BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS														
QUALIFICATION DEVELOPER (S)	Joint Technical Training School, Botswana Defence Force														
TITLE	Diploma in Automotive Mechanical Engineering											**NCQF LEVEL**	6		
STRANDS (where applicable)	N/A.														
FIELD	Manufacturing, Engineering and Technology											**CREDIT VALUE**	360		
SUB FIELD	Engineering and Engineering Trades														
New Qualification	√	Legacy Qualification		Renewal Qualification											
				Registration Code											
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

This qualification is designed to address the emergent need of technicians in Botswana due to the exponential growth of the Automobile Industry in the recent past years. This growth is both in quantity and quality. The industry is advancing owing to incorporation of technology which leads to more complex and robust vehicle systems being introduced. Quantitatively, the influx of imported second hand vehicles from Asian countries and franchised Motor dealers of Botswana has also necessitated skills development in the industry. The need for this qualification was specifically provoked by the same need in the Botswana Defence Force

According to the Education and Training Sector Strategic Plan, 'while training qualifications are designed to address many of the areas that are important for employers, graduates do not exhibit the

characteristics of people who have internalized learning in these areas. This suggests that there are weaknesses in quality and relevance in TVET pedagogy and practice.' ETSSP, (2015 – 2020, Page 30). This important research greatly influenced the development of this qualification to be more occupation focused and provide a better targeted route for graduates, and benefit employers and the economy. In its inaugural report, the Human Resource Development Council, HRDC pointed out the high skills mismatch in our Human Resource base with the auto mobile industry one of the affected industries. This qualification is meant to address the skills mismatch in this regard. Vision 2036 targets transport and logistics services as essential for economic growth for the country, the automotive industry strategically forms part of the service industry and this qualification will contribute positively to the growth of the industry.

A survey was conducted by the qualification developer prior to designing this qualification, this was done to identify limitations in the Automotive Engineering sector. It was found out that most auto mechanics and technicians lacked key skills critical to the industry, this included Computer Aided Design and Manufacturing, Communication Skills, Information Technology Skills as well as basic Management Skills. These skills will make the graduate to be proficient with modern engineering methods to meet the market expectations.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to produce graduates with advanced technical knowledge and competencies to;

1. Apply advanced skills in troubleshooting and diagnoses of motor vehicle mechanical problems using modern methods and technology.
2. Analyse technical data and advise on the maintenance of major and auxiliary aggregates of a motor vehicle.
3. Demonstrate advanced technical expertise in solving complex problems in automotive systems.
4. Manage an automotive mechanical workshop to ensure compliance to quality and industry standards.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

The minimum entry requirement:

1. Certificate IV, NCQF Level 4 or equivalent.

2.	Access through RPL will be provided through ETP policies in line with CAT and RPL national policies.

SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1. Apply engineering principles to systematically diagnose and solve problems related to automotive mechanical systems.	1.1 Inspect, test the vehicle and apply proper fault finding techniques. 1.2 Analyze mechanical faults using the latest vehicle diagnostic machines and devices. 1.3 Interpret information received through diagnosing devices from different computerized systems in the vehicle.
2. Apply knowledge of mathematics, natural sciences and engineering sciences to applied engineering procedures, processes, systems and methodologies to solve well-defined automotive mechanical engineering problems.	2.1 Compute necessary calculations to determine efficiency of mechanical components and systems in order to remedy any eminent problems. 2.2 Use known theories to deduct possible conditions leading to experienced automotive mechanical faults in order to arrive at appropriate solutions to the same. 2.3 Assess vehicle components performance against recommended conditions and devise remedies for short falls.
3. Perform procedural design of automotive mechanical components and systems to meet requirements within applicable standards, codes of practice and legislation.	3.1 Administer established design processes and methodologies to arrive at appropriate solutions in the form of components or systems as may be determined by the requirements arising from the problem. 3.2 Utilise relevant design languages such as engineering drawing to communicate ideas according to established standards. 3.3 Employ the use of simulating software to determine the efficiency of an automotive mechanical component or system.

