SECTION A:	***QUALIFICATION DETAILS***																
QUALIFICATION DEVELOPER (S)	*GIPS*																
TITLE	*DIPLOMA IN AUTOMOTIVE ELECTRICAL ENGINEERING*													***NCQF LEVEL***	*6*		
FIELD	*MANUFACTURING, ENGINEERING AND TECHNOLOGY*		***SUB-FIELD***	*ENGINEERING AND ENGINEERING TRADES*										***CREDIT VALUE***	*385*		
New Qualification		*X*	*Review of Existing Qualification*														
SUB-FRAMEWORK	*General Education*		*TVET*										*Higher Education*				
QUALIFICATION TYPE	*Certificate*	*I*		*II*		*III*		*IV*		*V*		*Diploma*	*X*	*Bachelor*			
	Bachelor Honours			*Post Graduate Certificate*								*Post Graduate Diploma*					
	Masters							*Doctorate/ PhD*									

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE:

The Diploma in Automotive Electrical Engineering is a robust qualification that meets the market needs, the students and relevant employers' needs. The Diploma qualifications offered by the ETP's are work-applied meaning that the process is embedded into the courses. Work- applied learning is regarded as the leading approach for developing business leaders because it impacts on the real performance of managers working with real problems within organisations to produce real solutions to the organisation. GIPS is prepared to run the Diploma in Automotive Electrical Engineering because of the fundamental principles and concepts of Technical, Management, the skills developments and attributes necessary to undertake research, evaluation of new information and a wide range of concepts necessary for a well rounded up graduate for the Corporate Industry.

The diploma in automotive engineering is a qualification which gives the students a well rounded up approach in the areas of Automotive, Mechanics, Engineering and Maintenance.

Also, in compliance with the mandate of the Human Resources Development Council (HRDC), the qualification embraces all elements of skills development and planning for citizen empowerment and skills development. There is great contribution to the manufacturing, engineering and technology as graduates who complete the qualification are eligible for employment at junior, senior and corporate management. The Institution is closing the gap of the shortage of manufacturing, engineering and technology Developers in the Nation. The articulation and progression pathways are well facilitated globally and nationally as the students who completed the Diploma in Automotive Electrical Engineering accredited by BQA are internationally recognised.

Employability is an asset of achievements - skills, understandings and personal attributes - that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy.

Employability means individuals must enjoy mobility within the labour market to realise their potential. In the system of the tertiary education the government must provide market-driven portable skills that will maximise contribution to its GDP to close the skills gap and the mismatch between qualification and the employment. In this document the primary discussion is centred on how Botswana has moved from a blueprint of its strategy called VISION 2036, to build "An Educated and Informed Nation" and "A Prosperous, Productive and Innovative Society", aimed at national, regional and global employability.

Higher Education Institutions in Botswana are collaborating with internationally accredited academic institutions with the motive of enhancing the marketability of their graduates locally and globally. Currently Botswana's educational policies are predicated on the assumption that graduates from Botswana's colleges and universities will be seeking employment by and large locally.

PURPOSE:

The purpose of this qualification is to equip graduates with knowledge, skills and competencies to be able to:

- Assemble, fit and repair automobile auxiliary harnesses.
- Build auto-electrical circuits.
- Remove and fit automobile components.
- Select and use vehicle lifting equipment.
- Diagnose and service automobile batteries and battery system components.
- Selecting, using and caring for engineering hand and power tools.
- Comply with safety, health and environmental requirements in the workplace.
- Understand and apply the fundamentals of engine technology.

These competencies are supported by a range of related and supportive competencies as encapsulated in the Core component of the qualification.

ENTRY REQUIREMENTS (including access and inclusion)

Entry to the Diploma in Automotive Electrical Engineering is open to those applicants who have the following minimum requirement:

- NCQF Level IV with passes in Mathematics and Physics of Physical Science and English.
- Candidates with a Certificate V in Automotive Electrical Engineering or equivalent in similar discipline will be granted exemption based on RPL and CATs policy in line with BQA national RPL/CAT policy.
- Certificate V in Automotive Electrical Engineering or equivalent.

Provision for entry through recognition of prior learning will be done in accordance with institutional policies and guidelines which are aligned to BQA standards.

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

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Communicate with peers and supervisors in an automotive work context.	1.1 Communicate effectively with specific reference to corporate communication, interpreting verbal and nonverbal communication, professional writing and handling small groups. 1.2 Use terminology that is appropriate to the situation and in accordance with normal workplace usage. 1.3 Access and interpret information related to work tasks from a range of written and oral sources to ensure that work requirements are understood. 1.4 Ensure communication is clear and unambiguous and at an appropriate level for designated target audiences. 1.5 Communicate information that is accurate and convey it in accordance with acceptable timeframes. 1.6 Utilize communication that is effective, regular, and on-going.
2. Demonstrate an understanding of the fundamentals of engine technology.	1 Perform service operations on electrical systems. 2 Remove and refit electrical components in accordance with diesel plant equipment manufacturer's specifications and instructions. 3 Inspect diesel plant components to ensure optimal operation.
3. Access information from a range of written and oral sources to ensure that work requirements are understood.	1 Design the vehicle to make it safe to work with in accordance with manufacturer specifications.

