Certified Network Technologies Expert (CNTE)

Program Summary

This instructor-led program with a combination of lecture and hands-on laboratory exercises is our most comprehensive and diverse program combining the coursework of multiple disciplines. This program begins with an introductory class to fundamentals of networking which provides in-depth coursework basics of LAN and WAN environment and guides the student through multiple levels of network infrastructure study for Cisco, Juniper, Palo Alto, and other various environments. The goal of this program is to offer the student a single program to build the knowledge, skills, and certifications necessary to become a well-respected and well-trained professional poised to become a success in today's information technology environment.

➢ Certification program
➢ 1152 Contact Hours, 72 Credit Hours, 48 Weeks

TERM 1

Course No.	Course Name	Quarter Credit Hours	Clock Hours
CTE100	Technologies I	6	96
CTE110	Technologies II	6	96
CTE120	Technologies III	6	96
	Total	**18**	**288**

TERM 2

Course No.	Course Name	Quarter Credit Hours	Clock Hours
CTE130	Technologies IV	6	96
CTE140	Technologies V	6	96
CTE150	Technologies VI	6	96
	Total	**18**	**288**

TERM 3

Course No.	Course Name	Quarter Credit Hours	Clock Hours
CTE160	Technologies VII	6	96
CTE170	Technologies VIII	6	96
CTE180	Technologies IX	6	96
	Total	**18**	**288**

TERM 4

Course No.	Course Name	Quarter Credit Hours	Clock Hours
CTE190	Technologies X	6	96
CTE200	Technologies XI	6	96
CTE210	Technologies XII	6	96
Total		**18**	**288**

Type of Document Received Upon Graduation

Upon successfully completing all requirements of the programs offered at Brand College, the student will be awarded a Certificate of Completion.

Certification Tests

Performance on a certification test is based on a pass or fail. You must receive between 75% and 80%, depending on the test, to pass. It is encouraged to take each test as soon as you complete the corresponding course.

Career Development

Students who successfully complete this program will be prepared for midlevel to advanced professional opportunities in the IT field with emphasis on installation, configuration and maintenance of Local Area Network (LAN) and Wide Area Network (WAN) infrastructure. In addition, the students are qualified for positions involving the planning, installation, and maintenance of client workstation as well as server operating system, applications and network infrastructure services using Microsoft and Linux technologies. Although titles may vary by hiring organizations, students with these credentials are qualified to meet the requirements of positions such as Sr. Network Design Engineer, Sr. Network Systems Manager, Manager of Network Systems or similar designations.

This program also aligns with the following career opportunities classified by US Department of Labor under the Standard Occupational Classification (SOC) system.

- 25-1021 Computer Science Teacher, Postsecondary
- 15-1152 Computer Network Support Specialist
- 15-1143 Computer Network Architects

CNTE Program Details

<u>COURSE CTE100</u>
Title: Network+ Certification
Exam: CompTIA Exam N10-007

Course Description
CompTIA Network+ covers the configuration, management, and troubleshooting of common wired and wireless network devices. Also included are emerging technologies such as unified communications, mobile, cloud, and virtualization technologies.

Course Objectives
This course will cover the following subjects:

Network Concepts
- Explain Purposes and Uses of Ports and Protocols
- Explain devices, applications, protocols and services at their appropriate OSI layers
- Explain the concepts and characteristics of routing and switching
- Given a scenario, configure the appropriate IP addressing components
- Compare and contrast the characteristics of network topologies, types and technologies
- Given a scenario, implement the appropriate wireless technologies and configurations
- Summarize cloud concepts and their purposes
- Explain the functions of network services

Infrastructure
- Given a scenario, deploy the appropriate cabling solution
- Given a scenario, determine the appropriate placement of networking devices on a network and install/configure them
- Explain the purposes and use cases for advanced networking devices
- Explain the purposes of virtualization and network storage technologies
- Compare and contrast WAN technologies

Network Operations
- Given a scenario, use appropriate documentation and diagrams to manage the network
- Compare and contrast business continuity and disaster recovery concepts
- Explain common scanning, monitoring and patching processes and summarize their expected outputs
- Given a scenario, use remote access methods
- Identify policies and best practices

