



A+, Net+, Security+

MSIT101 / 240 Hours / 12 Months / Self-Paced / Materials Included

Course Overview:

CompTIA A+ 220-901 covers PC hardware and peripherals, mobile device hardware, networking and troubleshooting hardware and network connectivity issues.

CompTIA A+ 220-902 covers installing and configuring operating systems including Windows, iOS, Android, Apple OS X and Linux. It also addresses security, the fundamentals of cloud computing and operational procedures.

Held by over 1 million IT professionals worldwide, CompTIA A+ is the most essential IT certification for establishing an IT career. If you're new to the IT industry, this will help you put your best foot forward. And if you're already an IT professional, the CompTIA A+ certification validates your skills and can boost your career.

A+ is comprehensive and vendor-neutral

A+ certified professionals have mastered the technologies found in today's extensive and varied IT environments, from mobile to traditional devices and operating systems. They can confidently handle the most challenging technology problems more efficiently. Learn more with this infographic.

A+ validates foundational skills

A+ establishes best practices in troubleshooting, networking and security across a variety of devices to set the stage for IT careers. The certification also matches professional tech skills with communication skills.

A+ is trusted by employers

As businesses and governments worldwide continue to adopt mobile and cloud technology, they trust A+ certified professionals to keep their devices running and organizations working smoothly.

A+ is globally recognized and accredited

CompTIA A+ is compliant with ISO 17024 standards and is approved by the U.S. Department of Defense to meet directive 8570.01-M requirements.

A+ is industry supported

A+ is developed and maintained by leading IT experts. Content for the exams stems from a combination of industry-wide survey feedback and contributions from our team of subject matter experts. Learn more about the people behind the CompTIA A+ exam development and the CompTIA A+ Advisory Committee.

CompTIA's Network+ is a vendor-neutral certification that validates technical competency in networking administration and support. The Network+ certification confirms a technician's critical knowledge of media and topologies, protocols and standards, network implementation and network support. The exams also cover domains such as security, safety and environmental issues and communication and professionalism.

The CompTIA Network+ training measures the necessary competencies for an IT professional with approximately nine months experience in network support or administration. Students will learn the knowledge and skills needed to install, manage and troubleshoot a variety of networks on any platform.

CompTIA's Security+ is a vendor-neutral certification that validates the competency of security professionals working in the IT industry. The Security+ Certification confirms a technician's critical knowledge of communication security, infrastructure security, cryptography, operational security, and general

security concepts. Because human error is the number one cause for a network security breach, CompTIA Security+ is recognized by the technology community as a valuable credential that proves competency with information security.

The CompTIA Security+ Certification Training Course measures the necessary competencies for an IT professional with approximately two years networking experience. Students will learn the knowledge and skills needed to protect your business from the theft or destruction of information or disruption of communication.

CompTIA's Security Plus training course follows the CompTIA authorized curriculum, ensuring you receive the training and knowledge needed to succeed.

This course includes FREE access for 12 months to a cloud based lab platform to assist students develop the practical information technology (IT) skills necessary to succeed in high in demand IT jobs. This cloud based lab solution uses real equipment that enables our students to execute each practical task in a safe environment that is accessible from anywhere without needing to buy their own hardware or risk damage to their own system.

Along with providing the necessary hardware in a virtual environment, students gain access to high quality practical exercises that cover many of the exam topics they will encounter on their certifying exams.

Course Outline:

CompTIA A+ 220-901 Curriculum:

CompTIA A+ 220-901 - Module 1

- Introduction
- Toolkit
- BIOS/UEFI Configuration Settings
- Installing Firmware Upgrades
- BIOS Component Information
- BIOS Configurations
- Built-In Diagnostics
- Monitoring
- UEFI Settings

CompTIA A+ 220-901 - Module 2

- Motherboard Components-Purposes and Properties
- Motherboard Form Factors
- Expansion Slots
- RAM Slots
- CPU Sockets
- Chipsets
- CMOS Battery
- Power Connection Types
- Fan Connectors
- Front Panel Connectors
- Motherboard Components Demonstration

CompTIA A+ 220-901 - Module 3

- Compare and Contrast RAM Types and Features
- RAM Types
- RAM Configurations

- Single Sided vs. Double Sided RAM
- Memory Stick (RAM) Demonstration

CompTIA A+ 220-901 - Module 4

- Installing and Configuring PC Expansion Cards
- Sound Cards
- Video Cards
- Network Cards
- Serial and Parallel Cards
- USB Cards-Firewire and Thunderbolt Cards
- Storage Cards
- Modem Cards and Wireless/Cellular Cards
- Specialty Cards
- Expansion Cards Demonstration

CompTIA A+ 220-901 - Module 5

- Installing/Configuring Storage Devices and Media
- Optical Drives
- Magnetic Hard Drives
- Hot Swappable Drives
- Solid State /Flash Drives
- Hybrid Drives and eMMC
- Raid Types
- Tape Drives
- Types of Hard Drives Demonstration

