

DIPLOMA IN HARDWARE NETWORKING



CURRICULUM

FUNDAMENTALS OF COMPUTER APPLICATION

» Generations of Computer

» Block Diagram of a Computer

» Number System

» Functions of the Different Units

- Input unit,
- Output unit,
- Memory unit,
- CPU (ALU+CU)

» Input & Output Devices

Input Devices:

- Keyboard,
- Point and draw devices mouse, joystick, track ball, light pen
- Data scanning device image scanner, OCR, OMR, MICR, Bar code reader, card reader
- Voice Recognition Device
- Digitizers

Output Devices:

- Monitor
- Printer laser peinter, dotmatrix printer, ink jet printer
- Projecter

Memories

- [Memory hierarchy]

» Registers [Types of Registers]

» Cache Memory

» Primary Memory

RAM

- How data is stored in a RAM
- DRAM and SRAM

ROM

- ROM BIOS/ Firmware
- Types of ROM

Secondary Memories

Hard disk

- Structure of a hard disk, how data is stored in a hard disk, concept of tracks, sectors, clusters, cylinders
- Formatting of hard disk (low level formatting and hi level formatting)

Floppy [data storage mechanism]
CD [data storage mechanism]

» System Software

Operating System

- Functions of O/S
- Types of O/S

Program Language Translators

- Assembler
- Compiler
- Interpreter

Utility Programs

Communication Software

Performance Monitoring Software

» Application Software

» Software hierarchy and dependence between the different layers

» Computer Languages

- Machine language
- Assembly language
- High level language

N+

» N+

- Introduction to Datacomm and Networking
- Datacomm & Networking fundamentals
- OSI reference Model
- LAN fundamentals
- WAN fundamentals
- Network Devices
- Firewall & Application Gateways
- Designing & Implementing Structured Cabling
- Ethernet standards
- FDDI & token Ring Standards
- Digital Subscriber Line
- Deploying a Networking and security Measures
- LAN troubleshooting techniques and Tools
- TCP/IP Model
- IP Addressing

A+

- Introduction to Computer Architecture
- File Systems and Operating Systems
- Advanced DOS Commands
- Understanding Windows and its Features
- Customizing Files & Folders
- Connecting to Internet with Windows
- Internet Search Engines
- Chatting on Internet
- Understanding PC and its components
- Troubleshooting Strategy for computers

- Configuring I/O and Displays Devices
- Keyboard and Mouse
- Installing & Troubleshooting Sound Card
- Upgrading & Troubleshooting Memory
- Disk Devices - HDD, CDROM and DVD
- Printers and Scanners(DMP, Inkjet & Laser Jet)
- SMPS & Monitor
- Motherboards
- Processor -Celeron, P-4,Dual Core & Core2 Duo
- USB Devices
- All in one Printers(Printer, Scanner and Fax)
- PC Assembling and Maintenance

» Exit Profile

- Hardware Engineer, PC Engineer

» Upgrade Path

- N+, MCSE / MCITP, CCNA

CCNA

» IPv4 ADDRESSING

- IP address
- IP Addressing
- Version of IP Address
- Public
- Private IP Address
- Network Mask
- Role Network mask in IP Addressing
- Default Mask of Classful IP Address
- IP Address is combination of Network bits & Host bits
- Network ID or Network Address
- Broadcast ID or Broadcast Address
- No. of Network ID's & Valid IP Address in Class A , Class B , Class C
- Design & Implementation of Network Scenario with Classful Network

» IPV4 Saving Techniques

- Subnetting
- VLSM
- NAT
- Subnetting & its advantages
- How to proceed for Subnetting & VLSM
 - Design & Implementation of Network Scenario with Subnetted Network & VLSM

- Network Address, Broadcast Address
- First Valid IP address,
- Last valid IP address,
- Valid range of IP address,
- Sub netmask,
- Block size,
- Next Network Address,

» Cisco Router Introduction Theory:

