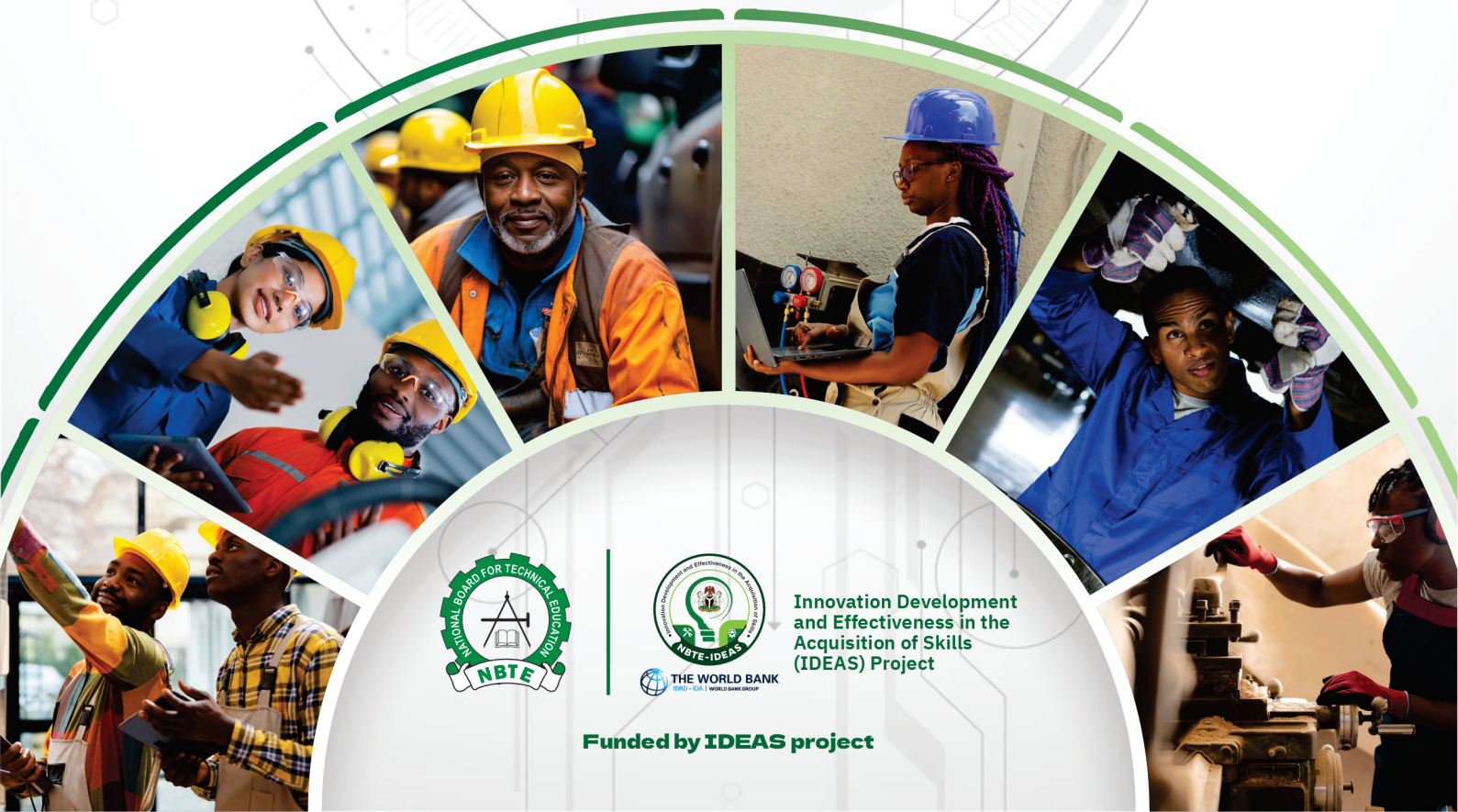
FEDERAL MINISTRY OF EDUCATION

National Skills Qualifications FOR COMPUTER NETWORKING

LEVEL 1, 2 & 3

February, 2025



NATIONAL BOARD FOR TECHNICAL EDUCATION
NBTE

Innovation Development and Effectiveness in the Acquisition of Skills
NBTE-IDEAS

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Innovation Development and Effectiveness in the Acquisition of Skills (IDEAS) Project

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National Board for Technical Education

Plot B, Bida Road, P.M.B. 2239, Kaduna, Nigeria

NATIONAL SKILLS QUALIFICATION

COMPUTER NETWORKING

LEVEL 1-3

FEBRUARY, 2025

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NATIONAL SKILLS QUALIFICATION

COMPUTER NETWORKING

LEVEL 1

FEBRUARY, 2025

NATIONAL SKILLS QUALIFICATION

NSQ LEVEL 1 - COMPUTER NETWORKING

GENERAL INFORMATION

QUALIFICATION PURPOSE

This Qualification is designed to equip learners with knowledge and skills to assist in Office/Home network tasks under supervision, ensuring efficient installation and basic maintenance of network infrastructures.

QUALIFICATION OBJECTIVES

The learner should be able to: -

i. Apply occupational health and safety principles in the workplace.
ii. Collaborate effectively in a team setting.
iii. Communicate clearly and professionally in various contexts.
iv. Identify and differentiate computer network types and their applications.
v. Recognize and utilize essential network components.
vi. Implement basic network infrastructure and configure IPv4 addressing.
vii. Design, set up, and configure a SOHO (Small Office/Home Office) network.

Mandatory Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 001	ICT/NCI/001/L1	Occupational health and Safety	2	20	*Mandatory*
Unit 002	ICT/NCI/002/L1	Teamwork in Networking	2	20	*Mandatory*
Unit 003	ICT/NCI/003/L1	Communication in Networking	2	20	*Mandatory*
Unit 004	ICT/NCI/004/L1	Introduction to Computer Networking	2	20	*Mandatory*
Unit 005	ICT/NCI/005/L1	Computer Networking Components	3	30	*Mandatory*
Unit 006	ICT/NCI/006/L1	Concept of Network Infrastructure and IPv4 Addressing	4	40	*Mandatory*
Unit 007	ICT/NCI/007/L1	Setting up and configuration of SOHO (Small Office/Home Office) networks.	3	30	*Mandatory*
		Total	**18**	**180**	

Optional Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 008	ICT/NCI/008/L1	Fundamental of Network Simulation Tools	2	20	*Elective*
Unit 009	ICT/NCI/009/L1	Basic Network Troubleshooting	2	20	*Elective*
		Total	4	40	

Notes:

Mandatory Units:
Mandatory Units 1-7 focus on core competencies required for proficient knowledge and skills to perform Small Office/Home network tasks.

Elective Unit 008 focus on the ability of the student to effectively use the Packet Tracer Network Simulation tool to aid learning during the course.

These units cover essential skills such as IP addressing, understanding network components and infrastructure and the effective handling of network equipment. Mastery of these units ensures foundational expertise and operational efficiency in implementing basic network practices.
The learner must complete all the mandatory course units, which total ***180 credit hours***

NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 001: OCCUPATIONAL HEALTH AND SAFETY IN COMPUTER NETWORKING

Unit Reference Number: ICT/NCI/001/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
This Unit is to equip learners with the knowledge and skills to identify hazards, follow safety protocols, use protective equipment, and respond to emergencies, ensuring a safe and compliant working environment during network installations.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 001: OCCUPATIONAL HEALTH AND SAFETY IN NETWORK

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: The importance of occupational health and safety in computer networking	1.1	Explain relevant occupational health and safety regulations in the network industry.									
	1.2	Explain the importance of following occupational health and safety to prevent accidents, electrical hazards, and ensure personal and team safety.									
	1.3	Describe the consequences of non-compliance with occupational health and safety in network installation projects.									
LO 2: Recognize potential hazards in the network installation environment	2.1	Identify common hazards in network environments, such as electrical risks, tripping hazards, and sharp tools.									
	2.2	Assess risks in a work area before beginning tasks to ensure safety.									
	2.3	Recommend appropriate mitigation strategies to reduce hazards during network installation.									
LO 3: Use appropriate Personal Protective Equipment (PPE) for networking tasks	3.1	Identify the correct PPE required for network tasks (e.g., safety gloves, safety glasses, hard hats).									
	3.2	Demonstrate the correct use of PPE to ensure personal safety during installation and maintenance.									
	3.3	Inspect PPE before use to ensure it is in good condition and meets safety requirements.									
LO 4: Follow safe work practices during network installation	4.1	Apply lockout/tagout procedures to electrical systems to prevent electrical shock during cabling tasks.									
	4.2	Safely handle tools, such as cable cutters, strippers, and crimpers, following safety procedures.									
	4.3	Maintain a clean and organized work area to reduce the risk of accidents and ensure safe movement around the installation site.									
LO 5: Dispose of materials and equipment	5.1	Identify the proper disposal methods for materials used in network cabling (e.g., cables, insulation, packaging).									
	5.2	Safely store and dispose of hazardous materials, such as batteries or									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		chemicals, following environmental safety regulations.									
	5.3	Demonstrate the ability to clean up after installation tasks while adhering to environmental occupational health and safety.									