CompTIA A+ 220-901 - Module 6

- Installing CPU's and Applying Cooling Methods
- Socket Types
- Characteristics
- Cooling Methods
- CUP Types and Features Demonstration

CompTIA A+ 220-901 - Module 7

- PC Connection Interface/Characteristics and Purposes
- Physical Connections
- Serial and Parallel Connectors
- VGA/HDMI and DVI Connectors
- Audio/RJ and Thunderbolt Connectors
- Wireless Connections
- Connection Characteristics
- Speed and Distance
- Cables and Connector Types Demonstration

CompTIA A+ 220-901 - Module 8

- Installing Power Supplies
- Connector Types and Voltages
- Power Specifications
- Dual Voltage Options
- Power Supply Demonstration

CompTIA A+ 220-901 - Module 9

- Selecting Components for a Custom PC Configuration
- Graphic/CAD/CAM Design Workstations
- Audio/Video Editing Workstation
- Virtualization Workstation
- Gaming PC's
- Home Theater PC
- Think and Thin Client
- Home Server PC

CompTIA A+ 220-901 - Module 10

- Display Devices and Features
- Display Types
- Florescent vs LED Backlighting
- Types of LED Displays
- Plasma and OLED Displays
- Refresh and Frame Rate
- Display Brightness/Analog vs Digital
- Display Special Needs
- Aspect Ratios
- Display Settings Demonstration

CompTIA A+ 220-901 - Module 11

- PC Connectors and Associated Cables
- Display Connector Types
- Display Cable Types
- Device Cables and Connectors
- Adapters and Converters
- HDMI/DVI Cable Demonstration

CompTIA A+ 220-901 - Module 12

- Installing and Configuring Peripheral Devices
- Input Devices
- Output Devices
- Input and Output Devices

CompTIA A+ 220-901 - Module 13

- Installing and Configuring Multifunction Devices
- Printer Configuration Settings
- Device Sharing
- Integrated Print Server
- Remote Printing
- Configuring Shared Devices
- Data Privacy
- Hard Drive Caching
- Printer Configuration Settings Demonstration

CompTIA A+ 220-901 - Module 14

- Printer Technologies
- Laser Components
- Imaging Process
- Inkjet Printers
- Inkjet Components
- Thermal Printers
- Impact Printers
- Virtual Printers
- Virtual Printers Demonstration

CompTIA A+ 220-901 - Module 15

- Printer Maintenance
- General Laser Maintenance
- Paper Jams
- Laser Issues
- Maintenance Tasks
- Printer Calibration
- Thermal Printer Maintenance
- Impact Printer Maintenance
- Inkjet Printer Maintenance

CompTIA A+ 220-901 - Module 16

- Network Cables and Connectors
- Fiber Connectors
- Twisted Pair Connectors
- Wiring Standard
- Coaxial Connectors
- Cable/Connector Technology Comparison
- Cable/Connector Demonstration

CompTIA A+ 220-901 - Module 17

- Comparing Connector/Cabling Characteristics
- Fiber Cabling Characteristics

- Twisted Pair Cabling Characteristics
- Coaxial Cabling Characteristics
- Splitters and Signal Quality

CompTIA A+ 220-901 - Module 18

- TCP/IP Properties and Characteristics
- IP Classes
- IPv4 vs. IPv6
- APIPA vs. Link Local
- Static vs. Dynamic IP Addressing
- Client Side DNS and DHCP
- Subnet Mask vs. CIDR
- Gateway
- DNS/DHCP Configuration Settings Demonstration

CompTIA A+ 220-901 - Module 19

- TCP/UDP Ports and Protocols
- Protocols
- Port Numbers
- TCP vs. UDP

CompTIA A+ 220-901 - Module 20

- Wi-Fi Network Standards and Encryption
- Wireless Network Standards
- Modulation Technologies
- Encryption Types
- Connecting to A SSID Network Demonstration

CompTIA A+ 220-901 - Module 21

- Installing and Configuring Wireless and Wired Routers
- Wireless Router Channels
- Router Port Forwarding
- Router DHCP
- Demilitarized Zone (DMZ)
- Network Address Translation (NAT)
- Quality of Service (QoS)
- Firmware
- Universal Plug n Play (UPnP)

CompTIA A+ 220-901 - Module 22

- Internet/Network Connection Types and Features
- Internet Connection Types
- Cellular Connections
- Network Types

CompTIA A+ 220-901 - Module 23

- Network Architecture /Device Functions and Features
- Hubs and Switches
- Routers and Access Points
- Bridges and Modems
- Firewall
- Repeaters
- Ethernet Over Power and Power Over Ethernet
- Network Device Hardware Demonstration

CompTIA A+ 220-901 - Module 24

- Networking Tools
- Cable Tools
- Multimeter
- Wi-Fi Analyzer
- Networking Tools Demonstration