4. Conduct investigations of automotive mechanical systems problems through locating and searching relevant codes and catalogues, conducting standard tests, experiments and measurements.	4.1 Select available automotive mechanical literature to correct possible errors in vehicle components and systems. 4.2 Carry out standard tests, experiments and measurements to determine causes of automotive mechanical problems and solutions thereto. 4.3 Interpret findings and formulate solutions in accordance with required standards.
5. Use appropriate techniques, resources and modern engineering tools including information technology for the solution of automotive mechanical problems with an awareness of the limitations, restrictions, premises, assumptions and standards.	5.1 Conduct automotive mechanical diagnostics according to industry best practices. 5.2 Produce reports of tasks undertaken according to industry standards. 5.3 Employ the use of vehicle related software to establish automotive mechanical problems.
6. Communicate effectively, both orally and in writing within an automotive mechanical engineering environment.	6.1 Compile reports in established automotive mechanical engineering format. 6.2 Apply automotive mechanical engineering communication standards in the design and presentation of ideas in engineering drawing format. 6.3 Employ the correct automotive mechanical engineering jargon to refer to components and systems.
7. Demonstrate knowledge and understanding of the impact of automotive mechanical engineering activity on the society, economy, industrial and physical environment, and address issues by defined procedures.	7.1 Identify benefits and negative impacts of automotive engineering activities. 7.2 Implement strategies to minimise negative impacts through adoption of green technologies. 8.3 Manage the control of automotive mechanical engineering waste and categorise it according to its segregation.

8. Demonstrate knowledge and understanding of engineering management principles and apply these to an automotive mechanical engineering environment as a member and leader in a technical team and to manage projects.	8.1 Apply basic problem solving techniques and basic research methods. 8.2 Analyse daily reports from subordinate technicians and prepare weekly reports to senior engineers. 8.3 Provide technical assistance and motivate subordinate technicians and artisans. 8.4 Apply basic project management skills such as job scheduling, budget estimates and costing and time management. 8.5 Maintain safe and conducive working conditions in the workplace. 8.6 Formulate training plans for subordinates. 8.7 Comply with ethical standards of the organization and legislation.
9. Conduct an independent and life-long learning through well-developed learning skills	9.1 Employ advanced knowledge and skills that conform to automotive mechanical engineering standards gathered outside the academic learning achieved. 9.2 Demonstrate continued competence through keeping abreast of up-to-date tools and techniques available in the workplace. 9.3 Review existing knowledge to identify gaps and propose remedies for adopting to evolving technological and intelligent machine environments.

10. Demonstrate understanding and commitment to professional ethics, responsibilities and norms of engineering technical practice in automotive mechanical environment.	9.4 Apply required practices, legislation and limitations of authority to solve ethical dilemmas. 9.5 Interpret the ethical implications of engineering decisions in terms of the impact on environment, the business, costs and trustworthiness. 9.6 Devise decisions that are ethical and within boundaries of current competence during problem solving. 9.7 Recognise the responsibility for consequences arising from own actions or inaction.
11. Demonstrate an understanding of workplace practices to solve automotive mechanical engineering problems consistent with academic learning achieved.	11.1 Adhere to the working environment in terms of company structure and conventions, rules, policies, working hours, dress codes and reporting lines. 11.2 Comply with labour practices used in the workplace in accordance with relevant legislation. 11.3 Recognise workplace safety in accordance with relevant safety, health and environment legislation.

SECTION C	**QUALIFICATION STRUCTURE**				
COMPONENT	**TITLE**	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [4]	**Level [5]**	**Level [6]**	
FUNDAMENTAL COMPONENT	Mathematics		16	20	36
	Physics		10		10
	Technical Drawing		8		8

	Computer Technology		6		6
	Workshop Technology		10		10
	Technical Communication		6		6
	Computer Aided Design			8	8
CORE COMPONENT Subjects/Courses/ Modules/Units		**Credits Per Relevant NCQF Level**			**Total Credits**
		Level (4)	**Level (5)**	**Level (6)**	
	Troubleshooting and Maintenance Procedures			10	10
	Fluid Mechanics			8	8
	Basic Control Engineering		8		8
	Strength of Materials			10	10
	Thermodynamics and Heat Transfer			10	10
	Electrical and Electronic Principles		10		10
	Motor Vehicle Practice			10	10
	Petrol Engines			8	8
	Diesel Engines			8	8
	Cooling and Lubrication			10	10
	Body & Chassis		9		9
	Transmission			10	10
	Steering and Suspension			10	10
	Braking Systems			10	10