Network Security
- Summarize the purposes of physical security devices
- Explain authentication and access controls
- Given a scenario, secure a basic wireless network
- Summarize common networking attacks
- Given a scenario, implement network device hardening
- Explain common mitigation techniques and their purposes

Network Troubleshooting and Tools
- Explain the network troubleshooting methodology
- Given a scenario, use the appropriate tool
- Given a scenario, troubleshoot common wired connectivity and performance issues
- Given a scenario, troubleshoot common wireless connectivity and performance issues
- Given a scenario, troubleshoot common network service issues

COURSE CTE110
Title: Cisco Certified Network Associate
Exam: 100-105

Course Description
This instructor-led program with a combination of lecture and hands-on laboratory exercises covers basic networking concepts implemented on Cisco routers. Students will be introduced to the Cisco Internetworking Operating System (IOS) and its command structure. TCP/IP addressing and implementation, including subnetting, will be covered thoroughly. Wide Area Networking (WAN) implementations including ISDN, frame relay, and serial point-to-point (including T1), will be emphasized. This is an advanced course providing the skills and knowledge necessary to pass the Cisco certification exam (one exam) necessary to become a Cisco Certified Network Associate (CCNA).

Course Objectives
This course will cover the following subjects:

Operation of IP Data Networks
- Recognize the purpose and functions of various network devices such as Routers, Switches, Bridges and Hubs
- Select the components required to meet a given network specification
- Identify common applications and their impact on the network
- Describe the purpose and basic operation of the protocols in the OSI and TCP/IP models
- Predict the data flow between two hosts across a network
- Identify the appropriate media, cables, ports, and connectors to connect Cisco network devices to other network devices and hosts in a LAN

LAN Switching Technologies
- Determine the technology and media access control method for Ethernet networks
- Identify basic switching concepts and the operation of Cisco switches
- Configure and verify initial switch configuration including remote access management
- Verify network status and switch operation using basic utilities
- Describe how VLANs create logically separate networks and the need for routing between them
- Configure and verify VLANs
- Configure and verify trunking on Cisco switches
- Identify enhanced switching technologies
- Configure and verify PVSTP operation

IP Addressing
- Describe the operation and necessity of using private and public IP addresses for IPv4 addressing
- Identify the appropriate IPv6 addressing scheme to satisfy addressing requirements in a LAN/WAN environment
- Identify the appropriate IPv4 addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment
- Describe the technological requirements for running IPv6 in conjunction with IPv4
- Describe IPv6 addresses

IP Routing Technologies
- Describe basic routing concepts
- Configure and verify utilizing the CLI to set basic router configuration
- Configure and verify operation status of a device interface
- Verify router configuration and network connectivity using
- Configure and verify routing configuration for a static or default route given specific routing requirements
- Differentiate methods of routing and routing protocols

- Configure and verify OSPF
- Configure and verify interVLAN routing (Router on a stick)
- Configure SVI interfaces
- Manage Cisco IOS Files
- Configure and verify EIGRP (single AS)

COURSE CTE120
Title: Cisco Certified Network Associate
Exam: 200-105

Course Description

This instructor-led program with a combination of lecture and hands-on laboratory exercises covers basic networking concepts implemented on Cisco routers. Students will be introduced to the Cisco Internetworking Operating System (IOS) and its command structure. TCP/IP addressing and implementation, including subnetting, will be covered thoroughly. Wide Area Networking (WAN) implementations including ISDN, frame relay, and serial point-to-point (including T1), will be emphasized. This is an advanced course providing the skills and knowledge necessary to pass the Cisco certification exam (one exam) necessary to become a Cisco Certified Network Associate (CCNA).