CompTIA A+ 220-901 - Module 25

- Laptop Hardware Components/Installation/Configuration
- Expansion Options and Memory
- Ports and Adapters
- Hardware/Device Replacement
- Laptop Overview Demonstration

CompTIA A+ 220-901 - Module 26

- Laptop Display Functions and Components
- Display Components
- LCD Power Inverter
- Display Digitizer

CompTIA A+ 220-901 - Module 27

- Laptop Functions and Features
- Special Function Keys
- Touch Pad and Screen Rotation
- GPS and Airplane Mode
- Docking Stations/Cable Locks/Removable Screens
- Laptop GPS and Airplane Mode Settings Demonstration

CompTIA A+ 220-901 - Module 28

- Mobile Device Characteristics
- Tablets and Smart Phones
- Wearable Devices
- Phablets and e-Readers
- Smart Cameras and GPS

CompTIA A+ 220-901 - Module 29

- Accessory Ports and Mobile Devices
- NFC Connection Types
- Proprietary Connection Types
- Lightning Connection Types
- Wireless Connection Types
- Mobile Device Accessories

CompTIA A+ 220-901 - Module 30

- Troubleshooting Motherboards/RAM/CPU/Power
- Shutdowns and Lockups
- Bootup Issues
- Overheating and Indicator Lights
- Proprietary Screen Crashes
- Distended Capacitors
- Troubleshooting Tools

CompTIA A+ 220-901 - Module 31

- Troubleshooting Hard Drives and RAID Arrays
- Common Hard Drive Symptoms
- Failure To Boot
- Drive Not Recognized and Other Symptoms
- BSOD/Pin Wheel and S.M.A.R.T Errors
- Hardware and Software Tools
- Defragmenting a Hard Drive Demonstration

CompTIA A+ 220-901 - Module 32

- Troubleshooting Video Projectors and Display Issues
- VGA Mode and Video Drivers
- Display and Projector Common Symptoms
- Managing Device Drivers Demonstration

CompTIA A+ 220-901 - Module 33

- Troubleshooting Wired and Wireless Networks
- Wireless Connectivity Common Symptoms
- Troubleshooting APIPA/Link Local Address
- Limited/Local and Intermittent Connectivity
- Transfer Speeds and Signal Issues
- Wireless/Wired Connectivity Hardware Tools
- Command Line Tools
- Command Line Tools Demonstration

CompTIA A+ 220-901 - Module 34

- Troubleshooting and Repairing Mobile Devices

- Troubleshooting Common Symptoms
- Disassembling and Re-Assembling Devices
- CompTIA A+ 220-901 - Module 35
- Troubleshooting Printers
- Troubleshooting Common Printer Symptoms
- Printer Repair and Maintenance Tools
- Course Closing

CompTIA A+ 220-902 Curriculum:

CompTIA A+ 220-902 - Module 1

- Introduction
- Features and Requirements Of Microsoft Operating Systems
- Identifying Features
- Windows Features
- System Restore and Event Viewer
- File Structure and Paths
- Other Features
- Upgrade Path
- Upgrade Tools
- System Tools Demonstration

CompTIA A+ 220-902 - Module 2

- Installing Windows PC Operating Systems
- Boot Methods
- Types of Installations
- Partitioning
- File System Types and Formatting
- Installation Parameters

CompTIA A+ 220-902 - Module 3

- Microsoft Command Line Tools
- Commands To Know
- Available Command Privileges
- Command Prompt Navigation Commands Demonstration

CompTIA A+ 220-902 - Module 4

- Operating System Features and Tools
- Windows Administrative Tools
- MSCONFIG
- Task Manager
- Disk Management
- Clean Installation Tools
- System Utilities

- Computer Management Demonstration
- Device Manager Demonstration
- User Accounts Demonstration
- Performance Monitor Demonstration
- Windows Services Demonstration
- Print Management
- System Configuration Demonstration
- Task Manager Console Demonstration
- Registry Editor Demonstration
- Microsoft Management Console Demonstration
- Defragmenting Optical Drives

CompTIA A+ 220-902 - Module 5

- Control Panel Utilities
- Internet Options
- Display Settings
- User Accounts and Folder Options
- System Properties
- Security Center/Action Center
- Power Options
- Programs and Features/Homegroups
- Devices and Printers/Sounds
- Troubleshooting/Network and Sharing Center
- Control Panel/Internet Options Demonstration
- Display Demonstration
- Power Options Demonstration
- Programs and Features Demonstration
- Homegroup Demonstration
- Sound Demonstration
- Troubleshooting/Network and Sharing Demonstration

CompTIA A+ 220-902 - Module 6

- Client and Desktop Windows Networking
- Homegroup vs Workgroup
- Domain Setup
- Network and Administrative Shares
- Establishing Network Connections
- Remote Desktop Connections
- Network Sharing Settings
- Firewall Settings
- Alternative IP Address Configuration
- Network Card Properties
- Joining a Computer to a Domain Demonstration

