QUALIFICATION SPECIFICATION SECTION A							
QUALIFICATION DEVELOPER		Botho University					
TITLE	Certificate IV in Computer Hardware Maintenance and Networking				**NCQF LEVEL**		4
FIELD	Information Communication Technology			**SUB-FIELD**		Information Technology	
New qualification	**X**		Review of existing qualification				
SUB-FRAMEWORK	General Education		**TVET**	**X**	Higher Education		
QUALIFICATION TYPE	**Certificate**	**X**	Diploma		Bachelor		
	Bachelor Honours		Master		Doctor		
CREDIT VALUE					**60**		
RATIONALE AND PURPOSE OF THE QUALIFICATION							

Rationale:

Now is the age of networking with more and more people gravitating towards usage of electronic devices like computers, tablets, laptops, smartphones, and so on. The importance on understanding computer hardware, its proper maintenance and the basics of computer networking plays a vital role. Networking domain, begin a vital part in the digital transformation, is holding a major role in helping us to move around using our own digital equipment's in our day to day operations especially with more Organisations enabling BYOD infrastructure.

According to HRDC Priority skills (Current & Future), which was published in March 2019, the occupations such as System Administrators, Computer Network Professionals, and ICT Security Managers with extensive skill sets on Computer Systems and Servers, Troubleshooting the Networking/ System Devices, Digital Technology Skills etc. are needed for the country.

In accordance with the Botswana National Development Plan 11 research and innovation remain critical factors in ensuring and sustaining national competitive advantage, economic growth and diversification with the main aim of achieving an efficiency-driven economy. Hardware's and its maintenance (ICT) have been mentioned as an area that can support innovative ways of solving business and industrial problems to enhance business processes through deployment of locally developed applications.

The Government of Botswana developed a National Information and Communications Technology (ICT) Policy dubbed Maitlamo Policy (2004) that was in line with other government initiatives and assist in

achieving Vision 2036which envisioned that the National ICT Policy would position Botswana for sustained growth in the digital age by serving as a key catalyst in achieving social, economic, political and cultural transformation within Botswana. The proposed qualification will enhance the development of secure, efficient and legal systems guided by the Maitlamo policy.

'Botswana Vision 2036' (HIRDC, 2017) entails emphasis on information communication technologies, financial and business and transport among others. On ICT more emphasis is on ICT being an enabler for efficient service delivery across all sectors' (HIRDC, 2017:16). Priority skills in each occupation have been identified and these include both the core skills and soft skills (HRDC, 2019).

So, this qualification is developed keeping in mind the learners who cannot go straight into the networking and hardware specializations instead, they can use this qualification as a bridging course to meet the needs of the country. Hardware professionals deal with installation and troubleshooting majority of physical components in the digital environment. All these components are integral to the computer industry. Companies need hardware professionals to look after the device installations, cable installations and being a part of technical help desks to ensure that computers work with a higher degree of efficiency. Networking is also important because it allows computer professionals to share files and vital information across different computer systems instantaneously. It explains the vast array of opportunities available to Computer hardware maintenance and networking professionals.

Purpose:

The purpose of this certification is to produce Computer Hardware Technicians for the IT industry (Pillar 1, Sustainable Economic Development, Vision 2036). This certificate is designed for individuals interested in acquiring basic technical skills and knowledge to maintain and repair personal computers and basics of networking. This certification helps the students to prepare for a networking career beginning from understanding what a network is and how networks operate, by learning the functions of a network, its architecture and structure. Students gain skills in identifying the peripherals, understanding its working procedure, upgrading or replacing the peripherals if required, installing Operating Systems, configuring and managing personal computers, building and configuring a simple network, configure and troubleshoot common internet applications, internet protocol services and sharing computers.

ENTRY REQUIREMENTS (including access and inclusion)

Entry into this qualification is through any one of the following requirements:

● Applicants must have obtained at least NCQF Level 3, Certificate III (or equivalent) including a pass in English Language and Mathematics.

● Applicants that do not meet the above criteria but possess relevant industry experience will be considered through recognition of prior learning (RPL) policy which is aligned to the BQA national RPL policy.

QUALIFICATION SPECIFICATION	
	SECTION B
GRADUATE PROFILE (LEARNING OUTCOMES) **At the end of this qualification, learner will be able to:**	**ASSESSMENT CRITERIA**
1. Troubleshoot components of PC's and Laptop computers	1.1 Identify and fix the nuts and bolts of the Desktop and Laptop Computers 1.2 Identify, install and configure the components of motherboard in Desktop Computers 1.3 Identify various types of display devices and their properties 1.4 Install and Configure the basic functionality of display devices 1.5 Identify available connection ports in PC 1.6 Identify, install and configure RAM types and their features 1.7 Demonstrate installation of a LCD monitor 1.8 Configure different video settings
2. Distinguish common network components.	2.1 Define the common terms, topologies used in computer networking. 2.2 List and identify the categories of networks. 2.3 Demonstrate the difference between logical and physical network topologies. 2.4 Identify the common cable types, connectors, wiring standards and other devices. 2.5 Create physical network topologies and locate/ place the networking devices in the correct tiers of the network 2.6 Describe appropriate network segmentation based on the scenario provided.
3. Configure Operating Systems for PC's and Laptop Computers to ensure proper operation. (GUI's & TUI's)	3.1 Define Operating System and its operations 3.2 Install and Configure Operating Systems (Windows and Linux OS) 3.3 Organize Desktops, Files and Icons, Tools and settings, Files and Folders.

