Las Positas College
3000 Campus Hill Drive
Livermore, CA 94551-7650
(925) 424-1000
(925) 443-0742 (Fax)

Course Outline for CNT 56

MCSA II NETWORKING WITH WINDOWS SERVER

Effective: Fall 2019

I. CATALOG DESCRIPTION:
CNT 56 — MCSA II NETWORKING WITH WINDOWS SERVER — 3.00 units

This course prepares students for the Microsoft's Examination: Networking with Windows Server, which is the second of three exams a student must pass to obtain a MCSA (Microsoft Certified Solutions Associate) Certification. By passing this exam, one become a Microsoft Certified Professional (MCP) and gains access to MCP benefits. Through many hands-on labs, students will install and configure DNS, DHCP, IPAM, VPN and RADIUS. Also covered: managing DFS and branch cache solutions, and implementing Software Defined Networking (SDN) solutions such as Hyper-V Network Virtualization (HNV) and Network Controller, Implement Network Connectivity and Remote Access Solutions, Implement Core and Distributed Network Solutions.

2.50 Units Lecture 0.50 Units Lab

Strongly Recommended
CNT 55 - MCSA I Windows Server Installation, Storage, and Compute
with a minimum grade of C

Grading Methods:
Letter or P/NP

Discipline:
- Computer Service Technology

	MIN
Lecture Hours:	45.00
Expected Outside of Class Hours:	90.00
Lab Hours:	27.00
Total Hours:	162.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering this course, it is strongly recommended that the student should be able to:

A. CNT55
1. Install and Configure Servers, Local Storage, and File & Share Access
2. Configure Print and Document Services
3. Configure Servers for Remote Management
4. Create and Configuring Virtual Machine Settings, Storage, and Virtual Networks
5. Configure IPv4 and IPv6 Addressing
6. Deploy and Configuring the DHCP and DNS Services
7. Install Domain Controllers with Active Directory
8. Create and Managing Active Directory Users, Groups and Organizational Units

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Install and configure DNS servers
B. Install and configure DHCP
C. Implement and Maintain IP Address Management (IPAM)
D. Implement Network Address Translation (NAT); configure routing
E. Implement Network Policy Server (NPS)
F. Implement IPv4 and IPv6 addressing
G. Implement Distributed File System (DFS) and Branch Office solutions
H. Implement high performance network solutions
I. Determine scenarios and requirements for implementing Software Defined Networking (SDN)

V. CONTENT:

A. Implement Domain Name System (DNS)
   1. Install and configure DNS servers
      a. Determine DNS installation requirements
      b. Determine supported DNS deployment scenarios on Nano Server
      c. Install DNS
      d. Configure forwarders
      e. Configure Root Hints
      f. Configure delegation
      g. Implement DNS policies
      h. Configure DNS Server settings using Windows PowerShell
      i. Configure Domain Name System Security Extensions (DNSSEC)
      j. Configure DNS Socket Pool
      k. Configure cache locking
      l. Enable Response Rate Limiting
      m. Configure DNS-based Authentication of Named Entities (DANE)
      n. Configure DNS logging
      o. Configure delegated administration
      p. Configure recursion settings
      q. Implement DNS performance tuning
      r. Configure global settings
   2. Create and configure DNS zones and records
      a. Create primary zones
      b. Configure Active Directory primary zones
      c. Create and configure secondary zones
      d. Create and configure stub zones
      e. Configure a GlobalNames zone; analyze zone-level statistics
      f. Create and configure DNS Resource Records (RR), including A, AAAA, PTR, SOA, NS, SRV, CNAME, and MX records
      g. Configure zone scavenging
      h. Configure record options, including Time To Live (TTL) and weight
      i. Configure round robin
      j. Configure secure dynamic updates
      k. Configure unknown record support
      l. Use DNS audit events and analytical (query) events for auditing and troubleshooting
      m. Configure Zone Scopes
      n. Configure records in Zone Scopes
      o. Configure policies for zone

B. Implement DHCP and IPAM
   1. Install and configure DHCP
      a. Install and configure DHCP servers
      b. Authorize a DHCP server
      c. Create and configure scopes
      d. Create and configure superscopes and multicast scopes
      e. Configure a DHCP reservation
      f. Configure DHCP options
      g. Configure DNS options from within DHCP
      h. Configure policies
      i. Configure client and server for PXE boot
      j. Configure DHCP Relay Agent
      k. Implement IPv6 addressing using DHCPv6
      l. Perform export and import of a DHCP server
      m. Perform DHCP server migration
   2. Manage and maintain DHCP
      a. Configure a lease period
      b. Back up and restore the DHCP database
      c. Configure high availability using DHCP failover
      d. Configure DHCP name protection
      e. Troubleshoot DHCP
   3. Implement and Maintain IP Address Management (IPAM)
      a. Provision IPAM manually or by using Group Policy
      b. Configure server discovery
      c. Create and manage IP blocks and ranges
      d. Monitor utilization of IP address space
      e. Migrate existing workloads to IPAM
      f. Configure IPAM database storage using SQL Server
      g. Determine scenarios for using IPAM with System Center Virtual Machine Manager for physical and virtual IP address space management
      h. Manage DHCP server properties using IPAM
      i. Configure DHCP scopes and options
      j. Configure DHCP policies and failover
      k. Manage DNS server properties using IPAM
      l. Manage DNS zones and records
      m. Manage DNS and DHCP servers in multiple Active Directory forests
      n. Delegate administration for DNS and DHCP using role-based access control (RBAC)
      o. Audit the changes performed on the DNS and DHCP servers
      p. Audit the IPAM address usage trail
      q. Audit DHCP lease events and user logon events

