Windows Server Administration

GENWS501

Apply Windows Server Administration

Competence

RQF Level: 5

Learning Hour
60

Credits: 6

Sector: ICT and MULTIMEDIA

Trade: Computer System and Architecture

Module Type: General

Curriculum: ICTCSA5001 - TVET CERTIFICATE V IN COMPUTER SYSTEM AND ARCHITECTURE

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Purpose statement	This general module describes the skills, knowledge and attitude required to Apply Windows Server Administration. This module is intended to prepare learners pursuing TVET Level 5 in Computer system and architecture. At the end of this module the learners will be able to Prepare Server Environment, Deploy Active Directory Services, Deploy DHCP services, Deploy DNS service, Deploy FTP services, and Perform maintenance.					
Learning assumed to be in place	N/A					
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%		30%	
	Practical work:		70%	Formative assessment	70%	50%
	Group project and presentation	30%				
	Individual project /Work	40%				
				Summative Assessment		**50%**

Elements of Competence and Performance Criteria	
Elements of competence	**Performance criteria**
1.Prepare Server Environment	1.1 Hypervisors are properly installed based on developer guide.
	1.2 Virtual machine is correctly configured according to server specification
	1.3 Windows server is properly installed based on system functionalities and server specifications
2. Deploy Active Directory	2.1 Active Directory Domain Services are successfully installed according to Microsoft standards

Services	2.2 Active Directory is properly configured according to the forest needs
	2.3 Group Policy Objects are efficiently managed in line with Authorization Authentication Accounting (AAA)
	2.4 DNS service is properly configured according to the organization's requirements
	2.5 Client PC is successfully joined to the domain in accordance with ADDS configurations
3. Deploy DHCP service	3.1 DHCP server is properly installed based on Microsoft standards
	3.2 DHCP server is properly configured based on organization requirements
	3.3 DHCP server is properly tested according to the organization's requirements
4. Deploy FTP service	4.1 FTP services are properly installed according to the Microsoft standards
	4.2 FTP server is properly configured based on server requirement
	4.3 FTP server file sharing is properly implemented based on user permissions
5. Perform maintenance	5.1 Windows Server Update Service is properly deployed based on system requirements
	5.2 Backup is properly performed according to the backup plan
	5.3 Troubleshooting is accurately performed based on server performance
	5.4 Migration is successfully performed according to the organization needs

KNOWLEDGE	SKILLS	ATTITUDES
- Description of Client/Server concepts - Description of Virtualization concepts - Description of active directory concepts - Description of GPO - Description of DHCP Concepts - Description of FTP Concepts - Description of Windows server update service	- Installation of windows server - Installation hypervisor - Configuration of Virtual Machine - Configuration of computer networks - Deployment Active Directory Services - Deployment of DNS Services - Deployment DHCP services - Deployment FTP services - Performing maintenance of Windows Server System	- Being Flexibility - Have Adaptability - Being Teamwork - Being Persistence - Having Time management - Being Organized - Being Curiosity - Having Passion - Having Creativity - Being Patience - Having Integrity - Being Reliability - Being Trustworthy - Being Honesty - Having Innovation - Having Confidence

Course content	

Learning outcomes	At the end of the module the learner will be able to:
	1. Prepare Server Environment
	2. Deploy Active Directory Services
	3. Deploy DHCP services
	4. Deploy FTP services
	5. Perform maintenance

Learning outcome 1: Prepare Server Environment	Learning hours: 10

Indicative content

- **Introduction to Windows server**
  - ✓ Description of Server concepts
    - ➕ Definition
    - ➕ Role
    - ➕ Services
  - ✓ Description of Client/Server concepts
    - ➕ Architecture
    - ➕ Communication
    - ➕ Role
  - ✓ Description of Windows server
    - ➕ Definition
    - ➕ Features
- **Installation of Hypervisors**
  - ✓ Description of Virtualization concepts
    - ➕ Definition
    - ➕ Types

- Benefits
- ✓ Description of Hypervisors
  - Definition
  - Functionalities
  - Types
- ✓ Identification of Hypervisors selection criteria
  - Environment
  - Cost
  - Performance
- ✓ Perform hypervisors Installation (VMware workstation)
- **Configuration of virtual machine**
  - ✓ Identification of hardware resources
    - RAM
    - Storage
    - CPU
    - Network interface
  - ✓ Identification of Software resources
    - Operating system
    - Boot Order
  - ✓ Creating Virtual machine
    - Security Setting
    - Customize VM options offered by Hypervisor
    - Network Configuration
- **Installation of Windows server**
  - ✓ Prepare Installation Media
  - ✓ Perform OS Installation
    - Windows server OS
    - Windows Client OS
  - ✓ Configuration of network adapter

- Physical Connections - Configure server network settings - Network sharing and Discovery - Firewall and Security - Assign static/Automatic IP Addressing - Test connectivity	