Course Objectives

This course will cover the following subjects:

IP Services
- Configure and verify DHCP (IOS Router)
- Describe the types, features, and applications of ACLs
- Configure and verify ACLs in a network environment
- Identify the basic operation of NAT
- Configure and verify NAT for given network requirements
- Configure and verify NTP as a client
- Recognize High availability (FHRP)
- Configure and verify syslog
- Describe SNMP v2 and v3

Network Device Security
- Configure and verify network device security features
- Configure and verify switch port security
- Configure and verify ACLs to filter network traffic
- Configure and verify an ACLs to limit telnet and SSH access to the router

Troubleshooting
- Troubleshoot and correct common problems associated with IP addressing and host configurations
- Troubleshoot and resolve VLAN problems
- Troubleshoot and resolve trunking problems on Cisco switches
- Troubleshoot and resolve ACL issues
- Troubleshoot and resolve Layer 1 problems
- Identify and correct common network problems
- Troubleshoot and resolve spanning tree operation issues
- Troubleshoot and resolve routing issues
- Troubleshoot and resolve OSPF problems
- Troubleshoot and resolve EIGRP problems
- Troubleshoot and resolve interVLAN routing problems
- Troubleshoot and resolve WAN implementation issues
- Monitor NetFlow statistics
- Troubleshoot EtherChannel problems

WAN Technologies
- Identify different WAN Technologies
- Configure and verify a basic WAN serial connection
- Configure and verify a PPP connection between Cisco routers

- Configure and verify frame relay on Cisco routers
- Implement and troubleshoot PPPoE

COURSE CTE130

Title: Implementing Cisco IP Routing
Exam: 300-101

Course Description

This instructor-led program with a combination of lecture and hands-on laboratory exercises will certify that the successful candidate has important knowledge and skills necessary to use advanced IP addressing and routing in implementing scalability for Cisco ISR routers connected to LANs and WANs. The exam covers topics on Advanced IP Addressing, Routing Principles, Multicast Routing, IPv6, Manipulating Routing Updates, Configuring basic BGP, Configuring EIGRP, OSPF, and IS-IS.

Course Objectives

This course will cover the following subjects:

- Identify Cisco Express Forwarding Concepts
- Explain General Network Challenges
- Describe IP Operations
- Explain TCP Operations
- Describe UDP Operations
- Recognize Proposed Changes to the Network
- Configure and Verify PPP
- Explain Frame Relay
- Identify, Configure, and Verify IPv4 addressing and subnetting
- Identify IPv6 Addressing and Subnetting
- Configure and Verify Static Routing
- Configure and Verify Default Routing
- Evaluate Routing Protocol Types
- Configure and Verify GRE
- Describe DMVPN
- Describe Easy Virtual Networking
- Describe IOS AAA Using Local Database
- Describe Device Security Using IOS AAA with TACACS+ and RADIUS
- Configure and Verify Device Access Control
- Configure and Verify Router Security Features
- Configure and Verify Device Management
- Configure and Verify SNMP
- Configure and Verify Logging
- Configure and Verify Network Time Protocol
- Configure and Verify IPv4 and IPv6 DHCP
- Configure and Verify IPv4 Network Address Translation
- Describe IPv6 NAT
- Describe SLA Architecture
- Configure and Verify IP SLA
- Configure and Verify Tracking Objects
- Configure and Verify Cisco NetFlow

COURSE CTE140

Title: Implementing Cisco Switched Networks
Exam: 300-115

Course Description

This instructor-led program with a combination of lecture and hands-on laboratory exercises will certify that the successful candidate has important knowledge and skills necessary to implement scalable multilayer switched networks. The exam includes topics on Campus Networks, describing and implementing advanced Spanning Tree concepts, VLANs and Inter-VLAN routing, High Availability, Wireless Client Access, Access Layer Voice concepts, and minimizing service Loss and Data Theft in a Campus Network.

Course Objectives

This course will cover the following subjects:

- Configure and Verify Switch Administration
- Configure and Verify Layer 2 Protocols
- Configure and Verify VLANs
- Configure and Verify Trunking
- Configure and Verify EtherChannels
- Configure and Verify Spanning Tree
- Configure and Verify Other LAN Switching Technologies
- Describe Chassis Virtualization and Aggregation Technologies
- Configure and Verify Switch Security Features
- Describe Device Security Using Cisco IOS AA with TACACS+ and RADIUS
- Configure and Verify First-Hop Redundancy Protocols

COURSE CTE150

Title: Troubleshooting and Maintaining Cisco IP Networks
Exam: 300-135

Course Description

This instructor-led program with a combination of lecture and hands-on laboratory exercises will certify that the successful candidate has important knowledge and skills necessary to secure and expand the reach of an enterprise network to (1) plan and perform regular maintenance on complex enterprise routed and switched networks and (2) use technology-based practices and a systematic ITIL-compliant approach to perform network troubleshooting.

