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SECTION A: QUALIFICATION DETAILS														
QUALIFICATION DEVELOPER (S)			GABORONE UNIVERSITY COLLEGE OF LAW AND PROFESSIONAL STUDIES											
TITLE	Certificate V in Borehole Maintenance										NCQF LEVEL	5		
FIELD	Manufacturing, Engineering and Technology			Sub-Field	Certificate V in Borehole Maintenance					CREDIT VALUE	130			
New Qualification					✓		Review of Existing Qualification							
SUB-FRAMEWORK						TVET			✓		Higher Education			
QUALIFICATION TYPE	Certificate	I	II	III	IV	V	✓	Diploma		Bachelor				
	Bachelor Honours			Post Graduate Certificate					Post Graduate Diploma					
	Masters					Doctorate/ PhD								
RATIONALE AND PURPOSE OF THE QUALIFICATION														
<p>RATIONALE:</p> <p>Quite a number of national policies and strategies have for years pointed out to the need to improve the quality of and expand Technical and Vocational Education and Training (TVET) in Botswana. These include the: Revised National Policy on Education (1994), which called for “provision of more practical and work-related subjects and support for cross curriculum approach”; National Policy on Vocational Education and Training (NaPVET) of 1997, which stated among other things that “involve stakeholders in the provision of vocational education and training through joint responsibility for planning, designing, monitoring, financing and implementing programme, providing quality resources”.</p>														


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The Human Resource Development Council (HRDC) is the main authority in Botswana for determining priority skills needed by the economy for now and for the future. They do this in close collaboration with respective industries, both public and private sector, and there is no better authority than this to guide qualifications and programmes development to address needs of the economy. In their (HRDC) December 2016 document titled “Top Occupations in High Demand” and their subsequent March 2019 document titled “Priority Skills (Current and Future)” it is clear that mechanical engineering is an occupation in high demand and will continue to be required for the foreseeable future, or at least up to the year 2028. Some of the identified top occupations in demand include Engineering Professionals with specific skills areas under Mechanical Engineering Technicians and Artisans. They identified Mechanics falling under Top 20 Occupations and covering specializations such as Heavy Plant Mechanic and borehole mechanics, Hydraulics Mechanic, Diesel Mechanic and Auto Electricians, intended soft skill are Management, Teamwork, Supervisory, Health & Safety and Environment. Botswana has a huge challenge in terms of water sources. The boreholes water source plays a vital role to supplement tap water in their country. However, failure to maintain these boreholes is a major blow to this initiative. The National Development Plan 11 (NDP 1)¹ aims to expand the water sources in Botswana, including exploitation of underground water sources. Hence this qualification is a huge step towards enhancing the sustainability of the borehole water in Botswana, by providing competently trained and skilled human resources to service borehole equipments.

Furthermore, the Education and Training Sector Strategy Plan (ETSSP) 2015 – 2020 clearly indicated the need for expanding access and equity in Technical and Vocational Education and Training (TVET) for purposes of developing skills needed for diversification of the economy.

The proposed qualification possesses the professional, interpersonal and personal management skills necessary for a career in Automotive Maintenance and workshop management. The qualification develops the graduates to have awareness of their civic responsibilities and their role in sustaining and preserving the environment, as well as managing natural resources. The qualification is intended to train highly skilled technicians, knowledgeable in the implementation, management of automotive repair workshops.

The Vision 2036 aspires to increase the availability of safe water sources in Botswana. This initiative implies the critical role of borehole water in the country. This qualification complements this initiative by ensuring that

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there are qualified persons who can maintain the available boreholes in Botswana. More so this qualification introduces learners to the basics and fundamentals of water mining in Botswana. Hence this qualification is tailored to meet practical and theoretical needs of mechanical engineering in Botswana.

Additionally, the needs assessment survey conducted indicated a critical need for this qualification to sustain the borehole water facilities. The stakeholders have great interest on the aims of the qualification to solve the current articulated challenges of lack sustainability of borehole water sources in Botswana. Also the stakeholders appraise the qualification structure for its key foundations to other higher level mechanical engineering qualifications.

PURPOSE:


The purpose of this qualification is to produce skilled and self-reliant artisans that can

- execute and coordinate borehole maintenance work on site everywhere in Botswana and under any climatic condition prevalent in Botswana.
- competently and confidently undertake tasks pertinent to a geological technician in field of water mining and exploration
- apply appropriate skills in relation to the maintenance of boreholes.
- contribute to the water mining geological discipline by effectively adhering to quality and occupational safety requirements. This qualification will
- identify and delineate potential sources of water and maintenance of borehole water sources.


ENTRY REQUIREMENTS (including access and inclusion)

- NCQF Level 4 Certificate IV with at least 3 passes or equivalent
OR
- Applicants may also be admitted into this qualification based on Recognition of Prior Learning (RPL) and Credit Accumulation Transfer (CAT) in accordance with National RPL Policy and institutional RPL policy. Applicants may therefore be admitted accordingly as outlined in the institution's RPL and CAT policies.

