



## COURSE OUTLINE

<b>Course Number</b> NET 122	<b>Course Title</b> Windows Server Operating System Administration	<b>Credits</b> 3
<b>Hours:</b> Lecture/Lab/Other 2/2/0	<b>Co-requisite</b> NET102, NET104, NET120	<b>Implementation Semester &amp; Year</b> Fall 2022

### **Catalog description:**

Students learn to install and configure the Windows server network OS, including overall administration, advanced file system concerns, and active directory services. Covers routing, remote access, network security, fault tolerance, and server and network resource optimization. Introduces application servers and troubleshooting in a network environment. Hands-on exercises reinforce Microsoft certification exam objectives.

### **General Education**

**Category:**  
Not GenEd

### **Course coordinator:**

Winston H. Maddox, Professor  
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Cybersecurity  
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### **Required texts & Other materials:**

TESTOut Web Material ISBN:( 978-1-935080-65-7)

### **Course Student Learning Outcomes (SLO):**

***Upon successful completion of this course, the student will be able to:***

1. Install and configure Server, Perform Windows Server Unattended Installation [Supports ILG: 4, PLO: 1, 3]
2. Install and Configure Hyper-V, and administer Active Directory [Supports ILG: 2; PLO: 2, 5]
3. Implement DNS, Deploy and configure core network services [Supports ILG: 4, 9; PLO: 2, 4]
4. Configure server roles and features, Create and manage Group Policy [Supports ILG: 4, 11; PLO: 3, 4]
5. Configure network settings, Implement DHCP [Supports ILG: 2, 4; PLO: 5, 6]
6. Set up a Windows Application Server [Supports ILG: 4, 11 PLO: 1, 4, 6 ]

### **Course-specific Institutional Learning Goals (ILG):**

**Institutional Learning Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Institutional Learning Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals..

**Institutional Learning Goal 9. Ethical Reasoning and Action.** Students will understand ethical frameworks, issues, and situations.

**Institutional Learning Goal 11. Critical Thinking:** Students will use critical thinking skills understand, analyze, or apply information or solve problems.

### **Program Learning Outcomes for Windows Server Operating Systems (PLO)**

1. Demonstrate a working knowledge of an operating system, such as Windows 10 or above.
2. Demonstrate a knowledge of basic computer hardware components, including memory, hard disks, CPUs, communication and printer ports, display adapters, and pointing devices.
3. Install major networking components, including clients, servers, local area networks (LANs), network adapter cards, drivers, protocols, and network operating systems.
4. Proficiency using the Windows 10 interface, including the ability to use File Manager to locate, create, and manipulate folders and files.
5. Demonstrate a working knowledge of common Windows administrative tasks, including creating user and group accounts, assigning permissions, sharing folders, and auditing.
6. Proficiency and a working knowledge of network and end-user support.

### **Units of study in detail – Unit Student Learning Outcomes:**

#### **Unit I** [Unit I Introduction] [Supports Course SLO # 1]

##### **Learning Objectives**

*The student will be able to...*

- Understand basic aspects of Windows System Roles
- Identify basic Windows Server User Interface
- Identify and understand Windows Server 2016 Interface

#### **Unit II** [Unit II Server Installation] [Supports Course SLO # 2]

##### **Learning Objectives**

*The student will be able to...*

- Plan a Windows Server 2012 R2 installation.
- Install Windows Server 2012 R2.
- Upgrade from Server 2008.
- Upgrade from Server 2012.
- Migrate workloads.

#### **Unit III** [Unit III Server Configuration and Management] [Supports Course SLO # 6]

##### **Learning Objectives**

*The student will be able to...*

- Understand the early days of Windows, Use PowerShell cmdlets.
- Understand Windows CE, Install and configure the File Server role
- Install and configure a Server Core 2012 system, Install and configure a Server Core 2016 system.
- Manage a Server Core installation with PowerShell, Mount Windows images.
- Service offline images, Update offline images, Nano Server.
- Configure a Nano Server installation, Use PowerShell to remotely manage a Nano Server.