Course Objectives

This course will cover the following subjects:

- Use Cisco IOS Troubleshooting Tools
- Apply Troubleshooting methodologies
- Troubleshoot Switch Administration
- Troubleshoot Layer 2 Protocols
- Troubleshoot VLANs
- Troubleshoot Trunking
- Troubleshoot EtherChannels
- Troubleshoot Spanning Tree
- Troubleshoot other LAN Switching Technologies
- Troubleshoot Chassis Virtualization and Aggregation Technologies
- Troubleshoot IPv4 Addressing and Subnetting
- Troubleshoot IPv6 Addressing and Subnetting
- Troubleshoot Static Routing
- Troubleshoot Default Routing
- Troubleshoot Administrative Distance
- Troubleshoot GRE
- Troubleshoot IOS AAA using Local Database
- Troubleshoot Device Access Control
- Troubleshoot Router Security Features
- Troubleshoot Device Management
- Troubleshoot SNMP
- Troubleshoot Logging
- Troubleshoot Network Time Protocol
- Troubleshoot IPv4 and IPv6 DHCP
- Troubleshoot IPv4 Network Address Translation
- Troubleshoot SLA Architecture
- Troubleshoot Tracking Objects

COURSE CTE160
Title: BGP

Course Description

BCG is the protocol which is used to make core routing decisions on the Internet; it involves a table of IP networks or "prefixes" which designate network reachability among autonomous systems (AS). BGP is a path vector protocol or a variant of a Distance-vector routing protocol. BGP does not involve traditional Interior Gateway Protocol (**IGP**) metrics, but routing decisions are made based on path, network policies and/or rule-sets. For this reason, it is more appropriately termed a reachability protocol rather than routing protocol. BGP was created to replace the Exterior Gateway Protocol (**EGP**) to allow fully decentralized routing in order to transition from the core ARPAnet model to a decentralized system that included the NSFNET backbone and its associated regional networks. This allowed the Internet to become a truly decentralized system.

Course Objectives

This course will cover the following subjects:

- Understanding BGP Building Blocks
- Comparing the Control Plane and Forwarding Plane.
- BGP Processes and Memory Use.
- BGP Path Attributes.
- Memory Use for IP CEF.
- Tuning BGP Performance
- TCP Protocol Considerations
- Path MTU Discovery, Queue Optimization
- Packet Reception Process. Hold Queue Optimization
- Effective BGP Policy Control
- How to Use Regular Expressions in Cisco IOS Software
- Filter Lists for Enforcing BGP Policies. Prefix Lists
- DESIGNING BGP ENTERPRISE NETWORKS
- Enterprise BGP Core Network Design
- Internet Connectivity for Enterprise Networks
- DESIGNING BGP SERVICE PROVIDER NETWORKS
- Scalable iBGP Design and Implementation Guidelines
- Route Reflection and Confederation Migration Strategies
- Service Provider Architecture
- General ISP Network Architecture
- Interior Gateway Protocol Layout
- The Aggregation Layer, Network Addressing Methodology, Loopback Addressing.
- IMPLEMENTING BGP MULTIPROTOCOL EXTENSIONS
- Multiprotocol BGP and MPLS VPN
- Route Distinguisher and VPN-IPv4 Address
- Understanding MPLS Fundamentals. MPLS Labels
- Multiprotocol BGP and Interdomain Multicast
- Multicast Distribution Trees
- Multiprotocol BGP Support for IPv
- IPv6 Enhancements, Expanded Addressing Capabilities, Autoconfiguration Capabilities
- MP-BGP Extensions for IPv6 NLRI, Dual-Stack Deployment, MP-BGP for IPv6 Deployment Considerations
- Configuring MP-BGP for IPv, BGP Address Family Configuration, Injecting IPv6 Prefixes into BGP
- Security Enhancements
- QoS Capabilities, IPv6 Addressing
- Anycast Address Functionality

- Aggregatable Global Unicast Addresses
- MP-BGP Extensions for IPv6 NLRI
- Multiprotocol BGP Extensions for CLNS Support
- Matrix of BGP Features and Cisco IOS Software Releases

