BOTSWANA Qualifications Authority	**BQA NCQF QUALIFICATION TEMPLATE**

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<tr><td>TITLE</td><td colspan="5">Certificate IV in Electrical Installation and Maintenance</td><td colspan="4">NCQF LEVEL</td><td colspan="2">4</td></tr>
<tr><td>STRANDS (where applicable)</td><td colspan="11">NA</td></tr>
<tr><td>FIELD</td><td colspan="5">MANUFACTURING, ENGINEERING AND TECHNOLOGY</td><td colspan="4">CREDIT VALUE</td><td colspan="2">117</td></tr>
<tr><td>SUB FIELD</td><td colspan="11">ENGINEERING AND ENGINEERING TRADES</td></tr>
<tr><td>New Qualification</td><td>✓</td><td>Legacy Qualification</td><td></td><td colspan="6">Renewal Qualification</td><td colspan="2"></td></tr>
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<tr><td>SUB-FRAMEWORK</td><td colspan="2">General Education</td><td></td><td>TVET</td><td>✓</td><td colspan="4">Higher Education</td><td colspan="2"></td></tr>
<tr><td>QUALIFICATION TYPE</td><td>Certificate</td><td>I</td><td></td><td>II</td><td></td><td>III</td><td></td><td>IV</td><td>✓</td><td>V</td><td></td></tr>
<tr><td></td><td>Diploma</td><td></td><td>Bachelor</td><td></td><td colspan="7"></td></tr>
<tr><td></td><td colspan="2">Bachelor Honours</td><td></td><td colspan="2">Post Graduate Certificate</td><td></td><td colspan="3">Post Graduate Diploma</td><td colspan="2"></td></tr>
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<tr><td colspan="12">RATIONALE AND PURPOSE OF THE QUALIFICATION</td></tr>
<tr><td colspan="12">RATIONALE:
The Botswana Education and Training Sector Strategic Plan (ETSSP 2015-2020) marks a significant milestone in our collective efforts as a nation to bring about a more diversified, knowledge-based economy. Through a planned and careful development of human capital, the ETSSP seeks to refocus education and training on fulfillment of social and economic aspirations identified in our Revised National Policy on Education (RNPE) 2004, the National Development Plan 11, Vision 2036 and as well as the Millennium Development Goals. In particular, the ETSSP is intended to strengthen the match between qualifications and labour market requirements, thereby ensuring that education and</td></tr>
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training outputs are more closely aligned to socio economic development needs of the country. In line with this strategic goal, the (HRDC 2016) report on top occupations in demand has identified Electrician Technician as one of the priority skills for the Engineering and Manufacturing Sector hence development of this level of assistant electrician/ semi-skilled artisan

PURPOSE: (itemise exit level outcomes)

The purpose of the qualification to produce learners with broad knowledge of practical concepts and processes to perform a range of functions under minimum supervision;

1. Perform mathematical calculations on electrical principle to solve engineering problems.
2. Apply fault find techniques in power system in line with IEEE regulation.
3. Test electrical and electronic systems to ensure compatibility.
4. Install and maintain lighting systems and accessories to required standards.
5. Apply practical entrepreneurial concepts, essential entrepreneurial qualities and current support structures for successful entrepreneurial undertakings.
6. Use ICT for information retrieval and processing as well as communication and collaboration with others.
7. Apply effective fundamental and problem solving skills while performing assigned duties/tasks according to the set industry standards in an actual work environment.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

Minimum entry requirement for this qualification is a:

- Certificate III, NCQF LEVEL 3 (TVET/GE) or equivalent
- There will be provision for RPL and CAT for entry according to the national RPL and CAT policy.