- Introduction to Cisco Router
- General port diagram of Cisco Routers
- Cable & Connection.
- Connectivity diagram of Cisco Routers with Network Devices
- Describe the boot process of Cisco IOS routers
 - POST
 - Booting Process of Routers
 - Boot preferences
 - Cisco IOS image(s)
- How to access Cisco Router Console
- Basic Management mode & Commands of Cisco Router

» IP ROUTING Theory:

- Basic Routing Concept
- Routed & Routing Protocols
 - Types of Routing & Protocols.
 - Static Routing.
 - Static Route
- Default route
- Differentiate terms:
 - Next hop
 - AD
 - Metric
 - Destination NID
 - Route Codes
 - Outgoing Interface
- AD & Metrics of Different Routing Protocols

» LAB :

- Configure and verify Static Route
- Configure and verify Default Route

» DYNAMIC PROTOCOLS & DYNAMIC ROUTING Theory:

- Types of dynamic protocols
- IGP vs EGP protocols
- Static vs. Dynamic
- Link state vs. Distance Vector

» OSPF (Open Shortest Path First) Theory: OSPF Terminology

Link-states Advertisement

Router ID & its selection.

Loopback Interface & Loopback Interface

- Hello Timer & Dead Timer
- Concept of Area in OSPF & its Advantages
- Backbone area
- Types of Area's in OSPF
- OSPF router interface Priority
- DR & BDR Concept
- Process ID
- Concept of Wild Card Mask
- ABR & ASBR
- Passive Interface
- AD & Metric

Neighbor adjacency components

OSPF router states

Discuss OSPF single & multi area

Type of Tables in OSPF

- Neighbor Table
- Topology Table
- Routing Table

» LAB:

- Configure and verify ospfv2 single area
- Configure and verify ospfv2 multi area
- Verify ospf metric calculation.
- Modify OSPF Parameter.

» Helpful Command use in LAB

- show ip interface brief
- show protocols
- show running-config
- show ip route
- show ip route connected
- show ip route ospf

» EIGRP (Enhanced Interior Gateway Routing Protocol) Theory :

- Characteristics of EIGRP
- Feasible Distance / Feasible Successors /Administrative distance
- Feasibility condition
- Metric composition
- Router ID
- Auto summary & no auto summary
- Multicast address of eigrp
- Hello & Hold timer

- AD's of eigrp
- Passive interface
- Wild card mask
- Types of eigrp tables.
 - Neighbor Table
 - Topology Table
 - Routing Table
- Neighbor adjacency Parameter
 - Hello
 - ASN
 - METRIC

» LAB:

- Configure and verify EIGRP
- Configure and verify Redistribution with non-eigrp
- Stop unwanted Traffic on LAN segment (using passive-interface.)
- Modify EIGRP Parameter.

» Helpful Command use in LAB

- show ip interface brief
- show protocols
- show running-config
- show ip route
- show ip route eigrp
- show ip eigrp neighbour
- show ip eigrp topology

» HOW TO MANAGE CISCO DEVICES Theory :

- Cisco Discovery Protocol (CDP)
- Introduction
- How to enable & disable CDP on Router & Interface
- Password recovery procedure
- Backup & Up gradation of IOS
- Backup & Up gradation of Configuration File

» Describe following terms:

- Ping
- Traceroute
- Tracert
- Debug IP Packet
- Debug IP ICMP

» LAB:

- Verify CDP to find out information of directly connected Cisco devices
- Disable CDP on router and interface
- Modify CDP Timers.
- Configure and verify of Advance Telnet feature.
- Configure & Verify HOST Resolving.

- Backup of IOS File
- Backup of Configuration File.
- Restoring of IOS File
- Restoring of Configuration File.
- Cisco router Password recovery & Recovery of NVRM File.