Resources required for the learning outcome	
Equipment	- Projector - Computer - UPS - Rack
Materials	- Cables - Internet
Tools	- Windows Server OS - Windows client OS - VM Software - Bootable software - DVD - Flash disc - Web browser
Facilitation techniques or Learning activity	- Demonstration and simulation - Individual and group work - Practical exercise - Individualized - Trainer guided

Formative assessment methods /(CAT)	• Written assessment
	• Performance assessment
	• Product based assessment
	• Project based assessment

Learning outcome 2: Deploy Active Directory Services	Learning hours: 15

Indicative content

- **Installation of Active Directory Domain Services**
  - ✓ Description of active directory concepts
    - Active Directory
    - Active Directory Domain Service(ADDS)
    - Domain
    - Domain Controller (DC)
    - Organizational Units (OUs)
    - Forest
    - Tree
    - Global Catalog (GC)
    - Trust Relationship
    - User Accounts
    - Computer Accounts
    - Security Groups and Distribution Groups
    - Schema
  - ✓ Apply ADDS installation process through server manager
- **Configuration of Active Directory**
  - ✓ Description of domain deployment operation

- Adding a domain controller to an existing domain
- Adding a new domain to an existing forest
- Adding a new forest
- ✓ Promoting a server to a domain controller
- **Management of Group Policy Object (GPO)**
  - ✓ Description of GPO
    - Definition
    - Types (Local, Nonlocal and Starter)
    - Hierarchy policies (Local policy, Site policy, Domain policy and OU policy)
  - ✓ Creation of Accounts
    - User account
    - User groups
  - ✓ Managing shared resources
    - Creation of GPO
    - Authorizing / Denying user activities.
  - ✓ User authentication method
    - LDAP
    - RADIUS
- **Deployment of DNS service**
  - ✓ Description of DNS
    - Definition
    - DNS Operation
    - DNS queries (Recursive Query, Iterative Query)
    - DNS zones and zone files
  - ✓ Identification of DNS records
    - A Record (Address Record)
    - AAAA Record (IPv6 Address Record)
    - CNAME Record (Canonical Name)
    - MX Record (Mail Exchange)

- PTR
- NS
- SOA

✓ Performing DNS installation

✓ Configuration of DNS Settings
- Choose a DNS Hosting Provider
- Public DNS IP addresses (IPv4)
- Public DNS IP addresses (IPV6)
- DNS zones

✓ Testing of DNS Configuration
- Verify DNS Settings
- Ping a Domain Name
- Resolve a Domain Name

● **Joining client Computer to the domain**

✓ Add client to the domain
- Change from workgroup to domain
- Domain name
- Administrator username
- Administrator password

✓ Integrate Client computer to organization network

✓ Test domain for reachability between client over a network

Resources required for the indicative content	
Equipment	- Projector - Computer - UPS - Router - Switch
Materials	Cables

	• Internet
Tools	• Modem
	• VMware Software
	• Windows server OS
	• Windows client OS
	• Bootable device software
	• DVD
	• Flash disc
Facilitation techniques or Learning activity	• Demonstration and simulation
	• Practical exercise
	• Individualized
	• Trainer guided
Formative assessment methods /(CAT)	• Written assessment
	• Performance assessment
	• Product based assessment
	• Project based assessment

Learning outcome 3: Deploy DHCP services	Learning hours: 10
Indicative content	

- **Installation of DHCP Server**
  - ✓ Description of DHCP Concepts
    - ♦ Definition
    - ♦ Benefit
    - ♦ Operations
  - ✓ Perform DHCP installation
- **Configuration of DHCP server**

- ✓ Configuration of DHCP Scope
  - 🔶 Set lease duration
  - 🔶 IP address Range
  - 🔶 Start DHCP service
- ✓ Advanced configuration settings
  - 🔶 DHCP reservation
  - 🔶 Set exclusion
- ✓ Start DHCP Service

- **Testing DHCP Configuration**
  - ✓ Check IP address of the DHCP client or Client devices
  - ✓ Check IP addresses from the DHCP server

Resources required for the indicative content	
Equipment	- Projector - Computer - UPS - Router - Switch
Materials	- Cables - Internet
Tools	- Modem - VMware Workstation - Windows server 2019 OS - Windows client OS - Bootable device software - DVD - Flash disc

Facilitation techniques or Learning activity	• Demonstration and simulation • Practical exercise • Individualized
Formative assessment methods /(CAT)	• Written assessment • Performance assessment • Product based assessment • Project based assessment

Learning outcome 4: Deploy FTP services	Learning hours: 15
Indicative content	

- **Installation of FTP server**
  - ✓ Description of FTP Concepts
    - Definition
    - Authentication
    - Port numbers
    - Anonymous
  - ✓ Select FTP client
    - FileZilla
    - WinScp
  - ✓ Install FTP client
  - ✓ Install FTP services
- **Configuration of the FTP Server**
  - ✓ Root directory for the FTP server
  - ✓ Access permissions
    - Read
    - write