(Note: Please use Arial 11 font for completing the template)

SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1. Use mathematical concepts to solve engineering problems	1.1 Perform units conversion to find final values in circuit construction in accordance with recommended standards 1.2 Apply basic electrical laws for direct current electric circuits' calculation. 1.3 Carry out calculations to find charge, energy and power in electrical circuits. 1.4 Apply voltages and current rules in an electric circuit.
2. Demonstrate knowledge of electrical supply network.	2.1 Illustrate drawings of a generation power stations 2.2 Identify components of transmission which include circuit drawings, voltage ratings and transformers 2.3 Interlink electrical distribution system 2.4 Install line of protection for electrical system from consumers point of to the appliances 2.5 Connect earthing systems to electrical installations in adherence to safety measures
3. Test electrical and electronic systems to ensure compatibility	3.1 Select the correct instrument for the measurement of given physical properties in line with the job specification. 3.2 Identify types of appliance to be maintained 3.3 Carry out all the necessary tests to identify faults in appliance 3.4 Repair and maintain electrical appliance 3.5 Record, compare and confirm measurements results in line with standard specifications.
4. Install and Maintain lighting systems and their accessories to required standards	4.1 Draw and interpret different electrical lighting circuits 4.2 Select appropriate lighting systems according to specified room size, type of luminaire, no. of luminaires and wattage in line with job requirements. 4.3 Install the luminaires in accordance with standard specifications 4.4 Carry out all the necessary tests to identify faults lighting circuits 4.5 Repair and maintain lighting systems

	4.6 Confirm measurements and accuracy in line with job requirements and standard specifications.
5. Apply Information and Communication Technology for efficient information retrieval, processing as well as communication and collaboration in the context of the electrical installation and maintenance industry.	5.1 Read and analyse data from a prepared database. 5.2 Enter and manipulate data using ICT tools. 5.3 Display data electronically through charts. 5.4 Manipulate and present information through the selection of appropriate spreadsheet tools
6. Understand and apply broad practical entrepreneurial concepts, essential entrepreneurial qualities and current policies/support structures for entrepreneurial success in Botswana.	6.1 Examine broad entrepreneurial concepts and contemporary issues that have an impact on present day entrepreneurial success. 6.2 Conduct a self-assessment in line with identifying necessary qualities for successful entrepreneurship 6.3 Identify business opportunities in a field of interest and select appropriate investment strategies to adopt, considering the associated risks. 6.4 Compile documents required for an entrepreneur to establish a company and take advantage of available support structures.
7. Apply effective fundamental and problem solving skills while performing assigned duties/tasks according to the set industry standards in an actual work environment.	7.1 Communicate and negotiate with stakeholders to initiate an industrious work based learning experience 7.2 Perform assigned vocation related tasks to the required standards 7.3 Apply effective fundamental (core) skills throughout the duration of the work based learning program. 7.4 Adhere to health and safety requirements at all times 7.5 Demonstrate problem solving skills as and when problems are encountered during the work process 7.6 Contribute effectively to team work initiatives within the work environment 7.7 Evaluate the work based learning experience, to determine its benefits and or limitations

SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [III]	Level [IV]	Level [V]	
FUNDAMENTAL COMPONENT Subjects/ Courses/ Modules/Units	Entrepreneurship		***2***		**2**
	Information and Communication Technology		***2***		**2**
CORE COMPONENT Subjects/Courses/ Modules/Units	Engineering Mathematics		12		12
	Generation and electrical systems		22		22
	Illumination		15		15
	Measurements and Appliance		32		32
	Industrial Attachment		32		32
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level			Total Credits
		Level [ ]	Level [ ]	Level [ ]	
1.					
2.					
Electives					

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	**Credit Value**
4	**117**
TOTAL CREDITS	**117**

Rules of Combination:

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

Candidates are required to achieve a minimum of 117 credits inclusive of 4 credits for fundamentals and 113 credits for core.

Candidates are also required to complete the required period of industrial attachment or work experience and submit associated portfolio of evidence as per stipulated exit outcomes and associated assessment criteria to be eligible for the award of the qualification.