Learner's Signature	Date
Assessor's Signature	Date
IQA's Signature	Date
EQA's Signature	Date

NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 002: TEAMWORK IN NETWORKING

Unit Reference Number: ICT/NCI/002/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
This Unit aims to develop learners' abilities to work effectively as part of a team during network installations, emphasizing collaboration, task management, and following supervisory guidance to achieve successful project outcomes.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 002: TEAMWORK IN NETWORK INSTALLATIONS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the role of teamwork in network installation projects	1.1	Explain the importance of teamwork in completing network installation tasks efficiently and on time.									
	1.2	Identify individual roles and responsibilities within a team during a network installation project.									
	1.3	Describe how effective teamwork contributes to safety and quality in network installation processes.									
LO 2: Collaborate effectively with team members on network tasks	2.1	Communicate task objectives and responsibilities clearly with team members to ensure mutual understanding.									
	2.2	Assist other team members in completing tasks to maintain project flow.									
	2.3	Resolve conflicts or disagreements with team members constructively, without disrupting project progress.									
LO 3: Follow supervisory guidance and instructions during network installations	3.1	Interpret instructions from supervisors or team leads accurately to ensure compliance with project requirements.									
	3.2	Demonstrate the ability to ask for clarification when instructions or tasks are not fully understood.									
	3.3	Execute tasks according to the supervisory plan, adjusting to changes in instruction as needed.									
LO 4: Manage tasks and time effectively within a team environment	4.1	Prioritize tasks based on project timelines and team objectives.									
	4.2	Monitor task progress and adjust work pace to ensure deadlines are met without compromising quality.									
	4.2	Coordinate with team members to ensure seamless task handovers and continuity of work.									
LO 5: Demonstrate a positive attitude and work ethics	5.1	Show respect for diverse team members by valuing their input and contributions.									
	5.2	Maintain a positive attitude, even in challenging situations, to foster a supportive team environment.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
in a team setting	5.3	Uphold professional standards by being punctual, reliable, and committed to delivering high-quality work.									

Learner's Signature	Date
Assessor's Signature	Date
IQA's Signature	Date
EQA's Signature	Date

NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 003: COMMUNICATION IN NETWORKING

Unit Reference Number: ICT/NCI/003/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
This Unit aims to equip learners with the communication skills necessary to interact effectively with supervisors, team members, and clients, ensuring the smooth execution of network projects through clear reporting, collaboration, and professional conduct.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 003: COMMUNICATION IN NETWORKING

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the importance of communication in network projects	1.1	Explain why clear and effective communication is essential in coordinating tasks within network projects.									
	1.2	Identify potential consequences of poor communication in network installation and maintenance activities.									
	1.3	Recognize the role of communication in ensuring safety, efficiency, and adherence to project specifications.									
LO 2: Communicate effectively with supervisors and team members	2.1	Demonstrate the ability to listen actively and follow verbal and written instructions from supervisors.									
	2.2	Use appropriate technical terminology when discussing project tasks with team members and supervisors.									
	2.3	Provide clear and concise updates on task progress, challenges, or delays to supervisors in a timely manner.									
LO 3: Write clear and accurate reports and documentation	3.1	Draft task reports that accurately reflect the status of networking, including completed tasks and any issues encountered.									
	3.2	Ensure documentation is organized, legible, and free from errors, following standard formats for technical reporting.									
	3.3	Submit reports and documentation on time, as required by the project or supervisor.									
LO 4: Know professional communication with clients or stakeholders	4.1	Demonstrate polite and professional communication skills when interacting with clients or stakeholders on-site.									
	4.2	Explain technical information or project status to clients in clear, non-technical language.									
	4.3	Handle client inquiries or concerns with a positive attitude, escalating issues to supervisors when necessary.									
LO 5: Use digital communication	5.1	Use email, messaging apps, and other digital tools to communicate project updates or instructions.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
tools effectively in networking projects	5.2	Ensure messages sent through digital tools are clear, concise, and professional.									
	5.3	Follow proper protocols for documenting and storing digital communication related to networking projects.									

Learner's Signature	Date
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NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 004: INTRODUCTION TO COMPUTER NETWORKS

Unit Reference Number: ICT/NCI/004/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
This Unit is to equip learners with the knowledge and skills to identify a basic computer network, its types and topological layouts.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Observer Testimony (OT)
4. Assignment (ASS), etc.
5. Usage of network simulation tools

UNIT 004: INTRODUCTION TO COMPUTER NETWORKS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Define Computer Networking Concepts	1.1	Define the term “computer network”									
	1.2	Explain the role of computer networks in business, education, and daily life.									
	1.3	Identify key benefits of networking.									
	1.4	Differentiate between traditional and modern network-based communication methods.									
LO 2: Differentiate Types of Networks	2.1	Define Local Area Network and									
	2.2	Describe the characteristics of Local Area Networks (LAN).									
	2.3	Differentiate between Wide Area Networks (WAN) and Metropolitan Area Networks (MAN).									
	2.4	Explain the purpose of Personal Area Networks (PAN).									
	2.5	Compare various network types based on speed, coverage, and infrastructure requirements.									
LO 3: Understand Networking Models	3.1	Describe the seven layers of the OSI model and their functions.									
	3.2	Explain the four layers of the TCP/IP model.									
	3.3	Describe how data flows between layers in both networking models.									
	3.4	Compare the OSI and TCP/IP models,									
LO 4: Identify Networking Devices	4.1	Discuss the function of a router, switch, and modem.									
	4.2	Explain the role of network interface cards (NIC) in connecting devices to a network.									
	4.3	Identify the differences between hubs, switches, and routers.									
Recognize Network Communication Principles	5.1	Define data transmission									
	5.2	Explain the concept of network packets.									
	5.3	Explain the impact of bandwidth and Throughput on network performance.									
LO 6: Understand Basic Network Topologies	6.1	Define network topology									
	6.2	Explain the importance of network topology in network design.									
	6.3	Discuss the characteristics of star, bus, ring, and mesh topologies.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	6.4	Differentiate network topologies in network design.									
LO 7: Know Role of Internet Protocols	7.1	Define networking protocols									
	7.2	Explain the purpose of networking protocols in communication.									
	7.3	Describe the function of TCP/IP in ensuring reliable data transmission.									
	7.4	Explain the role of HTTP, FTP, and DNS in accessing and transferring data over the internet.									

Learner's Signature	**Date**
Assessor's Signature	**Date**
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NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 005: Computer Networking Components

Unit Reference Number: ICT/NCI/005/L1
NSQ Level: 1
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose:
This Unit aims to equip the learners with the understanding of network components which includes; end devices, intermediary devices and the types of media.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 005: Computer Networking Components

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the concept of end devices	1.1	Explain end devices									
	1.2	List the different types of end devices									
	1.3	Explain the functions of end devices									
LO 2: Understand the concept of Intermediary Devices	2.1	Explain Intermediary devices									
	2.2	List the different types of intermediary devices									
	2.3	Explain the functions of intermediary devices									
LO 3: Understand the concept of network media	3.1	Define network media									
	3.2	List the types of network media (Electrical Cable, Optical Cable & Wireless)									
	3.3	Understand the types of electrical media cable (Coaxial cable, UTP & STP Cable)									
	3.4	Identify the types of wireless electromagnetic media (Bluetooth, Wi-Fi,)									
	3.5	Identify the types of optical media cable (Single Mode and Multimode)									

Learner's Signature	**Date**
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NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 006: Concept of Network Infrastructure and IPv4 Addressing

Unit Reference Number: ICT/NCI/006/L1
NSQ Level: 1
Credit Value: 4
Guided Learning Hours: 40
Unit Purpose:

This Unit aims to equip learners with the knowledge and skills of Network infrastructure design and IPv4 Addressing.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is been carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 006: Concept of Network Infrastructure and IPv4 Addressing

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand network design	1.1	Define Network Design									
	1.2	Identify Importance of network design									
	1.3	Identify network design considerations									
	1.4	Explain network design consideration									
	1.5	Identify network design tools									
LO 2: Understand The Hierarchical Layers (Core, Distribution and Access)	2.1	Define the hierarchical model									
	2.2	Identify network infrastructure at the core layer									
	2.3	Identify network infrastructure at the distribution layer									
	2.4	Identify network infrastructure at the access layer									
LO 3: Understand Basic IPv4 Addressing including the Structure, the Classes (A, B, C, D, E)	3.1	Describe IP Address. and list the two types of IP address.									
	3.2	Describe IPv4 Addressing and differentiateidentify the difference between IPv4 and IPv6									
	3.3	Describe the structure of IPv4 Addressing									
	3.4	List the different classes of IPv4 address									
	3.5	Discuss IPv4 address scheme									
	3.6	Demonstrate IPv4 configuration on an end device)									

Learner's Signature	Date
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EQA's Signature	Date

NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 007: SETUP AND CONFIGURATION OF SOHO (SMALL OFFICE/HOME OFFICE) NETWORK.

