub
  4.1.13 PATA and SATA connectors
  4.1.14 SATA to PATA adapters
 4.2 Compare and contrast CPUs and BUSES
  4.2.1 Types of CPUs
  4.2.2 Clock speed
  4.2.3 CPU speed
  4.2.4 Data path
  4.2.5 CPU performance
  4.2.6 CPU cache
   4.2.6.1 L1
   4.2.6.2 L2
   4.2.6.3 L3
  4.2.7 CPU voltages
  4.2.8 Sockets and slots
  4.2.9 CPU operating modes
  4.2.10 Expansion BUS architecture
  4.2.11 BUS performance
  4.2.12 BUS mastering
 4.3 Identify and describe characteristics and differences in semiconductor memory:
  4.3.1 RAM/ROM
  4.3.2 Memory chips
  4.3.3 Memory organization
  4.3.4 Parity
  4.3.5 Access time
  4.3.6 Memory installation rules
  4.3.7 SIMM/DIMM capacities
  4.3.8 Cache
  4.3.9 Types of RAM
  4.3.10 Flash drives and other types of memory sticks

HW 5.0 PORTABLE SYSTEMS
 5.1 Identify laptop components
 5.2 Identify tablet and smartphone systems

HW 6.0 BASIC NETWORKING
6.1 Identify the major types of networks
6.2 Describe the various network topologies:
    6.2.1 Bus
    6.2.2 Star
    6.2.3 Ring
    6.2.4 Mesh
    6.2.5 Peer-To-Peer
    6.2.6 Client/Server
    6.2.7 Hybrid
    6.2.8 Tree
6.3 Describe various Nodes:
    6.3.1 Backbone
    6.3.2 Gateway
6.4 List Network design and architecture:
    6.4.1 Access methods
    6.4.2 Communication
6.5 Define connecting network components:
    6.5.1 Transmission media
    6.5.2 Common characteristics
    6.5.3 Signal transmission
    6.5.4 Primary cable types
    6.5.5 Common network problems
6.6 Describe hardware considerations:
    6.6.1 Buses
    6.6.2 RAM
    6.6.3 Network Interface Card (NIC)
    6.6.4 Hubs
    6.6.5 Hard drives
    6.6.6 Antivirus protection
    6.6.7 Bottlenecks

HW 7.0 MONITORS
7.1 Explain the technology and characteristic differences for monitors:
    7.1.1 LCD
    7.1.2 CRT

**End of Certified Network Computer Technician Competency Listings:
(12 major knowledge categories)**

Recommend a minimum of one-year experience in electronics or electronic equipment servicing and repair.

Find An ETA Test Site: http://www.eta-i.org/test_sites.html

Suggested Study Material:

Upgrading and Repairing PCs, 18th Ed.; Scott Mueller; (Oct 2007); 1584 ppg.; Que Publishing; ISBN 0789736977 (19th Ed. Available Nov 2009)
Network Warrior, 1st Ed.; Gary Donahue; (Jun 2007); 598 ppg; O'Reilly Media; ISBN 0596101511
Deploying Wireless Networks, Andy Wilton and Tim Charity; 1st Ed. (Oct 2008); 384 ppg; Cambridge Univ. Press; ISBN 0521874211
Next Generation Wireless LANs, Eldad Perahia and Robert Stacey; 1st Ed. (Sept 2008); 416 ppg.; Cambridge Univ. Press; ISBN 0521885841
Computer Networks and Internets, Douglas Comer; 5th Ed. (Apr 2008); 768 ppg; Prentice Hall; ISBN 0136061273
How Microsoft Windows Vista Works; 1st Ed.; Michael Miller, Eric Lindley; (Jan 2007); 288 ppg; Que Publishing; ISBN 0789735857
Alan Simpson's Windows Vista Bible, Desktop Edition; Alan Simpson, Bradley Jones; (Apr 2007); 860 ppg; Wiley; ISBN 0470046406