- Administrative Shares
- Mapping Drives Demonstration
- LAN Setting for Proxy Server Demonstration
- Connecting to a Remote Desktop Demonstration
- Alternate IP Addressing Demonstration

CompTIA A+ 220-902 - Module 7

- Preventive Maintenance Tools and Procedures
- Scheduled Backups
- Scheduled Disk Maintenance
- Maintenance Updates
- Maintenance Tools
- Managing Windows Update Settings
- Diskcheck and Defrag Demonstration

CompTIA A+ 220-902 - Module 8

- Operating Systems Features and Functionality
- Best Practices
- Disk Maintenance Utilities
- Shell/Terminal Tool
- Screen Sharing Tool
- Force Quit and xkill Tool
- Operating System Features
- Basic Linux Commands

CompTIA A+ 220-902 - Module 9

- Setup and Usage Of Client Side Virtualization
- Virtual Machines Requirements
- Client Side Virtualization Demonstration

CompTIA A+ 220-902 - Module 10

- Basic Cloud Concepts
- Cloud Based Services
- Cloud Models
- Cloud Benefits and Resource Pooling
- Measured Service

CompTIA A+ 220-902 - Module 11

- Network Host Services
- Server Roles
- Internet Appliances
- Legacy Embedded Systems

CompTIA A+ 220-902 - Module 12

- Mobile Operating Systems
- Android vs. IOS
- Application Sources
- Screen Orientation and Calibration
- Common Mobile Features
- Downloading Mobile Applications

CompTIA A+ 220-902 - Module 13

- Mobile Device Network Connectivity and Email Configuration
- Enabling and Disabling Wireless/Cellular Networks
- Corporate and ISP Email Configuration and Security
- PRI/PRL/Baseband Updates
- Radio Firmware Updates
- IMEI vs. IMSI
- VPN Connection Configuration

CompTIA A+ 220-902 - Module 14

- Mobile Device Synchronization
- Synchronization Data Types and Methods
- Mutual Authentication
- Synch Installation Requirements
- Synchronization Connection Types

CompTIA A+ 220-902 - Module 15

- Common Security Threats and Vulnerabilities
- Malware Viruses
- Social Engineering and Spoofing Attacks
- Zero Day and Zombie/Botnet Attacks
- Password Attacks and Other Considerations
- How to Change a MAC Address

CompTIA A+ 220-902 - Module 16

- Common Prevention Methods
- Physical Security
- Biometrics
- Physical Identification
- Digital Security Tools and Password Guidelines
- Firewalls
- User Education/AUP
- Least Privilege Principals
- Managing Multiple Displays

CompTIA A+ 220-902 - Module 17

- Basic Windows OS Security Settings

- Users and Groups
- Setting File Permissions
- NTFS Directory and File Permissions
- Sharing Files/Folders and Profile Options
- System Files and Folders and Authentication Concepts
- Encrypting Data at Rest
- Configuring NTFS Permissions and File Encryption

CompTIA A+ 220-902 - Module 18

- Enforcing Security Best Practices
- Password Best Practices
- Account Management
- Disable AutoRun and Data Encryption
- Patch/Update Management

CompTIA A+ 220-902 - Module 19

- Methods for Securing Mobile Devices
- Screen Locks and Remote Wipes
- Device Locator and Remote Backup
- Login Restrictions and Maintaining Updates
- Device Authentication and Trusted Sources
- Firewalls and Policies and Procedures
- Downloading a Smartphone Firewall Application

CompTIA A+ 220-902 - Module 20

- Data Destruction and Disposal Methods
- Physical Destruction
- Recycling and Repurposing

CompTIA A+ 220-902 - Module 21

- Securing SOHO Wireless/Wired Networks
- Wireless Precautions
- Changing Default Access Credentials
- Enabling MAC Filtering
- Wireless Network Security Measures

CompTIA A+ 220-902 - Module 22

- Troubleshooting PC Operating Systems
- Common OS Symptoms
- Common Error Messages
- Compatibility Error
- Slow System Performance
- Boots to Safe Mode and Files Failing to Open
- OS Boot issues

- Multiple Monitor Orientation
- Repairing Disks
- Pre-Installation Environments
- MSCONFIG and Defrag Tools
- Registry Editors and Other Tools
- Uninstall/Reinstall/Repair
- Windows OS Recovery Settings Demonstration

CompTIA A+ 220-902 - Module 23

- Troubleshooting Common PC Security Issues
- Common Security Issue Symptoms
- Security Tools
- Malware Removal Best Practices

CompTIA A+ 220-902 - Module 24

- Troubleshooting Common Mobile OS and Application Issues
- Common Mobile Device Symptoms
- Troubleshooting Tools

CompTIA A+ 220-902 - Module 25

- Troubleshooting Mobile OS and Application Security Issues
- Common Security Symptoms
- Mobile Device Security Tools