Unit Reference Number: ICT/NCI/007/L1
NSQ Level: 1
Credit Value: 3
Guided Learning Hours: 30
Unit Purpose:
The purpose of this Unit is to provide learners with knowledge and skills to setup and configure a Small Office/Home Office basic network.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 007: SET UP AND CONFIGURE A SOHO (SMALL OFFICE/HOME OFFICE) NETWORK.

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Home/Office Network Basics	1.1	Define SOHO									
	1.2	List the components of SOHO									
	1.3	Identify the Technologies used in SOHO									
	1.4	Identify the steps carried out in implementing a SOHO									
LO 2: Understand Setting up a home router	2.1	Define Home Router									
	2.2	List the types of routers used for a home network									
	2.3	List the steps on configuring a DHCP on a home router									
LO 3: Understand connecting end devices in a SOHO	3.1	Identify the steps in connecting wireless devices to a SOHO									
	3.2	Identify the steps in connecting Wired devices to a SOHO									
	3.3	Demonstrate connecting wired devices to a SOHO									

Learner's Signature	**Date**
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NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 008: FUNDAMENTAL OF NETWORK SIMULATION TOOLS

Unit Reference Number: ICT/NCI008/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
The purpose of this Unit is to provide learners with knowledge and skills to use network simulators software to design and troubleshoot SOHO network.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 008: FUNDAMENTALS OF NETWORK SIMULATION TOOLS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand Network Simulator	1.1	Explain a Network Simulator									
	1.2	Download CISCO Packet Tracer Simulator									
	1.3	Install Packet Tracer Simulator									
	1.4	Customize the Packet Tracer									
	1.5	Explore the CISCO packet tracer environment									
	1.6	Use the Self Help and Tutorials of CISCO Packet Tracer									
LO 2: Use Packet Tracer Network	2.1	Define Packet Tracer									
	2.2	Identify CISCO Packet Tracer File Types									
	2.3	Carry out CISCO Packet Tracer Assessments									
	2.4	Identify different components and features in CISCO packet tracer									
LO 3: Build a SOHO Network Using Packet Tracer	3.1	List the different types of network simulators									
	3.2	Identify Network Media in Packet Tracer									
	3.3	Identify End Devices in CISCO packet tracer									
	3.4	Identify Intermediary devices in CISCO packet tracer									
	3.5	Outline the Basic Configuration of end devices in CISCO packet tracer									
	3.5	Outline the Basic configuration of intermediary devices in CISCO packet tracer									
LO 4: Manage Network in CISCO Packet tracer	4.1	Identify Packet Tracer Simulation mode									
	4.2	Examine Packets in SOHO network using cisco packet tracer									
	4.3	Edit and Annotate a Topology using Packet tracer									
	4.4	Monitor Your Network Using a Network Controller									

Learner's Signature	**Date**
Assessor's Signature	**Date**
IQA's Signature	**Date**
EQA's Signature	**Date**

NATIONAL SKILLS QUALIFICATION

LEVEL 1: COMPUTER NETWORKING

Unit 009: BASIC NETWORK TROUBLESHOOTING

Unit Reference Number: ICT/NCI/009/L1
NSQ Level: 1
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose:
The purpose of this Unit is to equip learners with the skills necessary to troubleshoot a SOHO network.

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 009: BASIC NETWORK TROUBLESHOOTING

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Understand Troubleshooting	1.1	Explain Troubleshooting									
	1.2	List the steps in troubleshooting a network									
	1.3	Identify reasons for troubleshooting a network									
	1.4	Identify tools used in troubleshooting a network									
LO 2: Identify Common Network Problems	2.1	Identify common symptoms of network issues.									
	2.2	Differentiate between hardware-related, software-related network problems.									
	2.3	Recognize issues related to incorrect IP settings, such as misconfigured IP addresses or subnet masks.									
	2.4	Identify external factors influencing network performance, such as bandwidth congestion or interference in wireless networks.									
LO 3: Apply Network Troubleshooting Methodology	3.1	Apply the troubleshooting methodology (Identify, Test, Resolve, Verify) to diagnose network issues.									
	3.2	Use logical steps to isolate the problem (e.g., check physical connections, verify configurations, test with different devices).									
	3.3	Document the troubleshooting process and solutions to maintain accurate records of network issues.									
	3.4	Resolve network issues efficiently by implementing practical solutions based on troubleshooting steps.									
LO 4: Use Diagnostic Tools for Network Troubleshooting	4.1	Use the "ping" command to check connectivity and packet loss between devices on the same network or across the internet.									
	4.2	Use "tracert" or "traceroute" to diagnose network routing problems and identify where packets are being delayed or dropped.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	4.3	Use "nslookup" to verify DNS resolution and troubleshoot domain name-related issues.									
	4.4	Use "ipconfig" or "ifconfig" to check IP configuration details.									

Learner's Signature	Date
Assessor's Signature	Date
IQA's Signature	Date
EQA's Signature	Date

NATIONAL SKILLS QUALIFICATION

COMPUTER NETWORKING

LEVEL 2

FEBRUARY, 2025

NATIONAL SKILLS QUALIFICATION

NSQ LEVEL 2- *COMPUTER NETWORKING*

GENERAL INFORMATION

QUALIFICATION PURPOSE

The purpose of this qualification is to equip learners with the technical skills and practical knowledge required to install, configure, maintain, and troubleshoot basic network infrastructures under supervision

QUALIFICATION OBJECTIVES

The learner should be able to: -

i. Install and Configure Network Hardware and Software – Set up and configure network devices such as routers, switches, and network interface cards (NICs) to establish functional network infrastructures.
ii. Perform Structured Cabling and Cable Management – Install and manage network cables, ensuring proper labeling, routing, and organization for optimal network performance.
iii. Configure and Troubleshoot Wired and Wireless Networks – Implement and support wired and wireless network connections while diagnosing common connectivity issues.
iv. Monitor and Maintain Network Performance – Use basic network monitoring tools to identify performance issues and apply preventive maintenance measures.
v. Implement Basic Network Security Measures – Apply security protocols, including password policies, firewalls, and antivirus solutions, to safeguard network resources.
vi. Provide Technical Support and Customer Service – Assist end users with network-related issues and document support requests efficiently.
vii. Follow Industry Standards and Best Practices – Adhere to network safety regulations, IT policies, and manufacturer guidelines while performing network-related tasks.

Mandatory Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 001	ICT/CNT/001/L2	Occupational Health and Safety in Networking	2	20	
Unit 002	ICT/CNT/002/L2	Communication for Networking Professionals	2	20	
Unit 003	ICT/CNT/003/L2	Teamwork and Collaboration in Networking	2	20	
Unit 004	ICT/CNT/004/L2	Network Hardware Installation and Configuration	3	40	
Unit 005	ICT/CNT/005/L2	Structured Cabling and Cable Management	3	30	
Unit 006	ICT/CNT/006/L2	Wired and Wireless Network Configuration	3	30	
Unit 007	ICT/CNT/007/L2	Network Performance Monitoring and Maintenance	3	40	
Unit 008	ICT/CNT/008/L2	Basic Network Security Implementation	3	30	
		TOTAL	12	230	

NOTE:

Mandatory Units

Learners must complete all mandatory units to gain a solid foundation in network support and troubleshooting. These units are designed to provide essential knowledge and practical skills required to perform networking tasks under supervision. The credit hours for mandatory units are non-negotiable and must be fulfilled to obtain the qualification.

