BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS				
QUALIFICATION DEVELOPER (S)	Kitso International College				
TITLE	Diploma in Automotive Body Repair & Refinishing Technology			**NCQF LEVEL**	6
STRANDS (where applicable)	1. 2. 3. 4.				
FIELD	Manufacturing, Engineering and Technology	**SUB-FIELD**	Engineering and Engineering trades	**CREDIT VALUE**	395

New Qualification		*x*		*Legacy Qualification*											
SUB-FRAMEWORK	*General Education*		*TVET*		*x*	*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:

Botswana National Development Plans 10 and 11 advocated for development of skills aligned to the country labour market based on the Human Resource Development Strategy survey administered by the Human Resources Development Council (HRDC). Automotive Engineering was identified as a key area for skills development. The following skills in Automotive Engineering area are illustrated as in the document found on the link below from the HRDC 2016 report Top 20 Occupations[1]. The skills required are Automotive Body Repairers, Heavy Plant Mechanics, Hydraulics Mechanics,

Diesel Mechanics and Automotive Mechanics and Electricians. These skills were identified as top priority skills areas for human capital development. HRDC Report (2016).

According to the Central Statistical Office (CSO) of Botswana Report on Transport & Infrastructure Statistics Report (2017, pg11) the national vehicle stock increased from 256,498 vehicles to 527,901 by 2017. The growth was largely attributed to privately owned vehicles which constitute 97.6% of the total vehicle population which occurred at an average growth of 18243 vehicles per year from 2008 to 2017. The CSO further reported that vehicle accidents that occur constituted vehicle "roll over", "side vehicle" collisions accidents, "rear end" and "head on" collusions. An accident damaged vehicle entails repairing structural and non-structural damages. The skills in Automotive Body Repair (ABRT) Technology henceforth form essential set of skills needed for repairing accident damaged cars. Skills in the Diploma in Automotive Body Repair & Refinishing Technology (ABRT) are needed to repair vehicle frame, body, mechanical and electrical systems, sub-systems and components.

Automotive Engineering plays a critical role in Botswana's formal and informal sectors. Therefore, training people in Automotive Engineering skills is not only renders services to the labour market but also plays a critical role in SME formation and hence employment creation, poverty reduction and economic diversification.

PURPOSE: (itemise exit level outcomes)

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

- Diagnose, assess, cost, and repair damaged vahicles.
- Demonstrate skill in stripping, reassembling and refitting trim, body panels, and mechanical and auto-electrical components.
- Repair damaged vehicles using a wide array of tools to cut off damaged or old parts, connect new parts, repair scratches, dents and dings.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

i. **Normal Entry Requirements:**

Certificate IV (NCQF Level 4) or equivalent best 6 subjects with a C or better in English, Mathematics, Physics and Chemistry.

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ii. CAT and RPL

There is a provision for entry through Credit Accumulation and Transfer (CAT) and Recognition of Prior Learning (RPL) in accordance with institutional policies and in line with National RPL and CAT policies

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
LO1 : Apply knowledge and understanding of Safety, Health and Environmental Risk (SHER)	1.1 Observe personal safety for all stakeholders and ensure the applications of the legislative regulatory requirements. 1.2 Identify hazards in the workplace that pose danger to personal health and provide solutions to them in accordance to regulated safety standards per your industry. 1.3 Maintain a register of the occurrence of incidents of accidents in line with organizational requirements. Apply appropriate action to control unsafe or health hazards and propose methods of eliminating them.
LO2: Apply knowledge and skill of machine shop practices to include, human and equipment safety and operation, as it relates to an engineering environment.	2.1 Demonstrate knowledge of metallurgy and properties of other engineering materials. 2.2 Apply hand tools to perform machine shop bench operations. 2.3 Select and use temporary and permanent methods of joining metals and other engineering materials. 2.4 Demonstrate application of machine tools to solve engineering tasks. 2.5 Perform different welding processes and explain their application on engineering materials and components. Apply knowledge of metallic and non-metallic materials in the selection of materials to be used for specific and work-related jobs.