CompTIA A+ 220-902 - Module 26

- Appropriate Safety Procedures
- Equipment Grounding
- Toxic Waste Handling
- Personal Safety
- Government Regulations Compliance

CompTIA A+ 220-902 - Module 27

- Applying Environmental Impact Controls
- MSDS Documentation
- Temperature/Humidity Levels and Proper Ventilation
- Power Issues
- Protecting the Computer
- Local Government Regulations Compliance

CompTIA A+ 220-902 - Module 28

- Addressing Prohibited Content and Policy Concepts
- Incident Response
- Documentation and Chain of Custody
- Software Licensing

- Personally Identifiable Information
- Security Policies Best Practices

CompTIA A+ 220-902 - Module 29

- Communication Techniques and Professionalism
- Using Proper Language and Guidelines
- Customer Related Situations and Difficulties
- Set and Meet Client Expectations
- Customer Confidential and Private Material

CompTIA A+ 220-902 - Module 30

- Troubleshooting Theory
- CompTIA Steps to Troubleshooting
- Course End

CompTIA 220-902 Live Lab:

Installing Windows

- Introduction
- Manual Installation of Windows 7
- Install Windows 8.1 using Windows Deployment Services
- Summary

Retrieving System Information

- Introduction
- Introduction to CPU-Z
- Collect Windows System Information
- Summary

Managing System Storage

- Introduction
- Manage Virtual Disks
- Configure Software RAID
- Summary

Securing Windows User Account Access

- Introduction
- Using System Configuration Tool
- Using Run As Feature
- Understanding User Account Control
- Summary

Using Windows Features and Tools

- Introduction
- Download and Install Windows Administrative Tools

- Using System Configuration Tool
- Working with Windows Apps
- Using Windows Internet Explorer
- Using Windows Accessories
- Configuring Ease of Access
- Summary

Understand Domains, Workgroups and Homegroups

- Introduction
- Organizing Computers in a Windows Network
- Summary

Configure IPv4 and IPv6 Addressing

- Introduction
- Understand IPv6 Link Local Address
- Configure the Network to Use an ISATAP Router
- Setup Network Connectivity Between IPv4 and IPv6 devices
- Summary

Understand Computer Name Resolution

- Introduction
- Working with Host Names
- Working with HOSTS File
- Working with NetBIOS names
- Summary

Understand TCPIP Services Part 1

- Introduction
- Configuring Port 21 for FTP
- Configuring Port 161 for SNMP
- Configuring Port 23 for Telnet
- Configuring Port 445 for SMB
- Configuring Port 3389 for RDP
- Summary

Understand TCPIP Services Part 2

- Introduction
- Installing and Configuring DHCP
- Installing and Configuring DNS
- Understanding Lightweight Directory Access Protocol (LDAP)
- Summary

Understand TCPIP Services Part 3

- Introduction

- Administering Kali Linux using VNC and SSH
- Verifying Port 80 for HTTP
- Verifying HTTPS Port 443
- Verifying Port 139 for NetBIOS
- Contrast TCP and UDP Protocols
- Summary

Configuring Security Policies

- Introduction
- Configure a Local Security Policy
- Configure a Domain Network Security Policy
- Summary

Identify Security Threats and Vulnerabilities

- Introduction
- Running MBSA to Detect System Vulnerabilities
- Summary

Configuring Windows Firewall

- Introduction
- Configuring Firewall Rules using Windows Firewall
- Configuring Firewall Rules using Windows Firewall with Advanced Security
- Configuring Firewall Rules using Remote Desktop
- Configuring Firewall Rules from the Command Line Interface
- Summary

Deploying Anti-Malware Programs

- Introduction
- Activating a Trojan
- Testing Network Services with netcat
- Deploying Malware Protection
- Summary

Performing System Maintenance

- Introduction
- Restoring a Windows Computer Using System Image Backup
- Using Windows Disk Maintenance Tools
- Configure and Run Windows Update
- Summary

Troubleshoot Common System Problems

- Introduction
- Resolve Common Network Access Issues
- Resolve Common System Performance Problems

- Summary

Troubleshoot Network Connectivity Issues

- Introduction
- Using Ipconfig
- Using Tracert
- Using Netstat
- Using Nslookup
- Using Pathping
- Using Arp
- Using Ping
- Using Nbtstat
- Summary

Troubleshoot Windows Operating System Errors

- Introduction
- Manage and Rollback Registry Entries
- Create a System Image Backup
- Understand Kernel Error
- Summary

Understand Computer Virtualization

- Introduction
- Install a Windows 8.1 Virtual Machine
- Summary

Configuring and Managing Printers

- Introduction
- Setting up Windows Printing Service
- Troubleshooting Common Network Printing Problems
- Summary

Understand Virtual Printing

- Introduction
- Set up Printing to PDF
- Printing a document to XPS
- Printing a Document to file
- Summary