	Electronic Injection and Ignition		7		7
	Entrepreneurial Skills		6		6
	Work Placement		40	20	60
	Green Car Technology			7	7
	Modern Fuel Injection Systems			8	8
	Modern Transmission Systems			7	7
	Operations Management			7	7
	Intelligent and Electronic Steering systems			7	7
	Fluid Power Systems			8	8
	Project			8	8
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [4]	**Level [5]**	**Level [6]**	
1.					
Electives	Measurements and Instrumentation			10	10
	Vehicle Electrics			10	10

	Sensors and Data Transfer			10	10
	Ancillary Equipment			10	10

BOTSWANA Qualifications Authority

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	**Credit Value**
5	136
6	224
TOTAL CREDITS	**360**
Rules of Combination: **(Please Indicate combinations for the different constituent components of the qualification)**	
To achieve the qualification, a learner must complete a minimum of 360 credits comprising 70 credits from Fundamental modules, 270 credits from Core modules, and at least 20 credits from Elective modules.	

BOTSWANA Qualifications Authority

ASSESSMENT ARRANGEMENTS

ASSESSMENT

Assessment will be integrated, made up of Formative and Summative Assessment.

Formative Assessment

Formative assessment will be administered throughout the learning period in the form of written tests and practical and formative assessment shall contribute 50% of the final grade of the course.

Summative Assessment

A summative assessment will be administered at the end of each module. Summative assessment shall contribute 50% to the course final grade.

Assessment will be conducted by BQA registered and accredited assessors. Assessors must possess a minimum qualification of Bachelor of Engineering in Automotive Mechanical Engineering or related field with a teaching and assessment qualification (e.g. PGDE, CVET, DVET, PGDHE).

MODERATION ARRANGEMENTS

Both internal and external moderation processes will be carried out by BQA registered and accredited moderators in line with institutional policies.
Moderators must possess a minimum qualification of Bachelor of Engineering in Automotive Engineering or related field. The moderator should be a highly experienced assessor with a teaching, assessment and moderation qualification.

RECOGNITION OF PRIOR LEARNING

RPL will be applicable for gaining credits towards the qualification in accordance to ETP policies that align with national RPL policies.

CREDIT ACCUMULATION AND TRANSFER

CAT will be applicable for gaining credits towards the qualification in accordance to ETP policies that align with national CAT policies.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation

1. Diploma in Heavy Plant Engineering
2. Diploma in Mechanical Engineering
3. Diploma in Mechatronics Engineering

Vertical Articulation

1. Bachelor of Engineering in Automobile Engineering
2. Bachelor of Engineering in Mechanical Engineering
3. Bachelor of Engineering in Industrial Engineering
4. Bachelor of Engineering in Mechatronics Engineering

Employment Pathways

Automotive Mechanical Technician
Automotive Diagnostic Technician
Automotive Workshop Manager
Maintenance Planner

QUALIFICATION AWARD AND CERTIFICATION

QUALIFICATION AWARD*:* To be awarded the qualification of Diploma in Automotive Mechanical Engineering, a candidate should satisfy the requirements of the qualification, which is 360 Credits; 84 Credits of Fundamental modules, 270 Credits of Core modules and 20 Credits Elective modules.

CERTIFICATION: Upon successful completion of all requirements of the qualification, the ETP shall issue transcripts and certificates to the graduates

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

This comparability matrix evaluates the alignment between the proposed Diploma in Automotive Mechanical Engineering (NCQF Level 6) and three (3) benchmarked qualifications: Diploma in Automotive Mechanical Technology registered in Botswana, the Diploma in Automotive Engineering offered regionally within Africa, specifically Kenya and the Pearson BTEC Higher National Diploma (HND) in Automotive Engineering from the United Kingdom. The comparison focuses on qualification levels, credit values, curriculum structures, assessment methods and articulation pathways to demonstrate equivalence with established regional and international standards.

Across the three (3) qualifications, there is a shared emphasis on developing graduates with strong diagnostic, repair, maintenance and supervisory capabilities essential for modern automotive service environments. All qualifications incorporate substantial practical components, technical theory, workshop competencies and occupational safety requirements, demonstrating comparable rigor and breadth.

This comparative analysis confirms that the proposed qualification aligns with recognized benchmarks for automotive engineering education within the region and beyond. It further supports quality assurance, enhances recognition of learning, and contributes to the harmonization of technical and vocational education and training (TVET) qualifications across borders.

