BQA NCQF QUALIFICATION TEMPLATE-6dec2023

SECTION A:	QUALIFICATION DETAILS
QUALIFICATION DEVELOPER (S)	Department of Teacher Training and Technical Education

TITLE	Diploma in Communication and Electronics Engineering			**NCQF LEVEL**	6
STRANDS (where applicable)	1. 2.N/A 3. 4.				
FIELD	Manufacturing, Engineering and Technology	**SUB-FIELD**	Engineering and Engineering Trades	**CREDIT VALUE**	364

New Qualification		✓										*Legacy Qualification*					
SUB-FRAMEWORK	*General Education*						*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

RATIONALE:

Communication & Electronics has been identified as one of the occupations in high demand in Botswana and beyond .The occupations or the skills are needed by the telecommunication, consumer electronics, power, mining, radio and television engineering sectors respectively. This is based on the Labour Market Analysis conducted by the HRDC.

The qualification Diploma in Communication & Electronics Engineering is developed as a response to the need established by Human Resource Development Council Report (HRDC 2019) for the Top

Occupations in Demand, which identified Communication & Electronics Technicians as one of the occupations in high demand in Botswana.

In addition, the qualification has been developed in line with Botswana Government's Vision 2036 which acknowledges Technical and Vocational Education Training (TVET) as one of the key contributors to economic growth and employment creation (page 17) and NDP11 (page 71) The Vision further emphasizes implementation of curriculum which is aligned to the needs of the economy, business, science, mathematics and technology (page 20).

Furthermore the qualification provides a broad coverage to address the needs of the industry, learners, employers and entrepreneurs. It provides learners with relevant skills to competitively and effectively function as Communication and Electronics Engineering technicians. The qualification will enable the graduates to work and/ or further their studies in the fields of Telecommunication engineering, Electrical, Electronics, Instrumentation and Mechatronics Engineering.
It has always been believed that vocational education more especially in Botswana context is for the illiterate or those who did not perform well at both basic and secondary school but thus not the case. Technical Vocational Education and Training is for people who are more into hands on practical skills rather academic or aiming for a blue collar job.

The qualification is another way of establishing a positive image for improved perception of the TVET sector. It increases enrollment and at the same time addressing the alignment of TVET programmes in Institutions and will create demand for qualified, productive and competitive human resources as stated in Education Training Strategic & Sector Plan (ETSSP) Pg 98.

The skills acquired by Communication and Electronics Engineering Technicians will help to transform Botswana from resource based economy to Research Based economy (vision 2036) by use of science, technology and innovation to propel the socio- economy to high levels of efficiency.

Also the Continental Education Strategy for Africa 2016 – 2025 stipulate that there is a need to expand TVET opportunities at both secondary and tertiary level.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to produce graduates with advanced knowledge, skills and competences to:

1. Install, program, maintain and repair telecommunication and electronic equipment and related systems.

2. Performs tests on electronics, and communication equipment; interprets readings and outputs of equipment; ensures proper functioning of equipment.
3. Reads and interprets wiring diagrams, drawings, and specifications related to installations or repair work.
4. Provide technical support and service in the Communication and Electronics engineering field.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)
The minimum entry requirement for this qualification is as follows: • Certificate IV, NCQF Level 4(General Education or TVET Intermediate Certificate) • Applicants who do not meet minimum entry will be absorbed through RPL and CAT according to the ETP's policies aligned to BQA RPL and CAT policies

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1 Diagnose and rectify faults in analogue and digital circuits and components in communication and electronic systems.	1.1 assemble, test, and troubleshoot analogue electronic circuits consisting of passive and active electronic components. 1.2 assemble, test and troubleshoot digital electronic circuits consisting of passive and active electronic components. 1.3Apply circuit simulation software in analogue and digital circuit analysis. 1.4 Design and develop Printed Circuit Board (PCB) for analogue and digital circuits
2 Carryout electrical and electronics installations, maintenance and commissioning according to applicable procedures and standards	2.1 Employ skills to handle and use tools and testing equipment safely in electronic installations, equipment maintenance and commissioning

	2.2 Interpret and analyse measurements of electrical and electronic quantities using graphs and charts 2.3 Prepare and interpret engineering drawings and circuits for electronics installations, maintenance and commissioning. 2.4 Employ the skill to work with engineering application software in circuit analysis. 2.5 Implement and monitor environmentally friendly and energy efficient practices and standards for a sustainable environment. 2.6 Apply electronics and electrical principles to solve engineering problems. 2.7 Install electrical and electronic equipment according to the set standards
3 Test, diagnose and repair electronic communication systems.	3.1 Analyse engineering principles used in communication and electronic equipment and systems. 3.2 Apply skills to implement, test and troubleshoot analogue electronic communication systems according to the set standards. 3.3 Apply skills to implement, test and troubleshoot digital electronic communication systems according to the set standards 3.4 Interface peripherals devices with the microprocessor through programming 3.5 Analyse the characteristics of networks, transmission lines and antennas used in an electronic communication system 3.6 Explore the operation of modern telephone exchange