	3.4 Configure and Troubleshoot Printers and Settings in Windows and Linux Operating Systems
4. Demonstrate the concept of OSI Model and TCP/IP Protocol Suite and configure the computer to a network.	4.1 Describe the OSI Model and its functions at various layers 4.2 Explain the features, protocols of different layers in OSI Model 4.3 Describe the TCP/IP protocol suite and its functions at four layers 4.4 Explain the features, protocols of different TCP/IP layers 4.5 Explain TCP/IP in relation to OSI Model 4.6 Identify and differentiate IP address classes and properties. 4.7 Configure IPv4 and IPv6 Addresses and Default Gateway.
5. Implement Networking of Computers for Small Scale Networks	5.1 Define and classify the network architecture. 5.2 Calculate the IP Addressing scheme. 5.3 Configure the IP Address in the network. 5.4 Describe the Operations, functions and need of DHCP, DNS and SMTP Servers.
6. Assemble PC's and Laptop Computers, and relevant software applications.	6.1 Identify Hardware devices and assemble the devices to working condition. 6.2 Install Software's and licenses. 6.3 Configure Start up settings.
7. Develop pertinent host, network and software security policies to ensure secured IT service operation.	7.1 Install and Configure Antivirus to protect data and devices. 7.2 Configure devices enabling Health and green IT.

QUALIFICATION STRUCTURE			
			SECTION C
FUNDAMENTAL COMPONENT	**Title**	**Level**	**Credits**
Subjects / Units / Modules /Courses	Essentials of Computers	4	10
CORE COMPONENT			
Subjects / Units / Modules /Courses	Desktop Hardware and Troubleshooting	4	10
	Protocols and Internetworking Standards	5	20
	Professional Practice	4	20
ELECTIVE COMPONENT	N/A		
Subjects / Units / Modules /Courses			

Rules of combinations, Credit distribution (where applicable):

The credit combination for this qualification is 60 credits: Level 4: 40 Credits & Level 5: 20 Credits

Credit distribution

Level and Credits	Compulsory	Elective
Level 4 Credits	40	
Level 5 Credits	20	
Minimum credits total:	60	

ASSESSMENT / MODERATION ARRANGEMENTS

This qualification is assessed and moderated as follows:

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the qualification. Both formative and summative assessment processes are monitored during the qualification and to determine competence at the end of the qualification.

Learners are continuously assessed through:

- Practical test
- Class assignments
- Presentations
- Informal class tests

- Formal modular tests
- Group Activities.

Pass requirements:

A learner passes a module if he/she obtains a final mark of 50% or more in the module. Learners will qualify if he/she obtains a final mark from the following components, 40% is from Continuous Assessment and 60 % from End Assessment. The final mark for the qualification is calculated by averaging the marks obtained in the various modules.

Continuous Assessment	Class Assignments, Presentations, Informal Class Tests, Group Activities.	40%
End Assessment	Practical Tests and Written Tests	60%

Moderation:

Moderation of assessments focuses on:
a) Ensuring the assessment is aligned to the module objectives and the learning outcomes.
b) Ensuring assessment is consistent on all levels within the institution and does not show any bias or academic disregard and that it is immune to all forms of prejudice.
c) Ensuring the level of assessment appropriately matches to students' level of study. This ensures that the assessments remain viable, relevant and provide an accurate judgement of a student's achievements and level of knowledge.
d) Maintaining consistency in the marking process

Pre-assessment Moderation:

This moderation is carried before assessment tasks are given to students. All submitted sets of question papers &marking keys are shared with the moderators. Each assessment pack should be moderated by two Moderators where possible. The question paper moderation report should be filled in for each question paper. Moderator report will be shared with question paper setter so that moderator feedback will be taken into account when finalizing the question paper.

Post-assessment moderation or moderation of marking:

Moderation of completed assessment tasks is categorized as post-assessment moderation. It is carried out after assessment tasks have been marked. The set of answer scripts and marking keys are shared with the moderators. At least 10% of the answer scripts in a module should be moderated during post assessment moderation.

Both internal and external moderation will be done in-line with the Moderation policy of the Institution.

RECOGNITION OF PRIOR LEARNING (if applicable)

A clear framework through which students can accumulate learning credits and transfer such credits toward appropriate qualifications helps to validate and recognize learning gained through formal and informal means, provides flexibility to students, and allows students to progress relatively seamlessly through their lifelong learning journey.