	2 Identify auto electrical features of the vehicle in relation to access to the faulty circuit. 3 Identify vehicle safety features in terms of precautions when working during operations. 4 Repair faulty circuits in accordance with workplace procedures. 5.Clean faulty components and dismantle them according to organizational requirements. 6. Conduct work with due consideration for other team members and overall productivity.
4. Interpret information from different sources of technical data for use on diagnosis.	1 Retrieve vehicle specifications with easiness 2 Minimize time for diagnosis in searching for required data. 3 Reduce damage to vehicles and components. 4 Achieve highest levels safety
5. Build auto-electrical circuits and work with automobile auxiliary harnesses.	1. Explain the theory of auto-electricity in terms of auto-electrical related activities. 2. Perform calculations using scientific formulae. 3. Identify components of auto-electrical circuits and auxiliary harnesses and describe them in terms of their uses and functions. 4. Interpret auto-electrical circuit diagrams and circuits are constructed based on the diagrams.> Range: These also include auto electrical auxiliary circuit diagrams. 5. Build Auto-electrical circuits, teste and repair them using theoretical knowledge of circuits and auto-electricity. 6. Test automobile auxiliary harnesses and remove, assemble and repair them according to standard procedure.

6. Diagnose and service automobile batteries and battery systems components.	1. Perform vehicle tests on a fitted automotive battery as per standard procedure. 2. Test cable related to the battery for condition as per standard procedure. 3. Remove the battery and refit it in accordance with procedure. 4. Test Batteries according to standard procedures. 5. Perform Service operations on battery/battery system components and repair operations on battery system components according to standard procedures. 6. Configure 12/24-volt battery systems and test them according to manufacturer's requirements. 7. Explain Jump-starting procedures and conducted as per standard procedure.
7. Demonstrate knowledge of the fundamentals of engine technology and remove and fit electronic/electric automobile components.	1. Identify the various types of automotive engines and engine operation in terms of their differences. 2. Identify the major parts of a typical automotive engine and describe them in terms of their functions. 3. Explain engine design classifications and the various automotive engine systems and describe them in terms of their functions and associated components. 4. Remove electronic/electric automobile components and inspect and test them according to standard procedure. 5. Perform welding activity where necessary according to procedure. 6. Apply safety procedures and practices during the performance of all operations. 7. Restore work areas and process documentation is completed as per procedure.

8. Select and use vehicle lifting equipment and engineering tools.	1. Discuss the basic operation of automobile lifting equipment and the function of various components related to hoists are explained. 2. Operate various types of lifting equipment in order to complete the auto electrical tasks on a vehicle. 3. Select hand and power engineering tools and use them according to manufacturer's specifications. 4. Maintain hand and power engineering tools and maintain them according to workplace procedure. 5. Automobile lifting equipment and hand and power engineering tools are used with due care for self, fellow workers, machines, equipment, materials and environment.
9. Explain the importance of occupational health and safety.	1. Explain the safety, health and environmental requirements applicable in a specific workplace. 2. Monitor workplace compliance to safety, health and environmental requirements against specified requirements. 3. Evaluate the performance of workplace safety activities as required by safety, health and environmental management programmes. 4. Recommendations to remediate workplace non-compliance to and non-performance of safety, health and environmental requirements and programmes are made to ensure the safety of all in the workplace.

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 *Subjects/ Courses/ Modules/Units*	Engineering Mathematics I		10		10
	Engineering Science		10		10
	Engineering Drawing		15		15
	Introduction to Electrical and Electronics		10		10
	Workshop Technology		15		15
	Engineering Mathematics II (Prerequisites: Engineering Mathematics I)		10		10
	Introduction to Technical Communication		10		10
	Electronic and Electrical Components (Prerequisites: Introduction to Electrical and Electronics)		15		15
	Automotive Electronics Workshop Practice		15		15

	Introduction to Information Technology		15		15
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Automotive Electrics and Electronics Technology			15	15
	Electronics and Control I			10	10
	Analogue and Digital			10	10
	Computer Applications **(Prerequisites**: Introduction to Information Technology)			15	15
	Practical Risk Assessment and Workshop Safety			15	15
	Engineering Mathematics III (Prerequisites: Engineering Mathematics II)			15	15
	Electronic and Control Systems II **(Prerequisites**: Electronics and Control I)			10	10
	Motor Vehicle Technology			10	10
	Analytical Techniques, Electronics and Control **(Prerequisites**: Electronics and Control I)			10	10
	Pneumatics and Hydraulics			10	10
	Automotive Systems Engineering			10	10
	Industrial Attachment			50	50