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ASSESSMENT ARRANGEMENTS

The weightings for the assessment will be as follows:

a) Formative assessment

The weighting of formative assessment is 60% of the final assessment mark.

b) Summative Assessment

The weighting of summative assessment is 40% of the final assessment mark.

MODERATION ARRANGEMENTS

Internal and external moderators perform assessments of the qualification. Both internal and external assessors are done in-line with the national assessment policy. Anyone assessing a learner against this qualification must be registered as an assessor from any relevant regulatory body

RECOGNITION OF PRIOR LEARNING

There shall be provision for award of the qualification through Recognition of Prior Learning (RPL) in accordance with institutional policies in line with the national RPL policy.

CREDIT ACCUMULATION AND TRANSFER

Credits Accumulated and Transfer will be administered in line with the national and institutional policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

LEARNING PATHWAYS

Horizontal Articulation

Graduates of this qualification may consider pursuing related qualifications in the following:

Horizontal Articulation (related qualifications of similar level that graduates may consider)

- Certificate IV in Solar Photovoltaic
- Certificate IV in Instrumentation
- Certificate IV in Electronics

Vertical Articulation (qualifications to which the holder may progress to)

- Certificate V in Control and Instrumentation
- Certificate V in Solar Photovoltaic
- Certificate V in Electrical Installation and Maintenance

EMPLOYMENT PATHWAYS

- Assistant Instrumentation Technician
- Assistant Photovoltaic Technician
- Electrical Artisan

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

A candidate is required to achieve the stipulated total of 117 credits inclusive of the 4credits for fundamental 113 credits for core units to be awarded the Certificate IV in Electrical Installation and Maintenance

Certification

Candidates meeting prescribed requirements will be awarded Certificate in addition to transcript.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

1. Title:

   The title for the developed qualification and those benchmarked against are all Certificate in Electrical Installation and Maintenance qualification hence they have similarities.

2. Level

   The developed qualification is at level 4, whereas the benchmarked ones are both at level 3, it indicates that the two benchmarked are similar but different compared to the developed qualification. The reason for comparing the developed qualification which is at level 4 with those benchmarked at level 3; is that the modules and the scope were similar, level 4 modules and scope for the benchmarked were more complex and similar to NCQF level 5 qualification.

3. Credits:

   The credits for all the qualifications are within the same range, the developed qualification has 117 credits, and benchmarked ones are SAQA Certificate 3 in Electrical, Credits 133 and NZQA National Certificate 3 Electrician, Credits 120. The developed qualification credits are within the range compared to the benchmarked ones, therefore developed qualification meets the regionally and internationally standards.

4. Main Exit Outcomes:

   All the qualifications are similar as they all impart knowledge, skills and competence in electrical and electronics concepts, use of measuring and testing instruments.

5. Domains/Modules/Courses/Subjects

   Comparison was done and it indicates that all qualifications cover similar modules examples, safety, illumination, principles of electrical and electronics.

6. Assessment strategies and Weightings

   Assessment strategies are the same for the qualifications as they cover formative, summative and practical assessments.

7. Qualification rules

   The developed qualification and the Eastern Institute of Technology do not have the elective component whereas ESKOM KOEBERG - RADIATION PROTECTION INSTITUTE has only fundamentals and core modules whereas the benchmarked ones have fundamental, core

and electives.
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Horizontal Articulation (related qualifications of similar level that graduates may consider)

Certificate IV in Refrigeration and Air Conditioning
Certificate IV in Control and Instrumentation
Certificate IV in Solar Photovoltaic

Vertical Articulation (qualifications to which the holder may progress to)

Certificate V in Control and Instrumentation
Certificate V in Solar Photovoltaic
Certificate V in Electrical Installation and Maintenance

EMPLOYMENT PATHWAYS
Assistant Instrumentation Technician
Electrical Artisan (Installation and Maintenance)
Assistant Technician Electrical
Assistant Technician Solar Photovoltaic

REVIEW PERIOD

This qualification shall be reviewed after every 5 years.

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**	