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SECTION B		QUALIFICATION SPECIFICATION	
GRADUATE PROFILE (LEARNING OUTCOMES)		ASSESSMENT CRITERIA	
1. Apply broad skills and knowledge on the use of computers and communication skills		1.1 Use different word processing techniques to communicate with stakeholders 1.2 Draw up spread sheets commands to deduce formulas and other mathematical techniques for records and data storage and use 1.3 Store, retrieve and use and maintain a personal computer's database and storage facilities.	
2. Apply mathematical calculations in borehole management		2.1 Measure and prepare materials list and quantities needed for a borehole maintenance job. 2.2 Record borehole daily water output or performance to determine sustainable consumption 2.3 Calculate and manage daily running costs of a borehole	
3. Monitor key borehole performance indicators		3.1 Collect and record current borehole data accurately 3.2 Observe health and safety procedures at all times according to the Health and Safety Act requirements	
4. Install and maintain a borehole		4.1 Fit plastic and still casing into a bore to prevent collapsing of soft soil into the borehole 4.2 Reticulate water pipes for a borehole 4.3. Conduct different methods of fitting a borehole. 4.3 Identify and evaluate maintenance requirements for a borehole.	

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	4.4 Diagnose, dismantle, service and assemble borehole pumping equipment
5. Provide sound technical advice to all stakeholders and implement supervisory management skills	<p>5.1 Liaise with various agencies and individuals, including local authorities, government agencies, clients, residents, suppliers, technical experts, and consultants</p> <p>5.2 Use project management skills to resolve technical conflicts in borehole fitting and operation.</p> <p>5.3 Organize coordination meetings for borehole project work.</p>
6. Setup business/practice rather than looking for employment and have the basic principles of setting up and running a business	<p>6.1 Prepare a business proposal for a borehole operation.</p> <p>6.2 Source funding for establishing a borehole maintenance business.</p> <p>6.3 Conduct different types of borehole maintenance.</p> <p>6.4 Manage a borehole maintenance company.</p>

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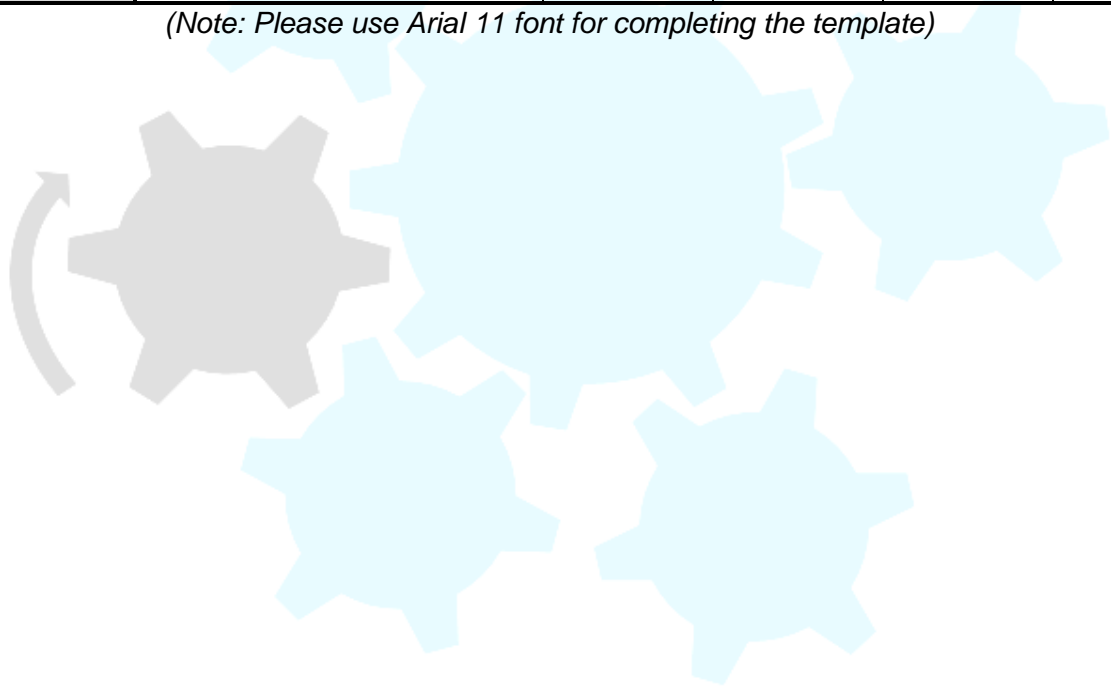
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SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total (Per Subject/ Course/ Module/ Units)
		Level [4]	Level [5]	Level [6]	
FUNDAMENTAL COMPONENT <i>Subjects/ Courses/ Modules/Units</i>	Introduction to Information Technology	10			10
	Basic Applied Mathematics	10			10
	Entrepreneurial Skills	10			10
CORE COMPONENT <i>Subjects/Courses/ Modules/Units</i>	Introduction to Boreholes		10		10
	Borehole Design		15		15
	Borehole Operation		15		15
	Borehole Installation and Maintenance		15		15
	Borehole Systems			15	15
	Environmental Health and Safety		10		10
	Practical Attachment (Experiential Training)		20		25