Total Credit Hours from Mandatory Units: 210

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 001: OCCUPATIONAL HEALTH AND SAFETY IN NETWORKING

Unit Reference Number: ICT/CNT/001/L2
NSQ Level: 2
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit provides learners with the necessary knowledge and skills to maintain a safe working environment in networking-related tasks*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 001: OCCUPATIONAL HEALTH AND SAFETY IN NETWORKING

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Identify Workplace Hazards and Apply Safety Measures	1.1	Identify common hazards such as electrical risks, tripping hazards, and ergonomic issues in networking environments.									
	1.2	Explain the importance of risk assessment and how to conduct one before performing networking tasks.									
	1.3	Apply appropriate safety measures, including the use of Personal Protective Equipment (PPE), fire safety procedures, and proper handling of cables and tools.									
LO 2: Follow Safe Handling Procedures for Networking Equipment	2.1	Demonstrate proper techniques for handling and installing networking hardware, including routers, switches, and servers.									
	2.2	Follow manufacturer guidelines and safety protocols when performing maintenance on network devices.									
	2.3	Dispose of electronic waste and damaged networking components following environmental and workplace safety regulations.									
LO 3: Respond to Workplace Emergencies and Incidents	3.1	Identify different types of emergencies, such as electrical fires, equipment malfunctions, and other site hazards.									
	3.2	Follow established workplace emergency response procedures, including fire evacuation plans and first-aid protocols.									
	3.3	Report and document workplace safety incidents accurately and communicate them to the relevant personnel.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 002: COMMUNICATION FOR NETWORKING PROFESSIONALS

Unit Reference Number: ICT/CNT/002/L2
NSQ Level: 2
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit equips learners with the necessary communication skills to interact effectively within IT and networking environments.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 002: COMMUNICATION FOR NETWORKING PROFESSIONALS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Demonstrate Effective Communication in Networking Environments	1.1	Use clear and professional language when explaining technical networking concepts to different audiences.									
	1.2	Apply active listening and questioning techniques to understand networking issues and provide appropriate responses.									
	1.3	Communicate technical support and troubleshooting steps effectively to users and colleagues.									
LO 2: Develop and Interpret Technical Documentation	2.1	Read and interpret network diagrams, system logs, and configuration documents accurately.									
	2.2	Create and maintain clear documentation of network configurations, troubleshooting procedures, and incident reports.									
	2.3	Follow industry standards for documenting networking tasks to ensure consistency and clarity.									
LO 3: Utilize Digital Communication Tools for Networking Support	3.1	Use email, chat, and helpdesk ticketing systems to document and track networking issues.									
	3.2	Conduct virtual meetings and remote troubleshooting sessions using appropriate online tools.									
	3.3	Maintain professionalism and clarity when communicating network-related concerns via digital platforms.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 003: TEAMWORK IN NETWORKING

Unit Reference Number: ICT/CNT/003/L2
NSQ Level: 2
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit focuses on the importance of teamwork and collaboration in networking environments*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 003: TEAMWORK IN NETWORKING

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Understand the Role of Teamwork in Networking Environments	1.1	Describe the benefits of teamwork in networking projects, including efficiency, problem-solving, and knowledge sharing.									
	1.2	Identify different roles in a networking team (e.g., network administrator, technician, support specialist) and explain their responsibilities.									
	1.3	Demonstrate an understanding of how collaboration improves network maintenance, security, and troubleshooting.									
LO 2: Apply Effective Communication and Collaboration Techniques in Team Settings	2.1	Use clear and concise communication when working with team members to complete networking tasks.									
	2.2	Participate in team discussions and contribute constructive ideas for network-related problem-solving.									
	2.3	Provide and receive feedback professionally to improve collaboration and efficiency in network operations.									
LO 3: Resolve Conflicts and Contribute to Team Success	3.1	Identify common sources of conflict in IT and networking teams and suggest strategies for resolution.									
	3.2	Demonstrate professionalism and respect when addressing disagreements with team members.									
	3.3	Work towards common goals by supporting teammates, sharing responsibilities, and maintaining a positive work environment.									

Learner's Signature	Date:
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IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUETR NETWORKING*

Unit 004: NETWORK HARDWARE INSTALLATION AND CONFIGURATION

Unit Reference Number: ICT/CNT/004/L2
NSQ Level: 2
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit provides learners with the knowledge skills required to install, configure, and maintain essential network hardware.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 004: NETWORK HARDWARE INSTALLATION AND CONFIGURATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Know Network Hardware for Installation	1.1	Identify key networking components,									
	1.2	Verify hardware compatibility with network specifications									
	1.3	Inspect network hardware for physical damage									
	1.4	Follow safety precautions before handling network devices.									
LO 2: Install Network Devices and Components	2.1	Mount networking hardware, ensuring proper placement and ventilation.									
	2.2	Establish physical connections using appropriate cables, connectors, and ports.									
	2.3	Label network cables for easy identification.									
	2.4	Test hardware connections									
LO 3: Configure Network Hardware for Initial Operation	3.1	Navigate the configuration interfaces of routers, switches, and other network devices.									
	3.2	Configure basic settings such as IP addressing, subnet masks, and default gateways.									
	3.3	Set up VLANs, DHCP, and basic security settings where applicable.									
	3.4	Save and back up initial configuration settings for future reference.									
LO 4: Troubleshoot Network Hardware	4.1	Diagnose common hardware failures, including connectivity issues, power failures, and overheating.									
	4.2	Apply basic troubleshooting techniques, such as checking cable integrity, resetting devices, and updating firmware.									
	4.3	Maintain network hardware by cleaning, inspecting, and replacing faulty components as needed.									
	4.4	Document troubleshooting steps and maintenance activities for future reference.									

Learner's Signature	Date:
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IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 005: STRUCTURED CABLING AND CABLE MANAGEMENT

Unit Reference Number: ICT/CNT/005/L2
NSQ Level: 2
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit provides learners with the knowledge and skills required for the installation, organization, and maintenance of structured cabling systems.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 005: STRUCTURED CABLING AND CABLE MANAGEMENT

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Select Appropriate Network Cables and Connectors	1.1	Identify various types of network cables, including twisted-pair (Cat5e, Cat6, Cat6a), fiber optic, and coaxial cables.									
	1.2	Explain the characteristics of each cable type in different networking environments.									
	1.3	Select the appropriate cables and connectors based on network requirements.									
	1.4	Identify the correct crimping tools, cable testers, and termination accessories.									
LO 2: Terminate Network Cables	2.1	Prepare cables for termination using proper stripping and crimping techniques.									
	2.2	Terminate copper cables using RJ-45 connectors.									
	2.3	Install fiber optic cables using appropriate splicing and termination techniques.									
	2.4	Test terminated cables for continuity, signal strength, and proper connectivity.									
LO 3: Implement Proper Cable Routing and Labeling Techniques	3.1	Implement structured cable routing to minimize interference.									
	3.2	Secure cables using cable trays, conduits, and ties while following safety and industry guidelines.									
	3.3	Label network cables according to a standardized naming convention.									
	3.4	Maintain documentation of cable layouts, patch panel mappings, and connection points.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 006: WIRED AND WIRELESS NETWORK CONFIGURATION

Unit Reference Number: ICT/CNT/006/L2
NSQ Level: 2
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit provides learners with the knowledge and practical skills to configure both wired and wireless networks.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 006: WIRED AND WIRELESS NETWORK CONFIGURATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Configure Wired Network Connections	1.1	Configure network devices such as routers, switches, and hubs for wired networks.									
	1.2	Assign IP addresses (static and dynamic) for wired network devices.									
	1.3	Implement basic VLAN configurations to segment network traffic.									
	1.4	Verify wired network connections using diagnostic tools (e.g., ping, tracer, and cable testers).									
LO 2: Configure Wireless Networks	2.1	Configure wireless routers and access points with appropriate SSID and encryption settings.									
	2.2	Configure wireless security protocols such as WPA2, WPA3, and MAC filtering to enhance security.									
	2.3	Optimize wireless network coverage by adjusting settings.									
	2.4	Monitor wireless network performance using diagnostic tools.									
LO 3: Implement Network Security Measures for Wired and Wireless Networks	3.1	Configure network firewalls.									
	3.2	Enable encryption protocols (e.g., WPA3, TLS) to secure wireless communications.									
	3.3	Implement authentication mechanisms such as RADIUS and 802.1X for secure network access.									
	3.4	Identify common network security threats, including unauthorized access and rogue access points.									
LO 4: Maintain Wired and Wireless Network Performance	4.1	Utilize network monitoring tools (e.g., Wireshark, NetFlow) to analyze traffic and detect anomalies.									
	4.2	Diagnose common wired and wireless network connectivity issues.									
	4.3	Apply firmware and software updates to network devices.									
	4.4	Document network configurations, performance metrics, and troubleshooting steps for future reference.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 007: NETWORK PERFORMANCE MONITORING AND MAINTENANCE