Candidates may apply for recognition of prior learning whether such learning has been gained through formal study, through workplace learning, or through any other formal or informal means. Any candidate applying for recognition of prior learning (RPL) or Credit Accumulation and Transfer (CAT) will be expected to provide evidence of such learning that must be relevant, sufficient, valid, verifiable, and authentic. In addition, the candidate may be interviewed by a member of staff or have to take a formal test, which may include a live demonstration of skills and competencies, to assess competence.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathway:
A Certificate IV provides for articulation with and progression to a Certificate V.

Vertical Pathway: A Certificate IV provides for articulation with and progression to a Certificate V. Students can progress to the following qualifications:
- Certificate V Advanced Computer Hardware Maintenance and Networking;
- Certificate V Cyber Security Essentials

Horizontal Pathway:
- Certificate IV Database Administration; Certificate IV Interactive multimedia;
- Certificate IV Cyber Security Basics

Employment Pathway:
After completion of this qualification the learners will be competent enough to find employment in both public and private sector as technician in the IT industry and can be self-employed to do computer assembling, sales and support in related fields. Some of the job opportunities for the graduates are the following;

- Computer Technical support
- PC repair technician
- Help Desk Technician or Computer Technician
- Hardware maintenance and troubleshooting technician
- Network maintenance & support
- Network Administrator

QUALIFICATION AWARD AND CERTIFICATION

The learner will be awarded 'Level 4 Certificate in Computer Hardware Maintenance and Networking, after attaining 60 credit value as specified in the rules of combination and credit distribution.

REGIONAL AND INTERNATIONAL COMPARABILITY

The qualification has been benchmarked with three similar qualifications from different institutions: However, there are no qualifications similar to the proposed which is delivered in this region.

Parameters	This qualification	Durban Computer College, South Africa	Central Carolina Community College, Carolina, United States	Damelin Correspondence College, Johannesburg, SA
Qualification Name	Certificate in Computer Hardware Maintenance and Networking	Certificate in PC Support	Computer Hardware / Troubleshooting Repair Certificate	Certificate in Technical Support(PC)
Duration	6 Months	12 Months	12 Months	18 Months
Delivery Mode	Classroom	Classroom	Classroom	Distance
Total Credits	60	120	15	-
Modules/Courses	Essential of Computers Desktop Hardware and Troubleshooting Protocols and Internetworking Standards Professional Practice	Hardware Networking Programming Operating Systems Server Technologies End User Computing	Introduction to computers Hardware / software support Advanced Hardware / software support Networking concepts Operating system concepts Windows Single user	Communication Mathematical Literacy Computer Application PC Technologies Windows 10 Enterprise Desktop Support Configuring Windows 10 Network Technologies
Learning Outcomes	Troubleshoot components of PC's and Laptop computers Distinguish common	• Hardware Fundamentals • Operating System Fundamentals	• Networking terminology and protocols, local and wide area networks, and network standards	● Communicate Effectively in a Technical Support Environment ● Mathematical Literacy

| | network components. Configure Operating Systems for PC's and Laptop Computers to ensure proper operation. (GUI's & TUI's) Demonstrate the concept of OSI Model and TCP/IP Protocol Suite and configure the computer to a network. Implement Networking of Computers for Small Scale Networks Assemble PC's and Laptop Computers, and relevant software applications. Develop pertinent host, network and software security policies to ensure secured IT service operation. | ● Network and Security Fundamentals
● Safety and Operational Procedures
● Support Display Devices
● Installing and Configuring Peripheral Components
● Managing System Components
● Managing Data Storage
● Installing and Configuring Microsoft Windows
● Optimizing and Maintaining Microsoft Windows
● Working with Other Operating Systems
● Customized Client Environments
● Networking Technologies
● Installing and Configuring Networking Capabilities
● Supporting Mobile Digital Devices
● Supporting Printers and Multifunction Devices
● Security Threats, Vulnerabilities and Controls | ● Securing information systems and the various implementation policies.
● Component identification, memory-system, peripheral installation and configuration, preventive maintenance, hardware diagnostics/repair, installation and optimization of system software, commercial programs, system configuration, and device-drivers
● File and memory management, system configuration/ optimization, and utilities, single-user environment | ● Computer Technology Principles and Support

● Data Communications and Networking Support | |

		• Implementing Security Controls • Troubleshooting System-wide Issues		
Target Populations	Candidates who wish to learn computer hardware assembling, maintenance and trouble shooting. And individuals seeking entry point qualification for further studies in the field of computer networking.	Individuals who want to pursue careers in computers.	Individuals will for employment in business, industry, and government organizations as technicians, helpdesk technicians, or any generalist computer technician.	The programme is designed to equip learners to enter any PC business environment in a vital supporting or training role. The strength of the qualification is the depth in which the software packages are covered: Their application in business, features and functions, installations, support issues and general user problems.

The proposed qualification covers most of the core areas that are covered in other qualifications. In addition, it covers in-depth of PC assembling and troubleshooting and networking concepts with a practical exercise.

It gives more hands-on experience and covers mostly required topics at par with the industry requirements.

REVIEW PERIOD

5 Years

Other information – please add any supplementary information to help the application for this qualification for NCQF Registration.

N/A