Understand Cloud-Based Applications and Storage

- Introduction
- Sign up for Microsoft Office 365 Trial
- Creating Shared Folder in OneDrive
- Summary

Configuring a Mobile Device

- Introduction
- Configuring Windows Mobile Phone Emulator Settings
- Summary

Configuring E-mail on a Mobile Device

- Introduction
- Configure POP3, IMAP4 and SMTP Settings
- Summary

Managing File System Security

- Introduction
- Understand Shared Folders and NTFS Permissions
- Understand Effective Permissions
- Summary

Managing BitLocker Drive Encryption

- Introduction
- Configuring Disk Encryption Using BitLocker
- Summary

Working with Linux Command Line

- Introduction
- Work on the Command Line
- Summary

Performing Basic File Management in Linux

- Introduction
- Perform Basic File Management
- Summary

Understand Internet Protocols and Basic Linux Network Configuration

- Introduction
- Fundamentals of Internet Protocols
- Basic Network Configuration
- Summary

Understand Basic Network Troubleshooting in Linux

- Introduction
- Basic Network Troubleshooting
- Summary

Network+ N10-006 Curriculum:

Module 1

- Course Introduction
- Introduction to Networks Overview
- What is a Network?
- Peer to Peer Networking
- Client Server Networks
- Physical Topologies
- Physical Bus Topologies
- Physical Star Topologies
- Physical Ring Topologies
- Physical Mesh Topologies
- Point to Point Topologies
- Hybrid Topologies
- Backbones and Segments

Module 2

- OSI Model Overview
- Internetworking Models
- Advantages of Reference Models
- OSI Model and Layer Functions
- TCP Reliability
- TCP Flow Control and Packet Acknowledgement
- Routing at Layer 3
- Data Encapsulation
- Multiplexing
- Numbering Systems
- Base and Broad Band
- Bit Rate and Baud Rate
- Wavelength

Module 3

- Media Cables and Connectors Overview
- Physical Media
- Coax Media Cables and Connectors
- Twisted-Pair Media Cables and Connectors
- Fiber Optic Media Cables and Connectors
- UTP and BNC Couplers
- Broadband Over Power Lines
- Serial and USB Connectors
- Cable Properties
- Wiring Standards
- T1 Crossover Cable
- Wiring Distribution Installation
- Troubleshooting Wiring

Module 4

- Ethernet Standards and Properties Overview
- Collision and Broadcast Domains
- Carrier Sense Multiple Access/Collision Detection
- Duplex Ethernet
- Binary to Decimal
- Hex to Binary to Decimal
- Ethernet Addressing
- Ethernet Frames
- IEEE Standards
- 802.3 Standards
- IEEE 1901-2013

Module 5

- Network Devices Overview
- Common Network Device
- Hubs
- Network Interface Cards
- Network Bridges
- Switches and Routers
- Firewalls and Other Devices
- Dynamic Host Configuration Protocol
- Specialized Devices
- Multilayer Switch and Domain Name Services
- Proxy Servers
- Encryption Devices
- VPN Concentrator
- Planning and Implementing a Network

Module 6

- Internet Protocol Overview
- What is TCP/IP?
- DoD and OSI Model
- TCP/IP Protocol Suite
- TCP and UDP
- Port Number Examples
- IP Header
- ICMP
- ARP
- Data Encapsulation and De-Encapsulation
- Protocol Data Units
- Port Numbers at the Transport Layer

Module 7

- Internet Protocol Addressing Overview
- Addressing Terminology
- IP Addressing Hierarchical Scheme
- Classful IP Addressing
- Private IP Addressing
- IP Addressing Terms
- Internet Protocol Version 6
- Auto Configuration EUI-64
- Link Local and Global Addressing
- Transition Mechanisms
- Dynamic Host Configuration Protocol 6

Module 8

- Subnetting Overview
- Subnetting Basics
- Creating a Subnet Portion
- Determining Number of Computers Through Subnetting
- Locating Network ID's
- Determining Block Size or Interval
- Classless Inter-Domain Routing
- Troubleshooting IP Addresses
- Command Line Tools
- Network Address Translation
- How NAT Works

Module 9

- Routing Concepts Overview
- IP Routing Basics
- IP Routing Process
- Static and Dynamic Routing
- Additional Routing Terms
- Default Routing
- Gateway Redundancy

Module 10

- Dynamic Routing Protocols Overview
- Routing Protocol Basics
- Administrative Distance
- Routing Protocol Classes
- Distance Vector Routing Protocols
- Routing Information Protocol
- Classful and Classless Networks

- Discontiguous Network
- EIGRP and BGP
- RIP - OSF and IS-IS Protocols
- IPv6 Routing Protocols

Module 11

- Switching and VLAN Configuration Overview
- Switching and Virtual LANs
- Switching Services
- Address Learning and Forward/Filter Decisions
- Loop Avoidance
- Spanning Tree Protocol
- VLAN Broadcast Domains
- Access and Trunk Links
- VTP Modes of Operation and Configuration
- Advanced Features of Switches
- Switch Management
- VLAN Switch Configuration Demonstration