Unit Reference Number: ICT/CNT/007/L2
NSQ Level: 2
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit equips learners with the skills and knowledge required to monitor, analyze, and maintain network performance.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 007: NETWORK PERFORMANCE MONITORING AND MAINTENANCE

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Monitor Network Performance Using Diagnostic Tools	1.1	Identify key network performance indicators such as bandwidth utilization, latency, and packet loss.									
	1.2	Utilize network monitoring tools (e.g., Wireshark, PRTG, SolarWinds) to capture and analyze traffic data.									
	1.3	Interpret network performance reports									
	1.4	Set up notifications for critical network performance thresholds.									
LO 2: Troubleshoot Network Performance Issues	2.1	Identify symptoms of network congestion, bottlenecks, and connectivity issues.									
	2.2	Apply troubleshooting commands (e.g., ping, traceroute, netstat) to diagnose network issues.									
	2.3	Isolate issues related to faulty hardware, misconfigurations, or security breaches.									
LO 3: Implement Preventive Maintenance Strategies for Network Reliability.	3.1	Perform regular hardware inspections.									
	3.2	Perform regular firmware updates.									
	3.3	Implement automated backup and recovery solutions for network configurations.									
	3.4	Conduct scheduled system updates and patches.									
LO 4: Optimize Network Performance Through Configuration Adjustments	4.1	Adjust Quality of Service (QoS) settings to prioritize critical network traffic.									
	4.2	Optimize network bandwidth by managing load balancing and traffic shaping techniques.									
	4.3	Configure network devices to minimize latency and improve data transmission speed.									
	4.4	Monitor and adjust network security settings to balance performance and protection.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 2: *COMPUTER NETWORKING*

Unit 008: BASIC NETWORK SECURITY IMPLEMENTATION

Unit Reference Number: ICT/CNT/008/L2
NSQ Level: 2
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit provide learners with the knowledge and skills of core concepts and practices of network security.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 008: BASIC NETWORK SECURITY IMPLEMENTATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Understand Basic Network Security Concepts	1.1	Define key network security concepts									
	1.2	Identify common types of network security threats									
	1.3	Explain the role of encryption, firewalls, and access control.									
	1.4	Recognize common security vulnerabilities in networking protocols (e.g., TCP/IP, HTTP, DNS).									
LO 2: Implement Network Perimeter Security	2.1	Configure firewalls to filter incoming and outgoing network traffic.									
	2.2	Implement intrusion detection and prevention systems (IDPS).									
	2.3	Configure Virtual Private Networks (VPNs) for secure remote access.									
	2.4	Apply network address translation (NAT) and to enhance security.									
LO 3: Configure Network Access Control	3.1	Set up user authentication methods such as usernames/passwords, two-factor authentication, and biometrics.									
	3.2	Apply Role-Based Access Control (RBAC).									
	3.3	Implement Access Control Lists (ACLs) to restrict network traffic based on IP addresses, subnets, and ports.									
LO 4: Secure Network Communication and Data Transmission	4.1	Implement encryption methods, such as SSL/TLS, to protect sensitive data during transmission.									
	4.2	Configure secure communication protocols such as HTTPS, SSH, and SFTP for secure remote access and file transfer.									
	4.3	Ensure that wireless networks are secured using WPA2/WPA3 encryption standards.									
	4.4	Use Virtual LANs (VLANs) and VPNs to segment network traffic and enhance security.									
LO 5: Monitor and Respond to Security Incidents	5.1	Configure security monitoring tools such as Intrusion Detection Systems (IDS) and event log analyzers.									
	5.2	Recognize security alerts and events, such as unauthorized login attempts or malware activity.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	5.3	Develop incident response protocols to quickly mitigate security breaches.									
	5.4	Document security incidents and responses for future analysis and improvement.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

COMPUTER NETWORKING

LEVEL 3

FEBRUARY, 2025

NATIONAL SKILLS QUALIFICATION

NSQ LEVEL 3- COMPUTER NETWORKING

GENERAL INFORMATION

QUALIFICATION PURPOSE

This qualification is designed to equip learners with advanced skills and knowledge for managing, monitoring, maintaining, and securing complex network infrastructures and protocols.

QUALIFICATION OBJECTIVES

The learner should be able to: -

i. Configure and manage a variety of network devices.
ii. Implement and manage network security measures.
iii. Implement and manage complex networks.
iv. Monitor network performance
v. Configure and manage advanced network services,
vi. Set up IP Addresses.
vii. Manage network administration teams

Mandatory Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 001	ICT/CNT/001/L3	Health and Safety in Network Administration	2	20	
Unit 002	ICT/CNT/002/L3	Communication in Network Administration	2	20	
Unit 003	ICT/CNT/003/L3	Teamwork and in Network Administration	2	20	
Unit 004	ICT/CNT/004/L3	Advanced Network Configuration and Management	4	40	
Unit 005	ICT/CNT/005/L3	Network Security Management	4	40	
Unit 006	ICT/CNT/006/L3	Network Performance Monitoring and Troubleshooting	4	40	
Unit 007	ICT/CNT/007/L3	Advanced Network Services and Management	3	30	
Unit 008	ICT/CNT/008/L3	Advanced IP Addressing and subnetting	4	40	
Unit 009	ICT/CNT/009/L3	IoT Security	4	40	
		TOTAL	29	290	

NOTE:

Mandatory Units

Learners must complete all mandatory units to gain an advanced foundation in network administration. These units are designed to provide the essential knowledge and skills that are critical for independent work in network management, security, optimization, and leadership. The credit hours for mandatory units are non-negotiable and must be fulfilled to obtain the qualification.

Total Credit Hours from Mandatory Units: 290

Optional Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 010	ICT/CNT/010/L3	Leadership in Network Administration	3	30	
Unit 011	ICT/CNT/011/L3	Cloud Security	3	30	
		TOTAL	6	60	

NOTE:
By completing the optional unit, learners will gain the skills needed to lead network teams effectively, manage complex network infrastructure projects, and communicate with both technical and non-technical stakeholders. It also emphasizes the importance of fostering a proactive security culture and making informed decisions to ensure network reliability and efficiency. While optional, this unit provides valuable competencies for individuals looking to advance into managerial positions or drive technical improvements in a network administration role.

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 001: HEALTH AND SAFETY IN NETWORK ADMINISTRATION

Unit Reference Number: ICT/CNT/001/L3
NSQ Level: 3
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit focuses on ensuring that learners apply the health and safety practices essential for safe working environments in network administration.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO) 2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 001: HEALTH AND SAFETY IN NETWORK ADMINISTRATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Implement Health and Safety Standards in Network Administration	1.1	Identify common health and safety risks associated with network administration work environments (e.g., electrical hazards, equipment malfunctions).									
	1.2	Follow safety procedures for handling network devices and components such as routers, switches, and cables.									
	1.3	Ensure compliance with relevant workplace safety standards and regulations in network environments, including OSHA and local laws.									
LO 2: Implement Ergonomics and Safe Work Practices in Network Administration	2.1	Apply ergonomic guidelines to workstation setup (e.g., chair, desk, monitor height) to prevent repetitive strain injuries.									
	2.2	Use proper lifting techniques when handling heavy network equipment or hardware.									
	2.3	Implement regular breaks and posture correction techniques to reduce the risk of physical strain and fatigue during network administration tasks.									
LO 3: Address Cybersecurity Health and Safety Risks	3.1	Identify common cybersecurity threats, including malware, ransomware, and phishing, and implement safeguards to protect network systems.									
	3.2	Follow secure practices for handling sensitive network data and credentials (e.g., using strong passwords, secure encryption methods).									
	3.3	update network devices and software to minimize vulnerabilities that could compromise network security.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 002: COMMUNICATION IN NETWORK ADMINISTRATION

Unit Reference Number: ICT/CNT/002/L3
NSQ Level: 3
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit aims to equip learners with the essential communication skills required to interact effectively within a network administration environment.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 002: COMMUNICATION IN NETWORK ADMINISTRATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Demonstrate Effective Verbal Communication Skills	1.1	Present technical information related to network configurations, issues, and solutions clearly and concisely to non-technical stakeholders.									
	1.2	Use appropriate technical terminology when communicating with colleagues, clients, and other IT professionals.									
	1.3	Respond to queries from team members or users effectively and provide actionable information.									
LO 2: Develop Written Communication Skills for Network Administration	2.1	Prepare detailed network documentation, including diagrams, configurations, and reports, in a clear and organized format.									
	2.2	Write clear and concise emails or reports to communicate network updates, maintenance schedules, and troubleshooting results.									
	2.3	Maintain and update network logs, incident reports, and change management documentation in compliance with organizational standards.									
LO 3: Utilize Digital Communication Tools for Effective Collaboration	3.1	Use project management and communication tools (e.g., Slack, Microsoft Teams, Trello) to collaborate with team members on network projects and tasks.									
	3.2	Use remote communication tools (e.g., video conferencing, screen sharing) to troubleshoot network issues with colleagues or users.									
	3.3	Share network status updates and incident reports through digital platforms to ensure stakeholders are kept informed of ongoing network issues or changes.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 003: TEAMWORK IN NETWORK ADMINISTRATION