» IP SERVICES DHCP

- DHCP Server (IOS Router)
- DHCP Client
- DHCP Pool
- Default Router

» Packet Filtering via ACL

- Describe the types, features, and applications of ACLs
- Standard
- Sequence numbers
- Editing
- Extended
- Numbered
- Log option
- Inbound & Outbound ACL
- Drawback of Standard & Extended ACL
- How to overcome Drawback of Standard & Extended ACL
- ACL Implementation Rules
- Identify the basic operation of NAT
- Purpose
- Pool
- Static (fixed – One Private IP need One Public IP)
- 1 to 1 (variable– One Private IP need One Public IP)
- Overloading (Group of Private IP Address need one Public IP)
- Source addressing (bi-directional)
- One way NAT (uni-directional)

» NTP

- NTP Server
- NTP Client

» ADVANCE TOPICS

- VRRP
- HSRP
- GLBP
- Concept of Syslog server

» LAB:

- Configure and verify Static (fixed) NAT.
- Configure and verify Static (with pool) NAT
- Configure and verify PAT (Overloading)
- Configure and verify Numbered Standard &

Named Standard ACL

- Configure and verify Numbered Extended & Named Extended ACL.
- Configure and verify NTP Server and Client.
- configuring and verify router interfaces to use DHCP
- configuring and verify DHCP

» LAN Switching Technology

- Introduction of Cisco Switches
- Collision Domain & Broadcast Domain
- Bridges and Hubs
- Types of switching

» Bridge & its Function

- Forwarding
- Filtering
- Flooding

Formation of MAC Table or CAM Table

» VLAN & its Advantage

- Network segmentation
- Security
- Enhanced performance

How to create VLAN

Types of VLAN membership

Access port & Access link

Trunk port & Trunk link

How to form trunk & its requirements

Trunking Protocols ISL & dot1q

Frame Forwarding Techniques in Switch

Inter-Vlan Routing

STP

» STP Convergence Components

- lowest Bridge ID
- lowest RPC
- lowest Sender BID
- lowest Sender Port ID

» STP Convergence Steps:

- Election of Root Bridge.
- Election of Root Port.
- Election of Designated Port

Spanning Tree Mode

Concept of Etherchannel

» LAB:

- Configure and verify initial switch configuration
- Verify CAM Table.
- Configure and verify VLANs
- Configure and verify trunking on Cisco switches

- Configure and verify interVLAN routing (Router on a stick)
- sub interfaces

» Network Device Security Configure and verify network device security features such as

- Device password security
- Enable secret vs enable
- Transport
- Disable telnet
- SSH
- VTYS
- Physical security
- Service password

Configure and verify Switch Port Security features such as

Sticky MAC

MAC address limitation

Static / dynamic

» WAN Technologies

- WAN Connection types
- WAN Protocols
- Introduction of HDLC

» Introduction of PPP & its feature

- PPP sub Protocols
- PPP session establishment

PPP authentication methods

Understanding Frame-Relay

Fundamentals

How to make Router as a FRAME_RELAY Switch

» Frame-Relay logical Topologies

- Hub & Spoke
- Full Mesh
- Partial Mesh

Virtual Private Network

Basic fundamentals of VPN

» LAB :

- Configure and verify a basic WAN serial connection
- Configure and verify a PPP connection between Cisco routers
- Configure and verify PPP Authentication
- Configure and verify Frame Relay on Cisco routers

» Ipv6

- Introduction of Ipv6
- Need of Ipv6

» Ipv6 addressing

- Link Local address
- Site local address
- Global Unicast Address
- Multicast Address
- eui 64
- autoconfiguration

» Ipv6 packet type

- Unicast
- Multicast
- Anycast

Ipv6 supporting protocols (RIPng, OSPFv3, EIGRPv6, MP-BGP)

» LAB :

- Configuring & Verify IPV6 Address
- Configure & verify OSPFv2

» OSI (Open System Interconnection) & TCP/IP

- Introduction to OSI or Layered Structure model

Data encapsulation & De-encapsulation Process

PDU form of Data at each layer

Role of OSI layers

- Application
- Presentation
- Session
- Transport
- Network
- Data link
- Physical