Module 12

- Wireless Technologies Overview
- Wireless Technologies Basics
- Wireless Agencies and Standards
- Wireless Frequency Ranges
- 802.11 Committees and Subcommittees
- Wireless LAN Modulation Techniques
- Wireless Access Points and NIC Cards
- Wireless Network Types
- Installing and Configuring Hardware
- Wireless Security
- Troubleshooting Issues
- Environmental Factors
- Rogue Access Point

Module 13

- Network Hardening Techniques Overview
- Access Control Lists
- Tunneling Protocols
- Encryption Standards
- Remote Access
- User Account and Resource Security
- User Authentication Methods
- Authentication - Authorization and Accounting
- Secure and Unsecure Protocols

- Access Control List Demonstration

Module 14

- Network Security Vulnerabilities Overview
- Denial of Service Attacks
- Virus Attacks
- Attackers and Their Tools
- ARP Cache Poisoning and VLAN Hopping
- Mitigation Techniques
- Policies and Procedures
- NSA Specifications

Module 15

- Firewalls Overview
- Firewalls Types
- Firewall Technologies
- Intrusion Detection and Prevention Systems
- Vulnerability Scanning and VPN Concentrators
- Device Security
- Forward and Reverse Proxy Servers
- Network Address Translation and Port Forwarding
- Port Security Demonstration

Module 16

- Wide Area Network Technologies Overview
- Defining Wide Area Networks
- WAN Connection Types
- Dense and Course Wavelength Division Multiplexing
- Passive Optical Network and SONET
- Wireless Technologies
- Broadband Services
- WAN Protocols
- Cellular WAN
- Metro Ethernet

Module 17

- Network Troubleshooting Overview
- Protocol Analyzers
- Network Scanners
- Throughput Testers and Connectivity Software
- Command Line Tool traceroute
- ipconfig and ifconfig Utility
- Ping and IPv6 Utility
- Address Resolution Protocol

- nslookup Utility
- My traceroute Command
- nbtstat and netstat Utility
- File Transfer Protocol
- Telnet Utility
- Command Line Tool Guidelines
- Windows Command Line Tools Demonstration

Module 18

- Network Management Hardware Tools Overview
- Hardware Tools Overview

Module 19

- Troubleshooting Methodologies Overview
- Troubleshooting Approaches
- Narrowing Down the Problem
- Troubleshooting Steps
- Troubleshooting Tips

Module 20

- Network Monitoring Tools Overview
- Simple Network Management Protocol
- Schematics and Diagrams
- Policies - Procedures and Regulations
- Network Performance Monitoring
- Metrics - Reporting Terms and Interface Monitoring
- Configuration Management
- Virtual Networking
- Storage Area Network
- Cloud Architectures
- Protocol Analyzer Demonstration

Module 21

- Troubleshooting Wide Area Networks Overview
- Local and Wide Area Networks
- Wireless Local Area Network
- Personal Area Network
- SCADA and ICS
- Medianets
- WAN Connection Issues
- Customer Equipment
- Company ISP Security Policies and Satellite Issues

Module 22

- Physical Security Overview
- SCADA Review
- Network Segmentation
- Additional Physical Security and Specific Dangers
- Access Controls and Monitoring
- Environmental Controls and Electrical Power
- Access Control Authentication Types
- Multiple Factor Authentication

Module 23

- Network Access Control Overview
- IEEE 802.1x
- Network Access Control
- Computer Forensics
- Investigative Process
- Free Space vs. Slack Space
- Disaster Recovery
- Business Impact Assessment
- Backup Considerations
- RAID Backup Solutions
- Redundancy and Single Points of Failure

Module 24

- Troubleshooting Security Overview
- Firewall Security Issues
- Avenues of Attack
- Types of DDOS Attacks
- IP Address Spoofing
- Replay Attacks and TCP/IP Hijacking
- Encryption Attacks
- Address System and Password Attacks
- Software Exploitation
- Viruses and Malware
- Anti Malware Software
- Switch Port Security

Module 25

- Voice Over IP Overview
- VOIP

Module 26

- Security Policies and Programs Overview
- Security Programs
- Security Policy Types

- Security Policy Concepts
- Human Resource Policies
- Installation Safety Issues

Module 27

- IT Distribution and Change Management Overview
- IT Distribution Concepts and Procedures
- Change Management
- Course Review

CompTIA Network+ Virtual Lab

- Configuring a Network Adaptor
- ARP and Packet Analysis
- IP Address Configuration
- IP Addressing Schemes
- Configuring DHCP Clients and Servers
- IPv6 Addressing
- Configuring Routing
- TCP and Port Scanning
- Name Resolution
- Configuring Email Services
- Configuring a NAT Firewall
- Authentication Methods
- Configuring Certificate Services and HTTPs
- Performance Testing and Monitoring
- Monitoring and Management Tools
- Configuring Routing Using Cisco Devices
- Configuring VPNs