Unit Reference Number: ICT/CNT/003/L3
NSQ Level: 3
Credit Value: 2
Guided Learning Hours: 20

Unit Purpose: *This unit focuses on developing learners' ability to work effectively in teams, particularly in the context of network administration.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment, in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 003: TEAMWORK IN NETWORK ADMINISTRATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Collaborate Effectively with Team Members on Network Projects	1.1	participate in team meetings, contributing ideas, solutions, and feedback on network-related tasks or projects.									
	1.2	Share relevant information, network configurations, and troubleshooting steps with team members to ensure tasks are completed effectively.									
	1.3	Collaborate with team members to identify and resolve network issues quickly and efficiently, utilizing team resources and expertise.									
LO 2: Manage Responsibilities in Network Administration	2.1	Assign network administration tasks according to team members' skills and strengths, ensuring optimal team efficiency.									
	2.2	Take responsibility for assigned network administration tasks, ensuring they are completed on time and to the required standard.									
	2.3	Provide guidance and support to team members as needed, ensuring tasks are well-executed and deadlines are met.									
LO 3: Resolve Conflicts and Maintain a Positive Team Dynamic	3.1	Identify potential conflicts within the team and address them in a professional and constructive manner.									
	3.2	Mediate between team members when disagreements arise, ensuring that differing opinions are respected and solutions are found collaboratively.									
	3.3	Foster a positive team environment by encouraging open communication, trust, and mutual respect among team members.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 004: ADVANCED NETWORK CONFIGURATION AND MANAGEMENT

Unit Reference Number: ICT/CNT/004/L3
NSQ Level: 3
Credit Value: 4
Guided Learning Hours: 40

Unit Purpose: *This unit is designed to provide learners with the advanced skills necessary to configure, manage, and optimize complex network infrastructures.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 004: ADVANCED NETWORK CONFIGURATION AND MANAGEMENT

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Configure Routers and Switches	1.1	Manage routers, ensuring the correct setup of IP addressing, routing protocols, and access control lists (ACLs).									
	1.2	Set up network switches, including VLANs, trunking, and port security, to ensure proper network segmentation and security.									
	1.3	Perform troubleshooting and diagnostics on routers and switches to resolve connectivity and configuration issues.									
	1.4	Monitor the performance of routers and switches, adjusting configurations as necessary to maintain optimal network performance.									
LO 2: Manage Routing Protocols	2.1	Configure static and dynamic routing protocols (such as RIP, OSPF, and EIGRP) to enable efficient routing between network segments.									
	2.2	Implement route summarization, redistribution, and policy-based routing to optimize routing table size and efficiency.									
	2.3	Troubleshoot routing issues, ensuring that network traffic flows efficiently between multiple network segments.									
	2.4	Optimize routing performance using network analysis tools to ensure network reliability and minimize downtime.									
LO 3: Configure VLANs (Virtual Local Area Networks)	3.1	Manage VLANs to segment network traffic and improve security and performance.									
	3.2	Set up inter-VLAN routing, ensuring proper communication between different VLANs as required.									
	3.3	Configure trunking protocols, including IEEE 802.1Q, to allow VLAN traffic to pass between switches.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	3.4	Troubleshoot and resolve issues related to VLANs, such as VLAN misconfigurations or communication breakdowns.									
LO 4: Manage Network Firewalls and Security Settings	4.1	Configure network firewalls to filter traffic based on IP addresses, ports, and protocols.									
	4.2	Implement security policies such as Access Control Lists (ACLs), Intrusion Detection Systems (IDS), and VPN configurations to safeguard network infrastructure.									
	4.3	Analyze firewall logs to identify potential security threats or breaches.									
	4.4	Update firewall configurations to adapt to emerging threats and vulnerabilities, ensuring ongoing network security.									
LO 5: Troubleshoot Advanced Network Configurations	5.1	Utilize network analysis tools to identify bottlenecks, performance issues, or misconfigurations within the network.									
	5.2	Perform root cause analysis to identify issues related to routing, switching, VLANs, or firewalls and resolve them efficiently.									
	5.3	Optimize network performance by adjusting configurations based on troubleshooting findings, ensuring that the network is running at its best.									
	5.4	Implement network monitoring systems to proactively detect issues and optimize network configurations to avoid future disruptions.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 005: NETWORK SECURITY MANAGEMENT

Unit Reference Number: ICT/CNT/005/L3
NSQ Level: 3
Credit Value: 4
Guided Learning Hours: 40

Unit Purpose: *This unit provides learners with the skills needed to manage and secure network infrastructures.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 005: NETWORK SECURITY MANAGEMENT

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Implement Network Firewalls for Security	1.1	Configure network firewalls to control inbound and outbound traffic based on security policies.									
	1.2	Implement Access Control Lists ACLs on firewalls to filter traffic based on IP addresses, ports, and protocols.									
	1.3	Monitor firewall logs for potential security breaches or unauthorized access attempts.									
	1.4	Update firewall rules and policies in response to emerging security threats or organizational changes.									
LO 2: Deploy Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS)	2.1	Configure Intrusion Detection SystemsIDS to monitor network traffic for signs of suspicious activity or security breaches.									
	2.2	Set up Intrusion Prevention Systems (IPS) to automatically block malicious traffic and protect network assets.									
	2.3	Review IDS/IPS logs to identify potential vulnerabilities and security threats in the network.									
	2.4	Adjust IDS/IPS configurations to improve detection accuracy and minimize false positives or false negatives.									
LO 3: Manage Virtual Private Networks (VPNs)	3.1	Configure site-to-site and remote access VPNs to enable secure communication between network segments or remote users.									
	3.2	Implement VPN encryption protocols such as IPSec and SSL to ensure secure transmission of data across the network.									
	3.3	Troubleshoot VPN connections to ensure continuous, secure access for remote users.									
	3.4	Update VPN configurations to meet security requirements and ensure compatibility with changing network environments.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 4: Apply Security Policies and Access Control Mechanisms	4.1	Develop access control policies based on user roles, ensuring proper authorization for network resources.									
	4.2	Configure role-based access control (RBAC) or mandatory access control (MAC) to restrict access to sensitive network resources.									
	4.3	Enforce network security policies through network access control systems (e.g., NAC) to manage devices connecting to the network.									
	4.4	Update security policies to adapt to new security challenges, user needs, and organizational changes.									

Learner's Signature	Date:
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EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 006: NETWORK PERFORMANCE MONITORING AND TROUBLESHOOTING

Unit Reference Number: ICT/CNT/006/L3
NSQ Level: 3
Credit Value: 4
Guided Learning Hours: 40

Unit Purpose: *This unit aims to provide learners with the knowledge and skills required to monitor, assess, and troubleshoot network performance effectively.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 006: NETWORK PERFORMANCE MONITORING AND TROUBLESHOOTING

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Utilize Network Monitoring Tools for Performance Assessment	1.1	Use network monitoring software (e.g., SolarWinds, PRTG, Nagios) to collect data on network traffic, bandwidth utilization, and device health.									
	1.2	Analyze monitoring data to identify performance bottlenecks or deviations from normal network performance.									
	1.3	Configure network monitoring tools to send alerts for performance degradation or potential issues in real-time.									
	1.4	Review network performance reports and provide recommendations for improving efficiency and throughput.									
LO 2: Diagnose Network Issues Using Troubleshooting Tools	2.1	Use diagnostic tools such as Ping, Traceroute, and NetFlow to troubleshoot connectivity issues across the network.									
	2.2	Utilize Wireshark or similar packet analysis tools to capture and analyze network traffic for troubleshooting performance or security issues.									
	2.3	Interpret network logs and error messages to pinpoint the root cause of network disruptions or performance issues.									
	2.4	Perform diagnostic tests on network hardware (e.g., routers, switches, firewalls) to identify faulty devices or misconfigurations.									
LO 3: Resolve Network Performance Issues	3.1	Implement techniques to optimize network traffic, including Quality of Service (QoS), load balancing, and bandwidth management.									
	3.2	Address network congestion issues by adjusting configurations, such as rerouting traffic, optimizing routing protocols, or upgrading network components.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
	3.3	Resolve issues with network latency by identifying the source of delays (e.g., hardware failure, routing inefficiencies, or traffic overload).									
	3.4	Implement solutions to address packet loss, jitter, and other network performance anomalies that affect end-user experience.									
LO 4: Perform Root Cause Analysis (RCA) for Network Problems	4.1	Apply systematic troubleshooting methodologies (e.g., OSI model, divide and conquer) to identify the underlying cause of complex network issues.									
	4.2	Utilize logs, diagnostic tools, and performance metrics to analyze patterns and recurring issues within the network infrastructure.									
	4.3	Implement corrective actions based on the root cause analysis to prevent future occurrences of the same problem.									
LO 5: Implement Proactive Network Maintenance and Monitoring Practices	5.1	Set up regular network performance checks, including bandwidth monitoring, device health checks, and traffic analysis.									
	5.2	Implement automated monitoring systems to detect and address network issues before they impact users or services.									
	5.3	Establish a network maintenance schedule that includes routine software updates, hardware checks, and security patches.									