LO3: Demonstrate knowledge of vehicle construction by identifying parts and component assemblies.	3.1 Describe different types of metals used in vehicle construction and their strength ratings. 3.2 Identify major body panels, front-end assemblies and body shell assembly. 3.3 Locate the major parts of perimeter and unibody frames. Identify the major structural and non-structural components, sections, and assemblies of different vehicles.
LO4: Apply knowledge and skill in the use of automotive body repair shop tools and equipment.	4.1 Identify the setup and inner workings of a typical collision repair shop. 4.2 Explain the many types of measurements needed in collision repair. 4.3 Identify and use basic measuring tools common to auto body repair. 4.4 Identify common collision repair shop hand tools and machine tools. 4.5 Select and use appropriate fasteners and materials for particular collision repair jobs. Apply welding and soldering technology on collision damaged vehicles.
LO5: Demonstrate knowledge and skill of major body/frame damage repairs on accident-damaged vehicles.	5.1 Explain how impact forces are transmitted through both full frame and unibody construction. 5.2 Identify structural parts and panels on accident-damaged vehicles. 5.3 Diagnose various types of body damage, including twist, mash, sag, diamond and side-sway. 5.4 Analyze damage by measuring body dimensions using body measuring tools. 5.5 Demonstrate use of tram bars, self-centering gauges, and strut tower gauges. 5.6 Demonstrate how different types of unibody/frame straightening equipment are set up and used. 5.7 Perform panel positioning and welded panel replacement. 5.8 Perform basic panel straightening and alignment techniques.

	5.9 Perform service to interior parts and panels damaged in major collisions. Perform correct corrosion treatment procedures for specific applications.
LO6: Demonstrate knowledge and skill of minor and major vehicle damage repairs on accident-damaged vehicles.	6.1 Identify non-structural parts and components on accident-damaged vehicles. 6.2 Perform metal straightening techniques on various metals used on damaged vehicle panels. 6.3 Demonstrate procedures for metal shrinking and paint-less dent removal. 6.4 Demonstrate recommended application of different types of body fillers and glazes. 6.5 Perform repairs of minor cuts and cracks on plastics using adhesives. 6.6 Perform fibreglass and plastics welding repair sequences. 6.7 Perform hood-to-hinge, hood height, and hood latch adjustments. 6.8 Perform service on trim pieces on the outside of body panels. 6.9 Demonstrate different methods used to secure windshield glass, door glass replacement and adjustment. Remove and install dashboard assembly and instrument cluster.
LO7: Apply knowledge and skill, using tests and diagnosis on vehicle mechanical and electrical damage repairs.	7.1 Explain basic electrical values and use Ohm's Law to calculate circuit values. 7.2 Test, diagnose and repair basic electrical and electronic systems. 7.3 Inspect, repair or replace active and passive restraint systems' parts and components. 7.4 Use digital scan tools to check for electrical troubles before and after collision repairs. 3.1 Diagnose and service steering, suspension, cooling air-conditioning and emission control systems' parts and components.

LO8: Perform automotive collision refinishing procedures on different vehicle makes and models.	8.1 Identify the various types of spray coats. 8.2 Determine when and how to make spot repairs. 8.3 Demonstrate ability to use various types of equipment used in automotive collision refinishing. 8.4 Select the correct abrasive and sanding techniques for specific final sanding operations. 8.5 Perform masking techniques on panels and plastic parts for refinishing. 8.6 Prepare existing paint films and bare metal substrates for refinishing. 8.7 Demonstrate adjustment of spraying equipment to test for and develop a good spray pattern. 8.8 Demonstrate knowledge and skill in operating different types of spray guns, spray booths and respirators. 8.9 Perform complete spot repairs, panel repairs, and overall paint jobs. 1.1 Apply single-stage finishes, as well as basecoat/clear-coat systems.
LO9: Apply knowledge and skill on estimating collision vehicles' repair costs.	9.1 Explain the general purpose of damage estimates/quotations. 9.2 Outline the sequence for evaluating vehicle damage. 9.3 Describe the methods of determining the reparability of a damaged vehicle. 9.4 Determine whether collision damaged parts and/or components should be repaired or replaced with new ones. 9.5 Perform calculations pertaining to labour costs when estimating collision repair costs. 9.6 Perform calculations on material costs based on refinishing materials lists. a. Demonstrate knowledge and skill in use of computer-based estimating programs.

