



COURSE OUTLINE

Course Number NET 124	Course Title Network Infrastructure Administration	Credits 3
Hours: Lecture/Lab/Other 2/2/0	Co-requisite NET122	Implementation Semester & Year Fall 2022

Catalog description:

Windows-based focus includes implementing TCP/IP for cross-platform and Internet connectivity, WINS and DNS to resolve hosts on local and remote networks, DHCP to manage address configuration, RAS including dial-up connectivity and virtual private networks, and Internet connection sharing with NAT. Covers securing network communications with certificates, IP security, authentication, and encryption. Hands-on exercises reinforce Microsoft certification exam objectives.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:

TESTOut Web Material ISBN:(978-1-935080-67-1)

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 Objective

The student will be able to...

- Understand basic aspects of Windows Network Infrastructure Administration
- Identify basic Windows Network Infrastructure User Interface
- Identify and understand Windows Server Network Infrastructure Interface:
 - DNS Installation R2 installation.
 - Install Windows Server 2012 R2.
 - DNS Name Resolution Upgrade from Server 2012.
 - DNS Zones, DNS Records, Single-Label Name Resolution
 - DNS Server Properties, Protecting DNS, DNS Policies,
 - DNS Monitoring and Troubleshooting

Unit II [Unit II TCP/IP] [Supports Course SLO # 2]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - IPv4 Addresses,
 - IPv6 Addresses,
 - IPv4 to IPv6 Transitional Technologies

Unit III [Unit III DHCP] [Supports Course SLO # 6]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - Understand the early days of Windows, Use PowerShell cmdlets.
 - Installing DHCP, DHCP Scopes, DHCP Options

- Advanced Scopes, Centralized DHCP and PXE
- DHCP Policies, Advanced DHCP Management
- Maintaining the DHCP Database, Troubleshooting DHCP

Unit IV [Unit IV IP Address Management (IPAM)] [Supports Course SLO # 5]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - Explain what a computer network is, Configure IPv4 settings.
 - IPAM Installation
 - Advanced IPAM Administration
 - IPAM Auditing

Unit V [Unit V Routing and Remote Access (RRAS)] [Supports Course SLO # 5]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - Initialize a disk, Configure a volume, Extend a volume.
 - Routing
 - Installing VPN
 - VPNs
 - Connection Profiles

Unit VI [Unit VI Direct Access (DA)] [Supports Course SLO # 7]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - DirectAccess Installation
 - DirectAccess Troubleshooting
 - 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 Network Policy Server (NPS)] [Supports Course SLO # 7]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
 - Advantages of a client-server network model versus a workgroup model
 - Installing Network Policy Server (NPS)
 - NPS Templates
 - NPS Network Policies
 - NPS Connection Request Policies
 - RADIUS Accounting
 - Managing NPS Policies

Unit VIII [Unit VIII Distributed File System (DFS) and Branchcache] [Supports Course SLO # 7]

Learning Objectives

The student will be able to...

- Explain and Demonstrate -
- How does inheritance affect Group Policy settings?
 - Distributed File System (DFS) Namespaces and BranchCache
 - Configuring DFS Replication
 - Optimizing DFS Replication
 - Managing the DFS Replication Database
 - BranchCache Installation and Configuration

Unit IX [Unit IX High Performance Network Solutions] [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?
 - NIC Teaming and Switch Embedded Teaming (SET)
 - QoS with Data Center Bridging (DCB)
 - Virtual Machine Queue (VMQ) and Receive Side Scaling (RSS)
 - SMB Direct and SMB Multichannel
 - Single-root IO Virtualization (SR-IOV)

Unit X [Unit X Implementing Software Defined Networking (SDN)] [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
 - Implementing SDN
 - Implementing Hyper-V Network Virtualization (HNV)
 - Implementing Software Load Balancer (SLB)
 - Implementing Windows Server Gateways
 - Implementing Datacenter Firewall Policies

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

Item	Percent	Description
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