4 Analyse advanced communication systems	4.1 Apply the principles of wireless, mobile and fibre optics in an advanced communication systems 4.2 Explore microwave radar and satellite principles in advanced communication system 4.3 Apply data communication principles in a Local Area Network 4.4 Carry out installation, testing and maintenance of consumer electronic equipment and system
5 Execute engineering skills in measurement and instrumentation to carry out experiments	5.1 Employ the skill to analyse types of sensor and transducers used in electronic instrumentation 5.2 Apply the knowledge and skill to use electronic measuring instruments as per the se standards 5.3 Use bridge circuits for electronic measurement purposes according to the set standards
6 Apply safety, health and environmental measures in the workplace	6.1 Adhere to safety, health and environmental policies in the workplace 6.2 Adhere to safety, health and environmental regulations in the workplace to minimise risks and accidents 6.3 Administer first aid according to the required standards 6.4 Comply to safety, health and environmental reporting procedures for injuries and accidents in the workplace

7 Execute professional skills (soft) applicable in Communication and Electronics engineering	7.1 Communicate effectively and efficiently in Communication and Electronics discipline 7.2 Apply practical entrepreneurship skills in a business setup for Communication and Electronics discipline 7.3 Execute administrative duties within Communication and Electronics discipline 7.4 Perform research in Communication & Electronics engineering discipline as per the set standards 7.5 Apply code of ethics for engineers in the work environment 7.6 Employ ICT skills in communication and electronics engineering to execute the assigned tasks communication and Electronics field
8 Employ engineering mathematics skills to analyse circuits and systems in Communication and Electronics engineering	8.1 Perform calculations in order to solve problems within Communication and Electronics discipline field 8.2 Apply mathematical concepts and principles in field of Communication and Electronics discipline engineering 8.3 Perform calculations on Communication and Electronics discipline engineering systems

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SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [ ]	Level [5]	Level [6]	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	Occupational Health & Safety		*6*		***6***
	Electrical Engineering Drawing		*10*		***10***
	Introduction to Computing		*8*		***8***
	Entrepreneurship		*8*		***8***
	Communication Skills		*8*		***8***
	Engineering Ethics			*8*	***8***
	Introduction to Research Methods			*8*	***8***
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Engineering Mathematics		*18*	*18*	***36***
	Electrical Workshop Practice		*14*		***14***
	Electrical Engineering		*24*		***24***
	Electronics		*14*	*14*	***28***
	Measurement and Instrumentation		*12*		***12***
	Electronics Workshop Practice			*12*	***12***

	Networks Transmission lines & Antennas			*12*	***12***
	Principles of Communication Systems			*12*	***12***
	Digital communication and Telephony			*10*	***10***
	Microprocessor Based System			*12*	***12***
	Advanced Communication systems			*11*	***11***
	Consumer Electronic Equipment			*11*	***11***
	C++ Programming			*12*	***12***
	Data Communication and Networks			*12*	***12***
	Integrated Research Project			*30*	***30***
	Work Placement			*60*	***60***
STRANDS/ SPECIALIZATION	*Subjects/ Courses/ Modules/Units*	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [ ]	***Level [ ]***	***Level [ ]***	
1.					

2.					
Electives	***N/A***				

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	*Credit Value*
Level 5	***122***
Level 6	***242***
TOTAL CREDITS	***364***

Rules of Combination:

(Please Indicate combinations for the different constituent components of the qualification)

Fundamentals NCQF 5= 40
Fundamental NCQF 6 = 16

Core NCQF 5 = 81
Core NCQF 6=227

Total Credits 364

The candidate has to pass all core modules and fundamentals modules.

N.B. There are no electives for this qualification

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ASSESSMENT ARRANGEMENTS

Documentation

All necessary documents including: qualification document, alignment matrices, assessment instruments and Assessment criteria/rubrics should be available.

Formative (60%)

The contribution of formative assessment to the final grading shall be 60%

Summative Assessment (40%)

The contribution of summative assessment to the final grade shall be 40%

Assessment shall be carried out by BQA registered and accredited Assessors

MODERATION ARRANGEMENTS

Internal and external moderators to be engaged will be BQA accredited subject specialists in relevant fields with relevant industry experience and academic qualification.

RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning (RPL) will be considered for the award of the credits according to applicable RPL policies

CREDIT ACCUMULATION AND TRANSFER

Credit Accumulation and Transfer will be considered for the award of the credits according to applicable RPL policies

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

LEARNING PATHWAYS

Horizontal Articulation

- Diploma in Electrical & Electronics Engineering
- Diploma in Engineering Technology in Electronic Engineering
- Diploma in Telecommunication Engineering
- Diploma in Telecommunication and Information Technology

Vertical Articulation

- Bachelor of engineering in Communications & Electronics Engineering

- Bachelor of engineering in Electrical & Electronics Engineering
- Bachelor of engineering in Instrumentation Engineering

Employment Pathways

- Electronics Technician
- Supervisor
- Service Technician
- Senior Sales Manager

QUALIFICATION AWARD AND CERTIFICATION

Qualification Award

- Candidate meeting the required minimum of 364 credits will be awarded Diploma in Communication and Electronics Engineering in accordance with the qualification composition rules and applicable policies.

Certification

- There will be certification upon awarding of Diploma in Communication and Electronics Engineering qualification.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

Title of Qualifications

They have similar qualification tittles: The qualification tittle for TAFE South Australia is Diploma of Electronics and Communication Engineering and Uganda Institute of Information and Communications Technology (UICT) is Diploma in Electronics Communication Engineering whereas the proposed qualification is Diploma in Communication and Electronics Engineering.

Duration and Level

The duration of the qualification by TAFE South Australia is between 1-2 years, whereas for UICT is 2 years and the proposed qualification is 3 years. The proposed qualification has two entry levels which are for the holders of NCQF Level 4 qualification (BGCSE entry level is year 1) and NQF Level 5 qualification (Certificate V entry level at year two). TAFE South Australia entry level is for graduates of NQF level 5(who have first year/ Certificate V) whereas UICT qualification entry duration is for candidates with NQF Level 4(A Level students). The proposed qualification shares some of the competencies for second and third year with TAFE South Australia qualification, and shares all first and second year the competencies with UICT. Though Australian Qualification Framework ends at

level 12, Uganda National Qualification Framework at level 9 and for proposed qualification ends at NCQF level 10, the content and depth is equivalent.

Main Exit outcomes

The benchmarked qualifications and the proposed qualification have similar competencies such as installation, operation and maintenance of communication equipment, concepts and principles of communication, Apply Occupational Health and Safety regulations, codes and practices in the workplace, Design electronic printed circuit boards and others.

Modules

Some of the modules for the benchmarked are the same as the proposed qualification and examples include (for UICT) Engineering Project(Integrated Research Project- Proposed), Mobile Communication(Digital Communication and Telephony-proposed), Communication Skills and Engineering mathematics. Some of the similar modules with TAFE South Australia are Microprocessor(Microprocessor Based System- proposed), Data Communication and Networking, Cellular and Mobile Communication(Digital Communication and Telephony-proposed, Electronics and Engineering Mathematics)

Assessment strategies and Weightings

The proposed qualifications do have formative and summative assessments as well as the benchmarked.

Qualification rules and minimum Standards for the award of the qualification

The proposed qualification and the benchmarked have stated that the candidate has to certify all the set minimum standards (such as all the modules should be passed) of the qualification in order to be awarded a diploma.

Comparability and Articulation

- The students of the proposed qualification can articulate horizontally (NQF Level 6) or transfer to institutions offering the proposed qualification since benchmarked qualifications are similar. Horizontal articulation qualifications include: Diploma in Control and Instrumentation Engineering, Diploma in Electrical and Electronics Engineering, Diploma in Telecommunication

Engineering, Diploma in Telecommunication Engineering and Information Technology and Diploma in Engineering Technology in Electronic Engineering. .

- Students can articulate vertically to NQF Level 7(Bachelor's Degree) since the benchmarked qualifications offers qualification of Bachelor's Degree in Electronics and Communication Engineering. Vertical articulation qualifications also include: Bachelor's Degree in Telecommunication Engineering, Bachelor's Degree in Electronics Communication Engineering.

The graduates of the proposed qualification can be employed as Electronic Engineering Technical Officer, Engineering Associate, Communication Technician Technical Officer and Electronic Systems Technician. Fields of employment include mining, defence, communication, information and technology, power, telecom, utilities, transport and others.

In conclusion, this qualification is similar with the qualifications compared with.

REVIEW PERIOD

The qualification will be reviewed every five (5) years or as and when required depending on the changing needs of the market**.**

For Official Use Only:

CODE (ID)			
REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	
REVISION DATE:		**NAME OF PROFESSIONAL BODIES/REGULATORY**	