COURSE CTE170
Title: MPLS

Course Description

MPLS is a highly scalable, protocol agnostic, data-carrying mechanism. In an MPLS network, data packets are assigned labels. Packet-forwarding decisions are made solely on the contents of this label, without the need to examine the packet itself. This allows one to create end-to-end circuits across any type of transport medium, using any protocol. The primary benefit is to eliminate dependence on a particular OSI model data link layer technology, such as Asynchronous (ATM), Frame Relay, Synchronous Optical Networking (SONET) or Ethernet, and eliminate the need for multiple layer-2 networks to satisfy different types of traffic. MPLS belongs to the family of packet-switched networks.

Course Objectives

This course will cover the following subjects:

- MPLS VPN Architecture Overview
- MPLS VPN Terminology
- Connection-Oriented VPNs
- Connectionless VPNs
- MPLS-Based VPNs
- New MPLS VPN Developments
- Advanced PE-CE Connectivity
- Remote Access to an MPLS VPN
- Providing Dial-In Access to an MPLS VPN
- Providing Dial-Out Access via LSDO
- Providing Dial-Out Backup for MPLS VPN Access
- Providing DSL Access to an MPLS VPN
- Advanced features of MPLS VPN Remote Access
- PE-CE Routing Protocol Enhancements and Advanced Features
- PE-CE Connectivity: OSPF
- PE-CE Connectivity: Integrated IS-IS
- PE-CE Connectivity: EIGRP
- Virtual Router Connectivity
- Configuring Virtual Routers on CE Routers
- VRF Selection based on Source IP Address
- Performing NAT in a Virtual Router Environment
- Protecting MPLS-VPN Backbone
- Inherent Security Capabilities
- Neighbor Authentication
- CE-to-CE Authentication
- PE to CE Circuits
- Large-Scale Routing and Multiple Service Provider Connectivity
- Carrier Backbone Connectivity
- Label Distribution Protocols on PE-CE Links
- BCP-4 Between PE/CE Routers
- Hierarchical VPNs: Carrier's Carrier MPLS VPNs
- Multicast VPN
- Introduction to IP Multicast
- Enterprise Multicast in a Service Provider Environment
- MDTs
- IP Version 6 Transport Across an MPLS Backbone
- IPv6 Business Drivers

- Deployment of IPv6 in Existing Networks
- 6PE Operation and Configuration
- Introduction to Troubleshooting of MPLS-Based Solutions
- MPLS Control Panel Troubleshooting
- MPLS Data Plane Troubleshooting

COURSE CTE180

Title: Implementing Cisco Wireless Network Fundamentals
Exam: 200-355

Course Description

This instructor-led program with a combination of lecture and hands-on laboratory exercises covers the candidate's knowledge of installing, configuring, operating and troubleshooting. Upon completing this course, you will be able to understand the basic RF principles and characteristics and WLAN security methods and access with differing client devices. Define the Cisco WLAN architecture and the underling infrastructure used to support it. Implement a Centralized wireless access network using AireOS or IOS-XE wireless LAN controllers. Implement a Converged wireless access network using IOS-XE converged access switches and wireless LAN controllers. Implement small and remote access wireless networks using FlexConnect, Autonomous or Cloud architectures. Perform basic WLAN maintenance and troubleshooting -describe the requirements for a WLAN design.

Course Objectives

This course will cover the following subjects:

RF Fundamentals
- Describe the propagation of radio waves
- Frequency, amplitude, phase, wavelength
- Absorption, reflection, diffraction, scattering, refraction, fading, free space path loss, multipath
- Interpret RF signal measurements
- Signal Strength
- Differentiate interference vs. noise
- Define SNR
- Explain the principles of RF mathematics
- Describe Wi-Fi antenna characteristics
- Ability to read a radiation pattern chart
- Antenna types and uses

Technology Fundamentals
- Describe basic Wi-Fi governance
- Describe regional regulatory bodies
- IEEE 802.11
- Wi-Fi Alliance
- Describe usable channel and power combination
- Regional EIRP limitation examples
- Describe RRM fundamentals
- Describe 802.11 fundamentals
- Modulation techniques
- Channel width
- Wireless topologies
- Frame types