LO10: Apply scientific and mathematical techniques to solving problems in trade related challenges.	10.1 Use graphs, tables and charts to present work-related results. 10.2 Demonstrate skill in application of scientific laws and principles in trade-related problem solving. a. Interpret vehicle parameters and data using calculus and differentiation concepts.
LO11: Demonstrate knowledge, skill and overall understanding of office productivity tools.	11.1 Demonstrate proficiency in the use of spreadsheets, word processors, database management systems and presentation software. a. Demonstrate proficiency in the use of Information Communication Technology (ICT) for effective business communication.
LO12: Demonstrate Entrepreneurial and Innovation skills.	12.1 Demonstrate knowledge and understanding on creating a business plan. 12.2 Demonstrate the ability to market one's services and ideas. 12.3 Demonstrate the ability to mobilize people and resources. o Demonstrate the ability to create value in service provision.
LO13: Demonstrate knowledge and skill in customer care relations and industrial rapport.	13.1 Apply customer satisfaction principles by interact with the customers in order to answer questions. 13.2 Resolve support issues, improve credibility, and nurture relationships by using consistent feedback chains and service culture. 13.3 Demonstrate product knowledge, and development, to increase the organization's sales and reputation. 13.4 Create a professional connection with customers to enhance customer recovery, loyalty and lifetime value. a. Apply first contact resolution knowledge and skills to prevent future issues on customer-related matters.

LO14: Utilize CAD/CAM software to prepare technical graphics appropriate to the automotive engineering industry.	14.1 Construct block diagrams of engineering components/circuits used in day-to-day life. 14.2 Generate solid models and 2-D drawings of products adhering to standards. 14.3 Generate part models assembly of various machine components and systems using modeling packages. 14.4 Generate solid models and 3-D drawing for simple components. 14.5 Demonstrate knowledge of various codes and specifications of International Standards (ISO) concerned with engineering drawings. 14.6 Perform computer aided production planning, numerical control and Computer Numerical Control (CNC) programming. 1.4 Apply the principle of automation, the drafting and geometric modeling of database structure for graphics modeling.

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SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [5]	***Level [6]***	***Level [ ]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	Engineering Mathematics 1	15			15
	Engineering Mathematics 2		15		15
	Engineering Science	15			15
	Engineering Drawing	10			10
	Computer Fundamentals	10			10
	Technical Communication	10			10
	Machine Shop Practice	10			10
	Entrepreneurship		10		10
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Body Shop Tools & Equipment		10		10
	Vehicle Collision Estimation Fundamentals		10		10
	Automotive Fundamentals		10		10
	Vehicle Design		10		10
	Non-structural Study		10		10
	Strength of Materials		10		10

	Mechanics of Machines		10		10
	Engineering Design and Synthesis		10		10
	Computer-Aided Design		15		15
	Workshop Organization & Safety Management	10			10
	Industrial Placement		50		50
	Workshop Practice		60		60
	Fundamentals of Auto Body Repair Techniques I		10		10
	Fundamentals of Auto Body Repair Techniques II		10		10
	Vehicle Frame Damage Repair		10		10
	Mechanical & Electrical Damage Repair		10		10
	Automotive Painting & Refinishing		10		10
	Minor & Major Damage Repair		10		10
	Final Year Project		15		15
STRANDS/ SPECIALIZATION	*Subjects/ Courses/ Modules/Units*	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [ ]	***Level [ ]***	***Level [ ]***	

1.					
2.					
Electives *Subjects/Courses/ Modules/Units* ***Choose ONE***	Vehicle Product Features		10		***10***
	Customer Care & Industrial Rapport		***10***		***10***

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	*Credit Value*
5	*80*
6	*315*
	395
TOTAL CREDITS	

Rules of Combination:

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

Compulsory Components Credits

- Core Modules 290 Credits
- Fundamental Modules 95 Credits

Elective Credits:

- Elective Modules 10 Credits

Distribution Rules:

- Level 5 with a maximum of 80 Credits

Level 6 with a maximum of 315 Credits

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ASSESSMENT ARRANGEMENTS
All assessments leading to the award of the qualification should be based on learning outcomes assessment criteria. Theory (continuous assessment) and practice shall be weighed on a ratio of 50:50. The rationale is that at a master's level, students practice should be theory and evidence- based. Assessment will be carried out by BQA accredited assessors.
MODERATION ARRANGEMENTS
Internal and external moderation shall apply in accordance with applicable policies and regulations and moderation will be carried out by BQA accredited moderators or equivalent.
RECOGNITION OF PRIOR LEARNING
There will be a provision for awarding of the qualification through RPL mode which will be in line with the national RPL Policy.
CREDIT ACCUMULATION AND TRANSFER
There is possibility for award of the qualification through Credit Accumulation and Transfer (CAT) and in line with national CAT policies
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation of Diploma in Automotive Body Repair Technology

1. Diploma in Automotive Collision Estimation
2. Diploma in Automotive Electrical Technology
3. Diploma in Automotive Mechanical Technology
4. Diploma in Automotive Diesel/Heavy Plant Technology
5. Diploma in Automotive Control Systems
6. Diploma in Automotive Mechatronics

Vertical Articulation for Diploma Automotive Body Repair Technology

1. Bachelors in Technology (B. Tech.) in Automotive Body Repair Technology
2. Bachelors in Technology (B. Tech.) in Automotive Collision Estimation
3. Bachelors in Technology (B. Tech.) in Automotive Electrical Technology
4. Bachelors in Technology (B. Tech.) in Automotive Mechanical Technology
5. Bachelors in Technology (B. Tech.) in Automotive Diesel/Heavy Plant Technology
6. Bachelors in Technology (B. Tech.) in Automotive Control Systems
7. Bachelors in Technology (B. Tech.) in Automotive Mechatronics

Career Path in Automotive Body Repair

1. Automotive Body Repair Technician

2. Automotive Body Repair and Paint Technician
3. Automotive Paint Specialist
4. Vehicle Frame Technician
5. Automotive Paint Technician
6. Automotive Body Repair Consultant
7. Automotive Collision Estimator and Assessor
8. Motor Vehicle Assessor
9. Automotive Insurance Adjuster
10. Vehicle Physical Damage Appraiser
11. Automotive Insurance Claims Representative
12. Automotive Insurance Field Coordinator

Vehicle Collision Repair Business Manager

QUALIFICATION AWARD AND CERTIFICATION

A candidate is required to achieve the stipulated **395** total credits inclusive of the fundamental, core and elective components, to be awarded the **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)**.

Certification

Candidates meeting prescribed requirements will be awarded the **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)** certificate in accordance with standards prescribed for the award and applicable policies.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

On average, the qualification duration is 3 years, and corresponds to the **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)**. The average number of modules per semester is 5 and totals to an average of 24 modules over the entire course. The **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)** has 28 modules. All compared qualifications offer industrial attachment or apprentice. The compared qualifications do not offer electives. The **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)** offers electives to enhance specialization and diversification. The idea is to produce graduates competent in the cost assessment of vehicle body framework, mechanical and electrical damage. They do have different names, but the content is averagely 70% to 90% similar. However, the **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)** tends to cover more on vehicle damage cost estimation, insurance, customer care services, entrepreneurship, and workshop management.

In the context of Botswana, **Diploma in Automotive Body Repair & Refinishing Technology (ABRT)** offers

While benchmarking the qualification, the **Diploma in Automotive Body Repair and Refinishing Technology (ABRT)** , the equivalent Qualification levels in the country of origin, the learning objectives/exit learning outcomes/aims along with modules to identify the developed qualification's strengths and weaknesses to inform for reviews.are used

In the context of Botswana, the **Diploma in Automotive Body Repair and Refinishing Technology (ABRT)** offers design and synthesis, entrepreneurship, and IT skills, as a mandatory component of the curriculum. The qualification is outcome-based learning; therefore, emphasis is on hands-on skills and competency development. The qualification has also included industrial attached to further support the outcome-based approach. The qualification is, therefore, well-fitting to other qualifications sampled in the regional and international arena even for their further training.

We have faced with the following challenges while benchmarking

- Most of the colleges/Universities do run this qualification as a part qualification, not as a standalone, with other disciples of the trade
- Informations found in the university website is not static, they are kept changing due to regular updates. (added the web links where information is sourced

REVIEW PERIOD

This qualification will be reviewed after a period of 5 Years

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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**	