Domain 1.0 - Network Security

- Network Devices
- Test Questions
- Secure Network Administration
- Secure Network Design Elements
- Secure and Insecure Network Protocols
- Network Ports
- Secure Wireless
- Domain Review
- 1.2 Test Prep Questions
- 1.3 Test Prep Questions
- 1.4 Test Prep Questions
- 1.5 Test Prep Questions
- 1.6 Test Prep Questions
- Review Quz

Domain 2.0 - Compliance and Operational Security

- Risk Concepts
- Risk Mitigation
- Incident Response
- Security Training
- Business Continuity
- Environmental Controls
- Disaster Recovery
- Confidentiality, Integrity and Availability (CIA)
- Domain Review
- Installing Virtual PC and Active Directory Domain Services
- Windows Server Backup
- 2.1 Test Prep Questions
- 2.2 Test Prep Questions
- 2.3 Test Prep Questions
- 2.4 Test Prep Questions
- 2.5 Test Prep Questions
- 2.6 Test Prep Questions
- 2.7 Test Prep Questions
- 2.8 Test Prep Questions
- Review Quiz

Domain 3.0 - Threats and Vulnerabilities

- Malware Types
- Attack Types
- Social Engineering Attacks
- Wireless Attacks
- Application Attacks
- Attack Mitigation and Deterrence
- Attack Assessment Tools
- Penetration Testing vs. Vulnerability Assessment
- Domain Review
- Threats and Vulnerability Exercises
- Auditing
- Browser Security
- Personal Firewall
- Windows Software Update Services
- Password Crackers
- WinPatrol
- Deep Freeze
- Exercises Review
- Module Review
- 3.1 Test Prep Questions

- 3.2 Test Prep Questions
- 3.3 Test Prep Questions
- Review Quiz

Domain 4.0 - Application, Data and Host Security

- Application Security
- Host Security
- Data Security
- Domain Review
- Vulnerabilities Exercises
- Anti-Malware
- Malicious Software Removal Tool
- Identifying Vulnerabilities
- Security Templates
- Exercises Review
- 4.1 Test Prep Questions
- 4.2 Test Prep Questions
- Review Quiz

Domain 5.0 - Access Control and Identity Management

- Functions of Authentication Services
- Authentication, Authorization, and Access Control
- Account Management
- Domain Review
- Access Control and Identity Management Exercises
- Creating a Workstation
- Creating an OU and Delegating Control
- Disabling an Account
- Setting Workstation Restrictions
- Exercises Review
- 5.1 Test Prep Questions
- 5.2 Test Prep Questions
- 5.3 Test Prep Questions
- Review Quiz

Domain 6.0 - Cryptography

- Cryptography Concepts
- Cryptography Tools, Products, and Algorithms
- Public Key Infrastructure
- Certificate Services, Servers and Requests
- Use Steganography Software
- Domain Review
- 6.1 Test Prep Questions
- 6.2 Test Prep Questions

- 6.3 Test Prep Questions
- Review Quiz
- Course Close

CompTIA Security+ Virtual Lab

- Trojans and Malware Protection
- Network Vulnerabilities
- Vulnerability Scanning
- Routing Protocols
- Attacks against DHCP and DNS
- Steganography
- Configuring Certificate Services
- HTTP and HTTPS
- Web Application Vulnerabilities
- Telnet and FTP and SSH
- Password Sniffing
- Baseline Security Analyzer
- Network Access Protection
- VPNs
- Data Leakage Prevention
- Computer Forensic Tools

All necessary materials are included.

Certification(s):

This course prepares students to take the **CompTIA A+ 220-901 & 220-902, N10-006: Network+, SY0-401: Security+** certification exams.

System Requirements:

Internet Connectivity Requirements:

- Cable and DSL internet connections are recommended.

Hardware Requirements:

- Minimum Pentium 400 Mhz CPU or G3 Macintosh. 1 GHz or greater CPU recommended.
- 256MB RAM minimum. 1 GB RAM recommended.
- 800x600 video resolution minimum. 1025x768 recommended.
- Speakers/Headphones to listen to Dialogue steaming audio sessions.
- A microphone to speak in Dialogue streaming audio sessions.

Operating System Requirements:

- Windows Vista, 7, 8, 8.1, 9, 10
- Mac OSX 10 or higher.
- OpenSUSE Linux 9.2 or higher.

Web Browser Requirements:

- Google Chrome is recommended.
- Firefox 13.x or greater.
- Internet Explorer 6.x or greater.
- Safari 3.2.2 or greater.

Software Requirements:

- Adobe Flash Player 6 or greater.
- Oracle Java 7 or greater.
- Adobe Reader 7 or greater.

Web Browser Settings:

- Accept Cookies
- Disable Pop-up Blocker.

****Outlines are subject to change, as courses and materials are updated.****