1. SIMILARITIES

a. Title of Qualification, NQF Level & Credit Value or Duration

All qualifications fall within the technical and vocational automotive engineering field, designed to prepare learners for technician-level roles in the industry. They focus on developing practical and applied skills relevant to real-world automotive environments. Each qualification runs for 2 to 3 years of full-time study, showing a comparable level of training intensity and academic commitment. Overall, the qualifications are closely aligned in both purpose and duration.

b. Main Exit Outcomes

All qualifications focus on equipping learners with the skills to diagnose, maintain, and repair automotive electrical and electronic systems. They are designed to build strong hands on competencies aligned with industry requirements. The outcomes place strong emphasis on practical workplace readiness, particularly for employment in garages, workshops, and fleet maintenance environments. Overall, the qualifications are closely aligned in developing job-ready technicians for the automotive sector.

c. Domains/Modules/Courses/Subjects Covered (Fundamental, Core & Electives)

All qualifications share a common curriculum foundation that includes key modules such as vehicle electrical systems, diagnostics, engine performance, and safety protocols. These core areas ensure learners gain essential theoretical and technical knowledge relevant to automotive engineering. In addition, all qualifications incorporate workshop practice or laboratory based training components. This practical element reinforces hands on skills development and ensures learners can apply theory in real world automotive environments.

d. Assessment Strategies and Weightings

All institutions apply a blended assessment approach that combines theory-based examinations with practical or performance-based evaluations. This ensures that both conceptual understanding and applied technical skills are assessed. In addition, work integrated learning and laboratory based assessments form a key part of all qualifications. These components help reinforce real world competence and ensure learners can demonstrate occupational readiness in practical environments.

e. Qualification Rules and Minimum Standards for the Award of the Qualification

All require successful completion of prescribed modules and some form of practical training or lab experience.

f. Education and Employment Pathway

All qualifications lead to employment as automotive technicians, diagnostic specialists, and workshop personnel. Each qualification supports vertical progression into bachelor's degrees in mechanical or automotive engineering

2. DIFFERENCES

a. Title of Qualification, NQF Level & Credit Value or Duration

The proposed qualification carries 360 credits over 3 years, higher than some regional and international comparators with lower credit loads. The proposed qualification is explicitly aligned to NCQF Level 6, while external qualifications sit at different levels depending on their national frameworks.

b. Main Exit Outcomes

The proposed qualification includes workshop management and advanced communication skills, which are not explicitly emphasized in some comparator qualifications. It highlights advanced problem-solving using modern technologies, indicating a stronger focus on higher-order technical skills.

c. Domains/Modules/Courses/Subjects Covered (Fundamental, Core & Electives)

The proposed qualification includes Green Car Technology, Modern Fuel Injection Systems, Modern Transmission Systems, reflecting updated industry trends not always present in older comparator curricula. It offers a wide spread of fundamental, core, and elective modules totaling 360 credits, broader than some regional equivalents.

d. Assessment Strategies and Weightings

JTTS applies a 50/50 weighting (Formative vs. Summative), while others vary (e.g., South Africa uses more summative-focused national exams). Anoka uses performance-based evaluations and U.S. credit hour systems, differing from NCQF/NQF formats.

e. Qualification Rules and Minimum Standards for the Award of the Qualification

The proposed qualification mandates 82 fundamental, 242 core, and minimum 36 elective credits, showing a highly structured credit distribution. Some regional and international comparators allow greater flexibility in elective or optional units and may not specify fundamental/core/elective splits.

f. Employment and Education Pathways

The proposed qualification offers explicit horizontal and vertical articulation pathways, which is broader than some comparators. Regional qualifications often emphasize industry based progression, while the proposed qualification outlines clearer academic pathway structures.

3. CONCLUSION

The proposed Diploma in Automotive Mechanical Engineering (NCQF Level 6, 360 Credits) compares favourably with the benchmark qualifications examined from Botswana, the African region and the United Kingdom. It demonstrates strong alignment in terms of qualification level, curriculum content, learning outcomes, assessment practices and progression opportunities. The inclusion of modern automotive technologies, engineering management and advanced diagnostic competencies further enhances its relevance to current industry needs. Overall, the proposed qualification meets regional and international standards and provides a sound basis for accreditation, graduate employability and articulation to higher qualifications.
REVIEW PERIOD
The qualification will be reviewed every five years.

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

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CODE (ID)			
REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	