Implementing a Wireless Network
- Describe the various Cisco Wireless architecture
- Cloud
- Autonomous
- Split MAC
- Describe physical infrastructure connections
- Wired infrastructures

- Describe AP and WLC management access connections
- IP addressing: IPv4 / IPv6
- Management via wireless

Operating a Wireless Network
- Execute initial setup procedures Cisco wireless infrastructures
- Converged
- Centralized
- Autonomous
- Describe the Cisco implementation of the CAPWAP discovery and join process
- DHCP
- DNS
- Master-controller
- Distinguish different lightweight AP modes
- Describe and configure the components of a wireless LAN access for client connectivity using GUI only
- Identify wireless network and client management and configuration platform options
- Maintain wireless network

Configuration of Client Connectivity
- Identify authentication mechanisms
- LDAP, RADIUS, local authentication, WebAuth, 802.1X, PSK
- Configuring WLAN authentication mechanisms on the controller
- Configure client connectivity in different operating systems
- Describe roaming
- Describe wireless guest networking

Performing Client Connectivity Troubleshooting
- Validating WLAN configuration settings at the infrastructure side
- Security settings
- SSID settings
- Validating AP infrastructure settings
- Port level configuration
- Power source
- Validate client settings
- Employ appropriate controller tools to assist troubleshooting
- Identify appropriate third-party tools to assist troubleshooting

Site Survey Process
- Describe site survey methodologies and their purpose
- Describe passive and active site surveys
- Spectrum analyzer
- Site surveying software
- Describe the requirements of client real-time and non-real-time applications

COURSE CTE190

Title: Junos Associate (JNCIA-Junos)
Exam: JNO-102

Course Description
The courses in this path cover all of the entry-level skills and knowledge that you'll need to get started with Juniper Networks. You'll cover basics of the Juniper Networks Junos OS, networking fundamentals, and basic routing and switching. By the end of this path, you'll have covered the concepts and objectives necessary for taking the Juniper Networks Certified Associate – Junos (JNCIA-Junos) JN0-102 exam. Completing this path will help you prepare for the exam and get yourself started in the world of Juniper Networks.

Course Objectives
This course will cover the following subjects:

Networking Fundamentals
- Collision domains and broadcast domains
- Function of routers and switches
- Optical network fundamentals – SONET/SDH, OTN
- Ethernet networks
- Layer 2 addressing, including address resolution
- IPv4 and IPv6 fundamentals
- Layer 3 / IP addressing, including subnet masks
- Subnetting and supernetting
- Decimal to binary conversion
- Longest match routing
- Connection-oriented vs. connectionless protocols

Junos OS Fundamentals
- Junos device portfolio – product families, general functionality
- Software architecture
- Control and forwarding planes
- Routing Engine and Packet Forwarding Engine
- Protocol daemons
- Transit traffic processing
- Exception traffic

User Interfaces
- CLI functionality
- CLI modes
- CLI navigation
- CLI Help
- Filtering output
- Active vs. candidate configuration
- Reverting to previous configurations
- Modifying, managing, and saving configuration files
- Viewing, comparing, and loading configuration files
- J-Web – core/common functionality

Junos Configurations Basics
- Factory-default state
- Initial configuration
- User accounts

- Login classes
- User authentication methods
- Interface types and properties
- Configuration groups
- Additional initial configuration elements – NTP, SNMP, syslog, etc.
- Configuration archival
- Logging and tracing
- Rescue configuration

Operational Monitoring and Maintenance
- Show commands
- Monitor commands
- Interface statistics and errors
- Network tools – ping, traceroute, telnet, SSH, etc.
- Real-time performance monitoring (RPM)
- Junos OS installation
- Software upgrades
- Powering on and shutting down Junos devices
- Root password recovery

Routing Fundamentals
- Packet forwarding concepts
- Routing tables
- Routing vs. forwarding tables
- Route preference
- Routing instances
- Static routing
- Advantages of / use cases for dynamic routing protocols

Routing Policy and firewall fillers
- Default routing policies
- Import and export policies
- Routing policy flow
- Effect of policies on routes and routing tables
- Policy structure and terms
- Policy match criteria, match types, and actions
- Firewall filter concepts
- Filter match criteria and actions
- Effect of filters on packets
- Unicast reverse-path-forwarding (RPF)