Learner's Signature	Date:
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NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 007: ADVANCED NETWORK SERVICES AND MANAGEMENT

Unit Reference Number: ICT/CNT/007/L3
NSQ Level: 3
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit focuses on equipping learners with advanced skills to manage complex network services, including DNS, DHCP, VPNs, and QoS.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 007: ADVANCED NETWORK SERVICES MANAGEMENT

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Configure Domain Name System (DNS) Services	1.1	Configure primary and secondary DNS servers to support name resolution for the network.									
	1.2	Implement DNS zone types (e.g., forward lookup, reverse lookup) and configure records (A, MX, CNAME, etc.) to meet organizational needs.									
	1.3	Monitor DNS server performance and troubleshoot name resolution issues.									
	1.4	Secure DNS servers by configuring Domain Name System Security Extensions (DNSSEC) to prevent cache poisoning and ensure data integrity.									
LO 2: Configure Dynamic Host Configuration Protocol (DHCP) Services	2.1	Configure DHCP servers to assign IP addresses, default gateways, DNS servers, and other network settings to devices within a specified range.									
	2.2	Configure DHCP scopes, subnets, and reservations to ensure efficient IP address allocation.									
	2.3	Monitor DHCP server activity and address issues such as address conflicts or lease expiration.									
	2.4	Implement DHCP failover and high availability configurations to prevent service interruptions in case of DHCP server failures.									
LO 3: Manage Virtual Private Network (VPN) Services	3.1	Configure site-to-site and remote access VPNs using protocols such as IPSec, SSL, and L2TP to enable secure communication.									
	3.2	Set up authentication methods for VPNs, including certificate-based, pre-shared keys, and multi-factor authentication.									
	3.3	Monitor VPN connections to ensure security and performance, and resolve connection issues as they arise.									
	3.4	Implement VPN encryption and tunnelling protocols to protect data transmission and prevent unauthorized access.									
LO 4:	4.1	Configure QoS policies on network devices (routers, switches) to prioritize									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
Manage Quality of Service (QoS) for Network Traffic Optimization		traffic based on application requirements, such as VoIP, video, and business-critical apps.									
	4.2	Implement traffic shaping, bandwidth management, and congestion control mechanisms to optimize network performance.									
	4.3	Monitor QoS metrics and adjust policies to maintain high performance during periods of network congestion.									
	4.4	Troubleshoot QoS issues, such as latency, jitter, and packet loss, and optimize network performance to meet Service Level Agreements (SLAs).									
LO 5: Manage Service-Level Agreements (SLAs) for Network Services	5.1	Document SLAs for network services, including uptime, response time, and performance expectations for DNS, DHCP, VPN, and other critical services.									
	5.2	Implement monitoring systems to track SLA compliance and network service performance.									
	5.3	Report on SLA performance, identifying areas of improvement and making necessary adjustments to meet service goals.									
	5.4	Address SLA violations by investigating root causes, implementing corrective measures, and communicating resolutions to stakeholders.									

Learner's Signature	Date:
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LEVEL 3: *COMPUTER NETWORKING*

Unit 008: Advanced IP Addressing and subnetting

Unit Reference Number: ICT/CNT/008/L3
NSQ Level: 3
Credit Value: 4
Guided Learning Hours: 40

Unit Purpose: *This unit is designed to equip learners to master IPv4 and IPv6 addressing, perform subnetting, utilize VLSM and CIDR, and apply advanced IP concepts to design and optimize networks effectively.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.
5. Hands-on Subnetting and IP Address Allocation Labs
6. Final Capstone Project: Designing a Network with Advanced Subnetting Techniques

(This depends on the Trade Areas to be assessed)

UNIT 008: Advanced IP Addressing and subnetting

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Review IP Addressing	1.1	Identify the Structure of IPv4 Addresses									
	1.2	Explain the IPv4 Address Classes (A, B, C, D, E)									
	1.3	Define Private IP Addresses									
	1.4	Define Public IP Addresses									
	1.5	Identify the similarities between Private vs. Public IP Addresses									
	1.6	Identify the difference between Private vs. Public IP Addresses									
	1.7	Define Reserved IP Ranges									
	1.8	Define Special Use Cases									
	1.9	Identify types of Reserved IP Ranges									
	2.0	Identify types of Reserved IP Ranges Special Use Cases									
LO 2: Understand Fundamentals of Subnetting	2.1	Define Subnetting									
		Identify the Importance of Subnetting									
	2.2	Explain Subnet Masks									
	2.3	Calculate Network and Host Portion									
	2.4	Identify Network Address, Broadcast Address, and IP Ranges									
LO 3: Understand Advanced Subnetting Concepts	3.1	ExplainFixed-Length Subnetting (FLSM)									
	3.2	Describe Subnetting with Class A, B, and C Networks									
	3.3	Identify Usable Subnets and Hosts per Subnet									
	3.4	Carryout efficient IP Address Allocation									
LO: 4 Understand Variable Length Subnet Masking (VLSM)	4.1	Explain the concept of VLSM									
	4.2	Identify the Benefits of Using VLSM in Network Design									
	4.3	Implement VLSM Step-by-Step									
	4.4	Demonstrate Real-World VLSM Design Scenarios									
LO: 5 Understand Classless Inter-Domain Routing (CIDR)	5.1	Identify the Benefits of CIDR									
	5.2	Explain CIDR Notation (/8, /16, /24, etc.)									
	5.3	Explain CIDR Address Aggregation									
	5.4	Configure Route Summarization Using CIDR									
	5.5	Practice CIDR Usage in Network Design									
LO: 6	6.1	Explain the concept of IPv6 and Its Advantages									

Understand IPv6 Addressing and Subnetting	6.2	Outline the Structure of IPv6 Addresses									
	6.3	Identify IPv6 Address Types (Global Unicast, Link-Local, Multicast, etc.)									
	6.4	Identify IPv6 Subnetting and Prefix Lengths									
	6.5	Desribe IPv6 Address Allocation and Hierarchical Design									
LO:7 Understand Network Address Translation (NAT)	7.1	Explain NAT									
	7.2	Discuss the importance of NAT									
	7.3	Explain Static NAT, Dynamic NAT, and Port Address Translation (PAT)									
	7.4	Configure NAT and Use Cases									
LO: 8 Optimize Networks with Subnetting	8.1	Explain best practices for Subnetting in Enterprise Networks									
	8.2	Carryout Network Segmentation and Security Through Subnetting									
	8.3	Subnet Design for Scalability and Performance									
	8.4	Demonstrate Subnetting a Complex Enterprise Network									

Learner's Signature	**Date:**
Assessor's Signature	**Date:**
IQA's Signature	**Date:**
EQA's Signature	**Date:**

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 009: ICT Security

Unit Reference Number: ICT/CNT/009/L3
NSQ Level: 3
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit is designed to provide learners' with knowledge and skills of Iot network security*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.
5. Security Simulations

(This depends on the Trade Areas to be assessed)