C. Implement Network Connectivity and Remote Access Solutions
   1. Implement network connectivity solutions
      a. Implement Network Address Translation (NAT)
      b. Configure routing
   2. Implement virtual private network (VPN) and DirectAccess solutions
      a. Implement remote access and site-to-site (S2S) VPN solutions using remote access gateway
      b. Configure different VPN protocol options
      c. Configure authentication options
      d. Configure VPN reconnect
      e. Create and configure connection profiles
      f. Determine when to use remote access VPN and site-to-site VPN and configure appropriate protocols

g. Install and configure DirectAccess
h. Implement server requirements
i. Implement client configuration
j. Troubleshoot DirectAccess

3. Implement Network Policy Server (NPS)
   a. Configure a RADIUS server including RADIUS proxy
   b. Configure RADIUS clients
   c. Configure NPS templates
   d. Configure RADIUS accounting
   e. Configure certificates
   f. Configure Connection Request Policies
   g. Configure network policies for VPN and wireless and wired clients
   h. Import and export NPS policie

D. Implement Core and Distributed Network Solutions
1. Implement IPv4 and IPv6 addressing
   a. Configure IPv4 addresses and options
   b. Determine and configure appropriate IPv6 addresses
   c. Configure IPv4 or IPv6 subnetting
   d. Implement IPv6 stateless addressing
   e. Configure interoperability between IPv4 and IPv6 by using ISATAP, 6to4, and Teredo scenarios
   f. Configure Border Gateway Protocol (BGP)\
   g. Configure IPv4 and IPv6 routing
2. Implement Distributed File System (DFS) and Branch Office solutions
   a. Install and configure DFS namespaces
   b. Configure DFS replication targets
   c. Configure replication scheduling
   d. Configure Remote Differential Compression (RDC) settings
   e. Configure staging
   f. Configure fault tolerance
   g. Clone a Distributed File System Replication (DFSR) database
   h. Recover DFSR databases
   i. Optimize DFS Replication
   j. Install and configure BranchCache
   k. Implement distributed and hosted cache modes
   l. Implement BranchCache for web, file, and application servers
   m. Troubleshoot BranchCache

E. Implement an Advanced Network Infrastructure
1. Implement high performance network solutions
   a. Implement NIC Teaming or the Switch Embedded Teaming (SET) solution and identify when to use each
   b. Enable and configure Receive Side Scaling (RSS)
   c. Enable and configure network Quality of Service (QoS) with Data Center Bridging (DCB)
   d. Enable and configure SMB Direct on Remote Direct Memory Access (RDMA) enabled network adapters
   e. Configure SMB Multichannel
   f. Enable and configure virtual Receive Side Scaling (vRSS) on a Virtual Machine Queue (VMQ) capable network adapter
   g. Enable and configure Virtual Machine Multi-Queue (VMMQ)
   h. Enable and configure Single-Root I/O Virtualization (SR-IOV) on a supported network adapter
2. Determine scenarios and requirements for implementing Software Defined Networking (SDN)
   a. Determine deployment scenarios and network requirements for deploying SDN
   b. Determine requirements and scenarios for implementing Hyper-V Network Virtualization (HNV) using Network Virtualization Generic Route Encapsulation (NVGRE) encapsulation or Virtual Extensible LAN (VXLAN) encapsulation
   c. Determine scenarios for implementation of Software Load Balancer (SLB) for North-South and East-West load balancing
   d. Determine implementation scenarios for various types of Windows Server Gateways, including L3, GRE, and S2S, and their use
   e. Determine requirements and scenarios for Datacenter firewall policies and network security groups

VI. LAB CONTENT:

A. Implement Domain Name System (DNS)
1. Install and configure DNS servers
2. Create and configure DNS zones and records

B. Implement DHCP and IPAM
1. Install and configure DHCP
2. Manage and maintain DHCP
3. Implement and Maintain IP Address Management (IPAM)

C. Implement Network Connectivity and Remote Access Solutions
1. Implement network connectivity solutions
2. Implement virtual private network (VPN) and DirectAccess solutions
3. Implement Network Policy Server (NPS)

D. Implement Core and Distributed Network Solutions
1. Implement IPv4 and IPv6 addressing
2. Implement Distributed File System (DFS) and Branch Office solutions

E. Implement an Advanced Network Infrastructure
1. Implement high performance network solutions
2. Determine scenarios and requirements for implementing Software Defined Networking (SDN)

VII. METHODS OF INSTRUCTION:

A. **Lecture** -
B. **Lab** -
C. **Simulations** -
D. **Demonstration** -

VIII. TYPICAL ASSIGNMENTS:

A. Reading:
1. Discuss Microsoft’s DNS and how it integrates into Active Directory for unified functions.

B. Writing:
1. Explain in one page how you would set up Group Policies to allow only certain groups of users to get access to "CurrentProjects" folder.

C. Project:

1. Backup the DNS, DHCP, and Active Directory to an external devices, and explain how you would restrict access and protect these databases.

IX. EVALUATION:
Methods/Frequency

A. Exams/Tests
   7-15 per term
B. Simulation
   10-20 per term
C. Home Work
   8-16 per term

X. TYPICAL TEXTS:
1. Warren, Andrew . *Exam Ref 70-741 Networking with Windows Server 2016.* 1st ed., Microsoft Press, 2016.
2. Panek, William . *MCSA Windows Server 2016 Complete Study Guide.* 2nd ed., Sybex/Wiley, 2018.
3. Thomas, Orin . *Windows Server 2016 Inside Out.* 1 ed., Microsoft Press, 2017.

XI. OTHER MATERIALS REQUIRED OF STUDENTS:
A. Internet Access to Virtual Labs.