	Individual Project			30	30
	Automotive Fault Diagnosis			15	15
	Automotive Electronic Systems			10	10
ELECTIVE/ OPTIONAL COMPONENT *Subjects/Courses/ Modules/Units*	Automotive Wiring and Electrical Systems/ Vehicle Dynamics/ Vehicle Body Design **(Choose 1)**			15	15
	Entrepreneurship/ Business Finance/ Project Management **(Choose 1)**			10	10

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
5	***125 Credits***
6	***260 Credits***
TOTAL CREDITS	***385 Credits***

Rules of Combination:

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

The qualification consists of 370 credits distributed as follows

Level and Credits	**Fundamental**	**Core**	**Elective**
Level 5…credits….130	**125 Credits**		
Level 6…credits….2240		**235 Credits**	**25 credits**
Total Credits	**125 Credits**	**235 Credits**	**25 credits**

ASSESSMENT ARRANGEMENTS

Formative Assessment

Formative assessment will contribute 60% towards the final assessment mark.

Summative assessment:

Integrated assessment, focusing on the achievement of the exit-level outcomes, will be done by means of a written examination (of at least 3 hours) at the end of every module (per module) which will contribute 40% to their final assessment mark.

MODERATION ARRANGEMENTS

Both internal and external moderation will be done in-line with the Moderation policy of the Institution. In addition, all Moderators and Assessors must be registered and accredited with Botswana Qualification Authority (BQA).

RECOGNITION OF PRIOR LEARNING

Recognition of prior learning (RPL) will be considered for the award of this qualification

CREDIT ACCUMULATION AND TRANSFER

Any candidate applying for Credit Accumulation and Transfer (CAT) will be expected to provide evidence of such learning.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Academic Pathways

Vertical Articulation

- Bachelor's degree in Automotive Engineering
- Bachelor's degree in Automotive Repair
- Bachelor's degree in Motor Vehicle Engineering

Horizontal Articulation

- Diploma in Automotive Repair and Maintenance
- Diploma in Automotive Diagnostics and Repair
- Diploma in Education

- Diploma Motor Vehicle Body Repair & Refinishing
- Diploma in Electronics
- Diploma in Welding and Fabrication
- Diploma in Hydraulics & Pneumatics
- Diploma in Business Management

CAREER PATHWAYS

The jobs within the Automotive Electrical Engineering could be any of the following:

- Technical support Engineer
- Engine Calibration Engineer
- Fuel test Engineer
- Automotive project manager
- Interior Automotive Design Engineer
- Technical support Engineering Technician
- Engine Calibration Engineering Technician
- Fuel test Engineering Technician
- Automotive project manager Assistant
- Interior Automotive Design Engineering Technician
- Workshop manager Assistant
- Service Advisor
- Training Officer
- Assistant Manpower Development officer
- Automotive Electrical Engineering lecturer Technician / Assistant

QUALIFICATION AWARD AND CERTIFICATION

A learner will be awarded Diploma in Automotive Electrical Engineering after attaining 385 credits. The learner will be issued a certificate and an official transcript. This qualification does not have compensatory awards.

REGIONAL AND INTERNATIONAL COMPARABILITY

This qualification forms part of a progression across the three levels of the Further Education and Training band. The international comparability section for the field of Automotive Electrical Engineering applies to Levels 4-6 of the qualification series.

The qualification series was compared to similar outcomes-based qualifications in New Zealand, Australia, United Kingdom, and to some African countries in the Southern African Development Community (SADC); Mozambique, Namibia, Botswana, Zimbabwe, as well as countries in the East African Community (EAC); Kenya, Tanzania and Uganda. The Botswana Training Authority website provides information on the development and co-ordination of an integrated and standards-based vocational training system. At this

present time, focus on the development of standards-based qualifications through a Botswana Vocation Education and Training System (BVET) has focused on the Wholesale and Retail and Tourism sectors.

Similarities

- The basic methods of assessment include Coursework, Oral Examination, Portfolio of Evidence, Practical Demonstration/Assignment, Practical Examination and Written Examination.
- Another similarity can be seen in the employment pathway with all the qualifications selected citing jobs in the automotive electrical engineering industry.
- Also, the graduates follow similar employment paths.

Differences

- The duration of study is differing in all the qualifications.
- The NCQF for the three qualifications range from Level 4-6, which are certificate levels (BQA manual).
- The credit value range from 190 – 385.

REVIEW PERIOD

This qualification will be reviewed after 5 years.