Introduction of Protocols & Network Devices per layer

OSI peer to peer communication diagram

OSI Vs TCP/IP

TCP/IP Layers

CCNP

» 300-101 ROUTE

Implement an EIGRP based solution, given a network design and a set of requirements

- Determine network resources needed for implementing EIGRP on a network
- Create an EIGRP implementation plan
- Create an EIGRP verification plan
- Configure EIGRP routing
- Verify EIGRP solution was implemented properly using show and debug commands
- Document results of EIGRP implementation and verification

Implement a multi-area OSPF Network, given a network design and a set of requirements

- Determine network resources needed for implementing OSPF on a network
- Create an OSPF implementation plan
- Create an OSPF verification plan
- Configure OSPF routing
- Verify OSPF solution was implemented properly using show and debug commands
- Document results of OSPF implementation and verification plan

» **Implement an eBGP based solution, given a network design and a set of requirements**

- Determine network resources needed for implementing eBGP on a network
- Create an eBGP implementation plan
- Create an eBGP verification plan
- Configure eBGP routing
- Verify eBGP solution was implemented properly using show and debug commands
- Document results of eBGP implementation and verification plan

» **Implement an IPv6 based solution, given a network design and a set of requirements**

- Determine network resources needed for implementing IPv6 on a network
- Create an IPv6 implementation plan
- Create an IPv6 verification plan
- Configure IPv6 routing
- Configure IPv6 interoperation with Ipv4
- Verify IPv6 solution was implemented properly using show and debug commands
- Document results of IPv6 implementation and verification plan

» **Implement an IPv4 or IPv6 based redistribution solution, given a network design and a set of requirements**

- Create a redistribution implementation plan based upon the results of the redistribution analysis
- Create a redistribution verification plan
- Configure a redistribution solution
- Verify that a redistribution was implemented
- Document results of a redistribution implementation and verification plan
- Identify the differences between implementing an IPv4 and IPv6 redistribution solution

» **Implement Layer 3 Path Control Solution**

- Create a Layer 3 path control implementation plan based upon the results of the redistribution analysis
- Create a Layer 3 path control verification plan
- Configure Layer 3 path control
- Verify that a Layer 3 path control was implemented
- Document results of a Layer 3 path control implementation and verification plan
- Implement basic teleworker and branch services
- Describe broadband technologies
- Configure basic broadband connections
- Describe basic VPN technologies
- Configure GRE
- Describe branch access technologies

» **300-115 SWITCH**

Implement VLAN based solution, given a network design and a set of requirements

- Determine network resources needed for implementing a VLAN based solution on a network
- Create a VLAN based implementation plan
- Create a VLAN based verification plan
- Configure switch-to-switch connectivity for the VLAN based solution
- Configure loop prevention for the VLAN based solution
- Configure Access Ports for the VLAN based solution
- Verify the VLAN based solution was implemented properly using show and debug commands
- Document results of VLAN implementation and verification

» **Implement a Security Extension of a Layer 2 solution, given a network design and a set of requirements**

- Determine network resources needed for implementing a Security solution
- Create a implementation plan for the Security solution
- Create a verification plan for the Security solution
- Configure port security features
- Configure general switch security features
- Configure private VLANs Configure VACL and PACL
- Verify the Security based solution was implemented properly using show and debug commands