## **Unit IV [Unit IV Networking] NETWORKING [Supports Course SLO # 5]**

### **Learning Objectives**

***The student will be able to...***

- Explain what a computer network is, Configure IPv4 settings.
- Configure IPv6 settings, Configure Windows Firewall.
- Configure an IPsec connection in WFAS, Use Group Policy to enforce firewall rule
- Configure NIC teaming

## **Unit V [Unit V Server Storage] [Supports Course SLO # 5]**

### **Learning Objectives**

***The student will be able to...***

- Initialize a disk, Configure a volume, Extend a volume.

## **Unit VI [Unit VI Hyper-V] [Supports Course SLO # 7]**

### **Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- Install and configure Hyper-V on Server 2012.
- Install and configure Hyper-V on Server 2016.
- Install Hyper-V management tools; manage a Hyper-V deployment.
- Configure nested virtualization, Create Windows virtual machines on Server 2012.
- Create Windows virtual machines on Server 2016, Create Linux virtual machines.
- Manage virtual machines with PowerShell, upgrade legacy virtual machines.
- Create a virtual hard disk; Install a parent virtual machine using a fixed virtual hard disk.
- Create differencing disks from a parent disk, Create, apply, and delete checkpoints.
- Convert, compact, merge, and expand virtual hard disks, Create virtual switches.
- Add virtual network adapters, configure network isolation Prepare a production virtual machine, Optimize virtual network performance, Manage virtual network bandwidth.
- Configure virtual NIC teaming, manually move virtual machines, Configure a storage migration

## **Unit VII [Unit VII Active Directory] [Supports Course SLO # 7]**

### **Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- What are the advantages of a client-server network model versus a workgroup model?
- What is the difference between a tree and a forest? How can you tell when a new domain starts a new tree?
- What is the function of transitive trusts in a forest? What is the function of the schema?
- How does Active Directory ensure that each domain controller has the most current information from other domain controllers?
- To remove Active Directory from a domain controller, what action must you take before demoting the domain controller?
- What are the four methods you can use to install Active Directory Domain Services?
- How does Active Directory use the schema? What is the function of a Global Catalog server?
- How is a Global Catalog server updated? Create organizational units.
- Create nested organizational units. Prevent accidental deletion of OUs.
- Delegate administrative control, Create users in bulk.
- Query Active Directory with PowerShell, Create groups. Create global groups. Create a distribution group.
- Change group scope. Implement a group strategy. Enumerate group membership.

**Unit VIII** [Unit VIII Group Policy] [Supports Course SLO # 7]

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- How does inheritance affect Group Policy settings?
- If a setting is configured in a GPO linked to the domain and a GPO linked to an OU, which setting will be in effect?
- What is the difference between using a starter GPO and copying an existing GPO?
- Create and link GPOs to appropriate objects. Create a starter GPO.
- Centrally manage administrative templates using the central store.
- Configure the scope of Group Policy objects.
- Configure a password policy and apply it to specific users or groups. Configure audit policies
- Configure user rights to secure network resources
- Configure security option, Configure User Account Control
- Configure a software restriction policy for a specific user.
- Create a path rule for an application, Create a hash rule to create software restrictions.
- Create an AppLocker executable rule, Configure restricted groups

**Unit IX** [Unit IX DNS] [Supports Course SLO # 7]

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- Why is a reverse lookup zone for a network written backwards?
- What are the differences between primary zones and secondary zones?
- What is the difference between Refresh Interval and DNS Notify triggers for zone transfers?
- What information does an SOA record contain?
- How is an Active Directory-integrated zone different from a primary zone?
- Which type of zone would you create if you wanted to use secure dynamic updates?
- Which type of name resolution is performed by reverse lookup zones?

**Unit X** [Unit X File and Share Access] [Supports Course SLO # 7]

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- How are NTFS permissions used to control access to file and folders?
- Why should you assign permissions to groups rather than users?
- How do logged on users get updated permissions?
- How would you determine the effective permissions when both NTFS permissions and share permissions apply?
- What is the difference between *explicit permissions* and *inherited permissions*?
- What will happen if you move a file that has explicit NTFS permissions to a different folder on the same NTFS partition? What will happen if you copy the file to a different folder on the same NTFS partition?
- What is the difference between a *soft quota* and a *hard quota*?