UNIT 009: Understand IoT Security

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand IoT and Security	1.1	Explain the concept of IoT									
	1.2	Identify IoT Components and Ecosystem									
	1.3	List the Importance of IoT Security									
	1.4	Identify IoT Security Challenges and Trends									
LO 2: Understand IoT Threats and Vulnerabilities	2.1	Identify Common IoT Vulnerabilities									
	2.2	IoT Attack Vectors (Physical, Network, Application)									
	2.3	Identify Privacy Concerns in IoT									
LO 3: Understand IoT Security Frameworks and Standards	3.1	Explain the Overview of IoT Security Standards (NIST, IoTSF)									
	3.2	Identify IoT Security Guidelines from ENISA									
	3.3	Identify Regulatory and Compliance Requirements									
	3.4	Explain Industry Best Practices for IoT Security									
LO 4: Secure IoT Devices	4.1	Describe Secure Boot and Firmware Updates									
	4.2	Explain Hardware Root of Trust									
	4.3	Explain Device Tamper Detection									
	4.4	Explain Secure IoT Edge Devices									
	4.5	Describe Anti-Tampering and Secure Storage									
LO 5: Know Authentication and Access Control in IoT Mitigation Strategies	5.1	Configure Authentication Mechanisms for IoT Devices									
	5.2	Carry out Multi-Factor Authentication (MFA)									
	5.3	Explain Role-Based Access Control (RBAC)									
	5.4	Explain Identity and Access Management (IAM)									
	5.5	Identify Secure IoT APIs and Gateways									
LO 6: Data Protection and Encryption	6.1	Explain Data Security in Transit and at Rest									
	6.2	Outline the difference of Symmetric vs. Asymmetric Encryption									
	6.3	Explain TLS/SSL and Secure Communication Protocols									
	6.4	Identify Public Key Infrastructure (PKI) for IoT									

	6.5	Carryout Data Integrity and Secure Key Management									
LO 7: Know IoT Network Security	7.1	Carryout IoT Network Segmentation									
	7.2	Describe Firewalls and Intrusion Prevention Systems (IPS)									
	7.3	Explain Virtual Private Networks (VPNs) for IoT									
	7.4	Explain IoT Gateway Security									
	7.5	Explain Network Monitoring and Anomaly Detection									
LO 8: Know IoT Threat Detection and Incident Response	8.1	Decribe IoT Threat Monitoring and Detection									
	8.2	Carryout Anomaly Detection and Behavioural Analytics									
	8.3	Carryout IoT Forensics and Incident Investigation									
	8.4	Carryout Secure Logging and Auditing									
	8.5	Develop an Incident Response Plan									

Learner's Signature	Date:
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EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 010: LEADERSHIP IN NETWORK ADMINISTRATION

Unit Reference Number: ICT/CNT/010/L3
NSQ Level: 3
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit is designed to develop leadership skills specific to network administration roles, enabling learners to lead teams, manage projects, and make strategic decisions in complex network environments.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 010: LEADERSHIP IN NETWORK ADMINISTRATION

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Demonstrate Effective Leadership Skills in Network Administration	1.1	Set clear objectives and performance expectations for the network administration team, aligning with organizational goals.									
	1.2	Motivate and guide team members to meet deadlines, troubleshoot complex network issues, and ensure the reliability of network services.									
	1.3	Provide constructive feedback to team members and foster a culture of continuous improvement and professional development.									
	1.4	Lead by example in maintaining professionalism, technical expertise, and a positive work environment.									
LO 2: Manage Network Projects	2.1	Develop project plans for network upgrades, installations, or troubleshooting, clearly outlining timelines, resources, and deliverables.									
	2.2	Allocate resources effectively, including team members, tools, and budget, to meet project objectives.									
	2.3	Ensure project milestones are met on time by monitoring progress and addressing any roadblocks or delays.									
LO 3: Manage Network Security and Risk Mitigation Strategies	3.1	Lead the development and implementation of network security policies and protocols to protect the network from external and internal threats.									
	3.2	Coordinate security audits and risk assessments to identify vulnerabilities and plan mitigation strategies.									
	3.3	Foster a proactive security culture within the network administration team, ensuring that security is embedded in all aspects of network design and maintenance.									
LO 4: Make Strategic Decisions to Improve Network	4.1	Analyze network performance data and identify areas for improvement in speed, bandwidth, and overall efficiency.									

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
Performance and Efficiency	4.2	Implement network optimizations (e.g., hardware upgrades, routing adjustments, load balancing) to enhance performance and user experience.									
	4.3	Evaluate emerging technologies and trends in network administration, advising the organization on their potential benefits or risks.									
	4.4	Develop cost-effective strategies for network expansion, upgrades, and maintenance while considering the organization's growth and resource allocation.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *COMPUTER NETWORKING*

Unit 011: Cloud Security

Unit Reference Number: ICT/CNT/011/L3
NSQ Level: 3
Credit Value: 3
Guided Learning Hours: 30

Unit Purpose: *This unit is designed to enable learners with the knowledge and skills of cloud architectures, mitigate security risks, implement IAM, secure cloud networks and data, and manage compliance and incident response in cloud environments.*

Unit assessment requirements/ evidence requirements:
Assessment must be carried out in real workplace environment in which learning and human development is carried out.
Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

(This depends on the Trade Areas to be assessed)

UNIT 011: Cloud Security

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand Cloud Security	1.1	Define Cloud Computing									
	1.2	Explain Cloud Deployment Models (Public, Private, Hybrid, Community)									
	1.3	Explain Cloud Service Models (IaaS, PaaS, SaaS)									
	1.4	Identify Cloud Security Challenges and Threat Landscape									
	1.5	Identify Benefits of Securing Cloud Environments									
LO 2: Know Cloud Security Architecture and Design	2.1	Explain Cloud Security Reference Architecture									
	2.2	Describe Shared Responsibility Model									
	2.3	Identify Cloud-native Security Features									
	2.4	Identify Security Considerations for Multi-cloud and Hybrid Cloud									
	2.5	Design Secure Cloud Applications									
LO 3: Know Identity and Access Management (IAM) in Cloud	3.1	Identify IAM Basics and Importance									
	3.2	Explain Role-Based Access Control (RBAC) and Attribute-Based Access Control (ABAC)									
	3.3	Carryout Multi-Factor Authentication (MFA)									
	3.4	Manage Cloud Identity Providers									
	3.5	Describe Least Privilege Access and Zero Trust Architecture									
LO 4: Know Data Protection and Encryption in Cloud	4.1	Explain Data Security in Transit and at Rest									
	4.2	Explain Encryption Techniques (Symmetric and Asymmetric)									
	4.3	Explain Cloud Key Management Services (KMS)									
	4.4	Describe Data Loss Prevention (DLP) Solutions									
	4.5	Implement Backup and Disaster Recovery Strategies									
LO 5: Know Cloud Network Security	5.1	Explain Cloud Network Segmentation and Micro-Segmentation									
	5.2	Explain Virtual Private Cloud (VPC) Security									
	5.3	Explain Cloud Firewalls and Intrusion Detection Systems (IDS)									
	5.4	Secure APIs and Cloud Gateways									

	5.5	Explain VPN and Secure Access Service Edge (SASE)									
LO 6: Know Application Security in Cloud	6.1	Secure Software Development Lifecycle (SDLC) in Cloud									
	6.2	Explain Protecting Web Applications (WAF, DDoS Mitigation)									
	6.3	Carryout Secure Container and Kubernetes Deployments									
	6.4	Explain Serverless Security Considerations									
	6.5	Explain Cloud-native Application Protection Platforms (CNAPPs)									
LO 7: Know Compliance and Governance in Cloud	7.1	Explain Cloud Compliance Frameworks (ISO 27001, NIST, PCI-DSS)									
	7.2	Explain Data Sovereignty and Privacy Regulations (GDPR, CCPA)									
	7.3	Carry out Auditing and Monitoring Cloud Environments									
	7.4	Implement Cloud Governance Policies and Enforcement									
	7.5	Carryout Continuous Compliance and Reporting									
LO 8: Know Threat Detection and Incident Response in Cloud	8.1	Identify Cloud-native Threat Detection Tools									
	8.2	Identify Security Information and Event Management (SIEM) for Cloud									
	8.3	Outline Incident Response Planning for Cloud									
	8.4	Outline Forensics and Investigation in Cloud Environments									
	8.5	Develop a Cloud Incident Response Plan									
LO 9: Know Advanced Cloud Security Concepts	9.1	Explain Zero Trust Architecture for Cloud									
	9.2	Secure Access for Remote Workforces									
	9.3	Explain the role of AI and Machine Learning in Cloud Security									
	9.4	Explain Quantum-safe Cloud Security									
	9.5	Explain Future Trends in Cloud Security.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

National Skills Qualifications

FOR

COMPUTER NETWORKING

LEVEL 1, 2 & 3

Plot B, Bida Road, PMB 2239,Kaduna
ideasworldbankproject@nbte.gov.ng
Tel: +234 (0) 802 4728 042