- Document results of Security implementation and verification
- » **Implement Switch based Layer 3 services, given a network design and a set of requirements**
 - Determine network resources needed for implementing a Switch based Layer 3 solution
 - Create an implementation plan for the Switch based Layer 3 solution
 - Create a verification plan for the Switch based Layer 3 solution
 - Configure routing interfaces Configure Layer 3 Security
 - Verify the Switch based Layer 3 solution was implemented properly using show and debug commands
 - Document results of Switch based Layer 3 implementation and verification
- » **Prepare infrastructure to support advanced services**
 - Implement a Wireless Extension of a Layer 2 solution
 - Implement a VoIP support solution
 - Implement video support solution
- » **Implement High Availability, given a network design and a set of requirements**
 - Determine network resources needed for implementing High Availability on a network
 - Create a High Availability implementation plan
 - Create a High Availability verification plan
 - Implement first hop redundancy
 - protocols Implement switch supervisor redundancy
 - Verify High Availability solution was implemented properly using show and debug commands
 - Document results of High Availability implementation and verification
- » **300-135 TSHOOT**
 - Maintain and monitor network performance**
 - Develop a plan to monitor and manage a network
 - Perform network monitoring using IOS tools
 - Perform routine IOS device maintenance
 - Isolate sub-optimal internetwork operation at the correctly defined OSI Model layer
 - Troubleshoot Multi Protocol system networks**
 - Troubleshoot EIGRP
 - Troubleshoot OSPF
 - Troubleshoot eBGP
 - Troubleshoot routing redistribution solution
 - Troubleshoot a DHCP client and server solution
 - Troubleshoot NAT
 - Troubleshoot first hop redundancy protocols
 - Troubleshoot IPv6 routing
 - Troubleshoot IPv6 and IPv4 interoperability
 - Troubleshoot switch-to-switch connectivity for the VLAN based solution
 - Troubleshoot loop prevention for the VLAN based solution
 - Troubleshoot Access Ports for the VLAN based solution
 - Troubleshoot private VLANs
 - Troubleshoot port security
 - Troubleshoot general switch security
 - Troubleshoot VACL and PACL
 - Troubleshoot switch virtual interfaces (SVIs)
 - Troubleshoot switch supervisor redundancy
 - Troubleshoot switch support of advanced services (i.e., Wireless, VOIP and Video)
 - Troubleshoot a VoIP support solution
 - Troubleshoot a video support solution
 - Troubleshoot Layer 3 Security
 - Troubleshoot issues related to ACLs used to secure access to Cisco routers
 - Troubleshoot configuration issues related to accessing the AAA server for authentication purposes
 - Troubleshoot security issues related to 105 services (i.e., finger, NTP, HTTP, FTP, RCP etc.)

**» Installing and Configuring Windows Server 2012
At Course Completion**

After completing this course, students will be able to:

- Install and Configure Windows Server 2012.
- Describe AD DS.
- Manage Active Directory objects.
- Automate Active Directory administration.
- Implement Ipv4.
- Implement Dynamic Host Configuration Protocol (DHCP).
- Implement Domain Name System (DNS).
- Implement Ipv6.
- Implement local storage.
- Share files and printers.
- Implement Group Policy.
- Use Group Policy Objects (GPOs) to secure Windows Servers.
- Implement server virtualization using Hyper-V.

Administering Windows Server 2012

CURRICULUM**EXAM CODE 411****» At Course Completion**

After completing this course, students will be able to:

- Deploy and Maintain Server Images
- Configure and Troubleshoot DNS
- Maintain Active Directory Domain Services (AD DS).
- Manage User and Service Accounts
- Implement a Group Policy Infrastructure
- Manage User Desktops with Group Policy
- Configure and Troubleshoot Remote Access
- Install, Configure and Troubleshoot Network Policy Server (NPS) role
- Optimize File Services
- Configure Encryption and Advanced Auditing
- Monitor Windows Server 2012

Configuring Advanced Windows Server 2012 Services

EXAM CODE 412**CURRICULUM****» At Course Completion**

After completing this course, students will be able to:

- Implement advanced network services.
- Implement advanced file services.
- Implement Dynamic Access Control.
- Implement distributed Active Directory Domain Services (AD DS) deployments.
- Implement AD DS sites and replication.
- Implement Active Directory Certification Services (AD CS).
- Implement Active Directory Rights Management Services (AD RMS).
- Implement Active Directory Federation Services (AD FS).

Partners :



Java



development | consultancy | training

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