**Unit XI** [Unit XI Print and Document Services] [Supports Course SLO # 7]

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- What is the difference between a print device and a printer?
- When do you add the LPD service while configuring the Print Services role?
- When adding a printer, under which physical printing configurations would you choose a local printer? When would you choose a network printer?

- Under which circumstances would you configure a printer to use multiple print devices? When would you configure multiple printers for a single print device?
- Which services are included in the Print and Document Services role?
- How do you ensure important print jobs are automatically printed before other print jobs?
- How can you use printer permissions to designate a user as a print job administrator?

**Unit XII [Unit XII Server Management] [Supports Course SLO # 7]**

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- How to implement a clients receive updates in the absence of WSUS? Explain the disadvantages that this method poses for your network?
- Understand when should you deploy multiple, independent WSUS servers? How is this configuration similar to a single WSUS server?
- Know how to deploy WSUS when an Internet connection is not allowed for an isolated network?
- Explain the difference between synchronizing updates, downloading updates, and approving updates?
- Know which policy points clients to your WSUS server instead of the Microsoft Update website?

**Unit XIII [Unit XIII DHCP] [Supports Course SLO # 7]**

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- How does a client receive an address from a DHCP server?
- When must you authorize a DHCP server? What permissions do you need to authorize a DHCP server?
- How can you change the subnet on a scope?
- What must you do to allow a DHCP server to deliver IP addresses?

**Unit XIV [Unit XIV Containers] [Supports Course SLO # 7]**

**Learning Objectives**

***The student will be able to...***

- Explain how a Windows Server container differ from a Hyper-V container
- Which factors determine which Windows versions you need to support within your containers before you deploy the Container feature?
- Identify the advantages of using the Container feature
- Explain the three characteristics of Containers

**Unit XV [Unit XV High Availability] [Supports Course SLO # 7]**

**Learning Objectives**

***The student will be able to...***

- Explain what is Docker Hub used for
- Identify what does the docker run command do
- Understand how do you view all the running containers on the container host
- Explain which command can you use to open a command line interface that will allow you to manage the container
- Identify which three different types of networks can you configure containers to use
- Understand how to mount a directory in the container host's file system
- Explain and demonstrate how to deploy a container in an isolated sandbox with no network connectivity
- Explain what happens if Docker can't find a NAT network to bind to

**Unit XVI [Unit XVI Hyper-V] [Supports Course SLO # 7]**

**Learning Objectives**

***The student will be able to... Explain and Demonstrate***

- What are the characteristics of NLB cluster members?
- What mechanism do cluster members use to communicate consistent information about cluster membership?
- In unicast mode, how are MAC addresses used by cluster members?
- How does communication between cluster members take place when multicast mode is implemented?
- What are the prerequisites for installing and configuring a Network Load Balancing cluster?
- What are the steps for creating an NLB cluster?
- If you add a new host to a cluster, when does the new host come online?
- How do port rules control how an NLB cluster functions?
- What is the client affinity setting?
- How can you ensure that requests from clients on a specific subnet always connect to a specific cluster host?
- What happens when you add a host to a cluster that has different port rules?
- What tasks do you perform to implement a load-balancing cluster?
- What happens to traffic processing after you use the drainstop option?

**Evaluation of student learning:** [Evaluates SLOs #1, 2, 3, 4, 7]

Students' achievement of the course objectives will be evaluated through the use of the following:

- TESTOut Lab assignments assessing students' computer hardware comprehension skills related to the unit objectives.
- TESTOut Lab Chapter quizzes assessing students' comprehension of software computer concepts related to the unit objectives.
- Research and Final Research presentation assessing students' comprehension through the use of word, PowerPoint and graphics to demonstrate knowledge,
- Basic programming Labs and Quizzes assignments assessing students' basic comprehension of hardware functions and skills related to the unit objectives.
- Exams and Final Research Presentation assessing students' comprehension of computer concepts and applications related to the unit objectives.

**Grade Criteria**

<b>Item</b>	<b>Percent</b>	<b>Description</b>
TESTOut Labs	10%	Activity-based lab Assignment in Excel
TESTOut Quizzes	10%	15 Question quiz for each unit of Computer Concepts
Exams	35%	3 Assignment based on your IT Topics leading to the final project
Final Research Presentation	45%	Professional Presentation