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ELECTIVE/ OPTIONAL COMPONENT <i>Subjects/Courses/ Modules/Units</i>					


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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL		
TOTAL CREDITS PER NCQF LEVEL		
NCQF Level	Credit Value	
4	30	
5	85	
6	15	
TOTAL CREDITS	130	
Rules of Combination:		
(Please Indicate combinations for the different constituent components of the qualification)		
Fundamental Components:	Level 4	30 Credits
Core Components:	Level 5	85 Credits
	Level 6	15 credits
Elective components:	None	
Total Credits:	<u>130 Credits</u>	

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ASSESSMENT ARRANGEMENTS

All assessments leading to the awarding of this qualification will be based on learning outcomes associated with the following assessment criteria:

Formative Assessment

The weighting of formative assessment is 40% of the final assessment mark for the qualification.

Summative Assessment

The weighting of summative assessment is 60% of the final mark

MODERATION ARRANGEMENTS

All assessment tools shall undergo internal and external moderation. The internal and external moderation shall be conducted as ETP policies which must be aligned with the National policies. Assessment and moderation shall be conducted by BQA registered assessors and moderators.

RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning (RPL) will be applied to all applicants in accordance with National RPL guidelines or policy.

CREDIT ACCUMULATION AND TRANSFER

Credit Accumulation and Transfer (CATS) will be applied to all in line with National CAT guidelines or policy.


PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathway

The graduates of this qualification can academically progress into the following qualifications;

Vertical Progression

- Diploma in Borehole Maintenance
- Diploma in General Maintenance
- Diploma in Motor vehicle Mechanics.

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Horizontal Progression

- Certificate in Motor Vehicle Mechanics
- Certificate in Mechanical Engineering

Employment Pathways

Graduates of this qualification will find employment in various sectors of the economy for positions of;

- Borehole Mechanic
- Borehole Business Owner
- Borehole Operator

QUALIFICATION AWARD AND CERTIFICATION

Learners who successfully earn a stipulated minimum of **130** credits will be awarded a **Certificate V in Borehole Maintenance**. No part certification will be conferred to learners who do not meet the minimum credit requirements for this qualification. This qualification does not have exit awards.

REGIONAL AND INTERNATIONAL COMPARABILITY


It has not been possible to identify any institutions that offer a qualification that can be useful for benchmarking the proposed Certificate V in Borehole Maintenance qualification. However, there are a couple of institutions that offer relevant and fairly comparable short courses. Below is a comparison of these short courses with this proposed qualification.

Newcastle University (UK)

Title: Borehole Design, Construction and Operation

Core content:

- Background to groundwater investigation and development, sustainable yield.
- Types of boreholes and their uses, appropriate technology water supply wells, boreholes for sampling and monitoring.
- Borehole site location selection.
- Drilling methods.
- Borehole investigations, wireline geophysics, lithological analysis and sampling of cuttings.

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- Well design principles and practice, open holes, casing, screens, gravel packs.
- Drilling processes, cementing, centralisers, verticality of wells.
- Optimal design.
- Aquifer and well development.
- Pump selection for different purposes.
- Test pumping for sustainable yield / deployable output, aquifer properties (step and constant rate tests).
- Well maintenance and rehabilitation.
- Well design and operation for monitoring and water quality sampling.

Global Water Initiative and Sahel (Consulting West Africa)
Title: Community monitoring of borehole construction

Core content:

- Social aspects of implementation
- Practical implementation
- Drilling and lining the well
- Pump installation
- Constructing the superstructure

Watsan Training and Development Center (Kenya)

Title: Borehole Design, Construction and Operation

Core content:

- An introduction to a variety of types of boreholes and wells, their use, design, and operation
- A practical introduction to the main methods of drilling and borehole investigation techniques used to assess aquifer and well properties in the context of developing successful water supply boreholes
- An introduction to methods of optimising borehole design, including selection of appropriate technology and types of pumps, well and aquifer development, test pumping
- An awareness of the need for long term maintenance and rehabilitation of water supply boreholes, and details of appropriate methods

Avalon Sciences Limited (UK)

Title: Down hole Maintenance Course

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Core content:

- Introduction to your down hole system (Geochain/Slim/EHP)
- Down hole System Routine Maintenance
- Down hole System Major Maintenance
- Acquisition Software for Testing Purpose
- Ancillary Tool Maintenance including. Gamma, X-Over & TCU

Conclusively, this qualification compares favourably well with the short courses as indicated above.

REVIEW PERIOD

This qualification will be reviewed after 5 years

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