COURSE CTE200

Title: Firewall 8.1 Essentials
Test: PCNSE

Course Description

A Palo Alto Networks Certified Network Security Engineer (PCNSE) is capable of designing, deploying, configuring, maintaining and troubleshooting the vast majority of Palo Alto Networks-based network security implementations. Passing the PCNSE and exhibiting solid professional behavior, are the requirements for becoming a PCNSE. The formal certification exam is hosted and proctored by the third-party testing company Pearson VUE. Either exam should be taken by anyone who is prepared to demonstrate a deep understanding of Palo Alto Networks technologies. Candidates can be anyone who uses Palo Alto Networks products, including customers, partners, system engineers, systems integrators and support engineers.

Course Objectives

This course will cover the following subjects:

- Next-Generation Security Platform and Architecture
- Virtual and Cloud Deployment
- Initial Configuration
- Interface Configuration
- Security and NAT policies
- App-IDTM
- Content-IDTM
- URL Filtering
- Decryption
- WildFire
- User-IDTM
- GlobalProtectTM
- Site-to-Site VPNs
- Monitoring and Reporting
- Active/Passive High Availability
- Next-Generation Security Practices

COURSE CTE210
Title: Automating Network Tasks with Python Programing

Course Description
Automation is a key to keep pace with ever changing and increasing requirements and high complexity of modern networks. Today's network engineers need a basic understanding of programming and corresponding tools. Python is the most popular programming language used for network automation. Python excels at offering easy GUI programming and extensive libraries. This course teaches the candidates the necessary basic knowledge to write scripts and programing with Python.

Course Objectives
This course will cover the following subjects:

Python Basics
- Entering Expressions into the Interactive Shell
- The Integer, Floating-Point, and String Data Types
- String Concatenation and Replication
- Storing Values in Variables
- First Program
- Dissecting the Program

Flow Chart
- Boolean Values
- Comparison Operators
- Boolean Operators
- Mixing Boolean and Comparison Operators
- Elements of Flow Chart Control
- Program Execution
- Flow Control Statements
- Importing Modules
- Ending a Program Early with sys.exit

Functions
- def Statements with Parameters
- Return Values and Return Statements
- The None Value
- Keyword Arguments and print
- Local and Global Scope
- Exception Handling
- A Short Program: Guess the Number

Lists
- The List Data Type
- Working with Lists
- Augmented Assignment Operators
- Methods
- Example Program: Magic 8 Ball with a List
- List-Like Types: Strings and Tuples
- Mutable and immutable Data Types
- Passing References
- The copy Module's copy and deepcopy Functions

Dictionaries and Structuring Data
- The Dictionary Data type
- Dictionaries vs. Lists
- The keys, values, and items Methods
- Checking Whether a key or Value Exists in a Dictionary
- The get Method
- The setdefault Method
- Pretty Printing
- Using Data Structures to Model Real-World Things
- A Tic-Tac-Toe Board
- Nested Dictionaries and Lists

Manipulating Strings
- Working with Strings
- String Literals
- Indexing and Slicing Strings
- The in and not in Operators with strings
- Useful String Methods
- The upper, lower, isupper, and islower String Methods
- The isX String Methods
- The startswith and endswith String Methods
- The join and split String Methods
- Justifying Text with rjust, ljust, and center
- Removing Whitespace with strip, rstrip, and lstrip
- Copying and Pasting Strings with pyperclip Module

Reading and writing Files
- Files and File Paths
- Backslash on Windows and Forward Slash on OS X and Linux
- The Current Working Directory
- Absolute vs. Relative Paths
- Creating New Folders with os.makedirs
- The os.path Module
- Handling Absolute and Relative Paths
- Finding File Sizes and Folder Contents
- Checking Path Validity
- The File Reading/Writing Process
- Opening File with open Function
- Reading the Contents of the Files
- Writing to Files
- Saving Variables with the shelve Module
- Saving Variables with pprint.pformat Function

Project: Automation Task with Python
- Automating Network Task with Paramiko
- Automating Network Task with Netmiko
- Automating Network Task with Napalm