- ⊕ Execute
  - ✓ Test the FTP Server
- ● **Implementation of FTP server file sharing**
  - ✓ Choose an FTP Server Software
  - ✓ Set Permissions for Shared Directory
  - ✓ Test FTP File Sharing

Resources required for the indicative content	
Equipment	• Projector • Computer • UPS • Router • Switch
Materials	• Cables • Internet
Tools	• Modem • VMware Workstation • Windows server 2019 OS • Windows client OS • Bootable device software • DVD • USB
Facilitation techniques or Learning activity	• Demonstration and simulation • Practical exercise • Individualized • Trainer guided
Formative assessment methods /(CAT)	• Performance assessment • Product based assessment

	• Project based assessment

Learning outcome 5: Perform maintenance	Learning hours: 10
Indicative content	

- **Deployment of Windows Server Update Services (WSUS)**
  - ✓ Description of Windows server update service
  - ✓ Install the necessary roles and features
    - Open Server Manager
    - Add Roles and Features
  - ✓ Enable the WSUS role
- **Configuration of Windows Server Update Services (WSUS)**
  - ✓ Synchronize Updates
  - ✓ Approve Updates
    - Configure Client Settings
    - Client Detection and Update
    - Regularly review and approve new updates on the WSUS server.
    - Monitor the health and performance of the WSUS server and its database.
    - Periodically clean up expired and unneeded updates to save disk space.
- **Performing server backup**
  - ✓ Assess data to be backed up
  - ✓ Plan the Backup
    - Identification of Backup types
    - Selection of Backup Location
    - Scheduling Backups
  - ✓ Secure Backup Storage
  - ✓ Test Restorations

- ✓ Documentation of backup
  - ↴ Regularly review
  - ↴ Update backup strategy as your data and server requirements evolve
  - ↴ Periodic mock drills
  - ↴ Produce Disaster Recovery Plan(DRP) document
- ✓ Window server Recovery
- **Perform troubleshooting**
  - ✓ Gather Information
    - ↴ Server hardware specifications,
    - ↴ Software configuration
    - ↴ Logs
    - ↴ Error messages
    - ↴ Recent changes
  - ✓ Check Server Status
    - ↴ Verify that the server is up and running
    - ↴ Check Resource Utilization
  - ✓ Verify Network Connectivity
    - ↴ DNS settings
    - ↴ Network configurations
  - ✓ Use Diagnostic Tools
    - ↴ Utilize network diagnostic tools
    - ↴ Performance monitoring tools
  - ✓ Document Findings and Solutions
- **Performing migration**
  - ✓ Plan and prepare servers and services that need to be migrated
    - ↴ Timeline
    - ↴ Potential risks
  - ✓ Configure RAIDs
  - ✓ Perform migration process

✓ Use Data Transfer methods ✓ Monitoring and Validation	

Resources required for the indicative content	
Equipment	• Projector • Computer • UPS • Router • Switch
Materials	• Cables • Internet
Tools	• Modem • VMware Workstation • Windows server 2019 OS • Windows client OS • Bootable device software • DVD • Flash disc
Facilitation techniques or Learning activity	• Demonstration and simulation • Individual and group work • Practical exercise
Formative assessment methods /(CAT)	• Performance assessment • Product based assessment • Project based assessment

References:

1. Bigelow, S. J. (2021). 8. Bigelow, S. J., & Gillis, A. S. (2021). What is server virtualization? The ultimate guide. IT Operations.

2. Carpenter, T. P. (2011). 6. Carpenter, T. P. (2011). Microsoft Windows Server Administration Essentials. .

3. Dauti. (2022). . Dauti, B). Windows Server Administration Fundamentals - Third Edition: . dauti.

4. Dauti, B. (.-T. (2022). Dauti, B. (2022). Windows Server 2022 Administration Fundamentals - Third Edition: .

5. Dauti, B. (2022). Windows ServerAdministration Fundamentals - Third Edition: .

6. GeeksforGeeks. (2022). 7. GeeksforGeeks. (2022). Types of Server Virtualization in Computer Network. GeeksforGeeks. .

7. Krause, J. (2019). Krause, J. (2019). (Krause, 2019) Mastering Windows Server 2019: The Complete guide for IT professionals to install and manage Windows Server 2019 and deploy new capabilities, 2nd Edition. .

8. Krause, J. (2019). Mastering windows server, the complete guide for IT proessioals.

9. Krause, J. (n.d.). Krause, J. (2019). (Krause, 2019) Mastering Windows Server 2019: The complete guide for IT professionals to install and manage Windows Server 2019 and deploy new capabilities, 2nd Edition. .

10. Palmer, M. (.-O. ((2017).). 4. Palmer, M. (2017). Hands-On Microsoft Windows Server 2016. Cengage Learning.