SECTION A:	***QUALIFICATION DETAILS***															
QUALIFICATION DEVELOPER (S)	Kitso International College															
TITLE	Diploma in Automotive Collision Estimation Technology													***NCQF LEVEL***	*6*	
FIELD	Manufacturing, Engineering and Technology		***SUB-FIELD***		Engineering and Engineering Trades									***CREDIT VALUE***	*360*	
New Qualification			√		*Review of Existing 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:

The rationale of the **Diploma in Automotive Collision Estimation Technology (ACET)** is premised on the following national strategic planning documents and annual reporting documents from Botswana's key governance institutions.

Botswana National Development Plans 10 and 11 advocated for the development of skills aligned to the country's entry 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 the 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 Heavy Plant Mechanic, Hydraulics Mechanic, Diesel Mechanic, Automotive Body Repair and Auto

Electricians. These skills were identified as top priority skills areas for human capital development. HRDC Report (2016). Refer to Appendix 1 (Stakeholder Consultation).

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 rollover", "side vehicle" collisions accidents, "rear end" and "head on" collusions. An accident-damaged vehicle entails repairing structural and non-structural damages. The skills in the Diploma in Automotive Collision Estimation Technology henceforth form the essential set of skills needed for repairing accident-damaged cars. Skills in the Diploma in Automotive Collision Estimation Technology are skills needed to estimate and assess vehicle collision costs on damaged vehicle frame/chassis, body, mechanical and electrical systems, subsystems, and components. This sentiment is also expressed by the Bank of Botswana Annual report (2015, p92) which mentions that "as a landlocked country, Botswana is heavily dependent on efficient transport and communications and utility provision is relatively expensive and erratic, business face productivity and competitiveness challenges.

Efficient Transport implies the maintenance and installation of functional mechanical systems by Automotive Technicians. Therefore, the development of human capital that has critical automotive mechanical technology skills for the automotive engineering industry is not an option but a must as it is contributory to the economy's vibrancy. This viewpoint is also shared by the Ministry of Trade and Industry as expressed in their Economic Diversification Drive: Medium to Long-term Strategy Plan (2011-2016). Transport plays a critical role in the prioritized economy drive sectors such as Agro-processing, Leather and ternary, renewable energy, primary production, construction, building, and mining.

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

PURPOSE:

The purpose of the Diploma in Automotive Collision Estimation Technology qualification is to provide auto mechanics with knowledge, skills, and competence to:

- Assess damages on various vehicle makes and models.
- Innovate, create, and be proactive in the ever-evolving technological advances of the motor industry.
- Record any damages discovered within the vehicle such as dents, broken/damaged parts, or mechanical issues.
- Calculate on how much of the repairs with limitations of the insurance policy cover and source various data on costs, time for project requirements and materials to establish a finalized project estimate.

- Analyse a damaged vehicle and determine the approximate cost to repair.
- Perform a vital intermediary role between car owners, auto repair shops and insurance agencies.

ENTRY REQUIREMENTS (including access and inclusion)

Minimum entry requirement for this qualification is a:

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

Recognition of Prior Learning (RPL):

There shall be provision for entry through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in line with institutional and national policies.

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 with the regulated safety standards per your industry. 1.3 Maintain a register of the occurrence of incidents of accidents in line with organizational requirements. 1.4 Apply appropriate action to control unsafe or unhealthy 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 to engineering materials and components. 2.6 Apply knowledge of metallic and non-metallic materials in the selection of materials to be used for specific jobs.
LO3: Ability to read, interpret and construct engineering drawings and circuits.	3.1 Select the appropriate drawing equipment to be used.

	3.2 Produce drawings according to the task specifications whilst observing strict adherence to safety, health and quality standards. 3.3 Analyse drawings to determine appropriate technical decision-making and equipment use.
LO4: Apply scientific and mathematical techniques to solving problems in trade-related challenges.	1.1 Use graphs, tables and charts to present work-related results. 1.2 Demonstrate skill in the application of scientific laws and principles in trade-real problem-solving. 1.3 Interpret vehicle parameters and data using calculus and differentiation concepts.
LO5: Demonstrate knowledge of vehicle construction by identifying parts and component assemblies.	5.1 Describe different types of metals used in vehicle construction and their strength ratings. 5.2 Identify major body panels, front-end assemblies and a body shell assembly. 5.3 Locate the major parts of perimeter and unibody frames. 5.4 Identify the major structural and non-structural components, sections, and assemblies of different vehicles.
LO6: Apply knowledge of vehicle damage estimation principles.	6.1 Prepare and set up a professional estimation environment. 6.2 Record quotations/estimates on clear and industry-standard documentation. 6.3 Record and communicate to customers and stakeholders on supplementary/extra quotes, hidden and prior (pre-incident) damage. 6.4 Recommend genuine or original equipment manufacturer (OEM) replacement parts.

	6.5 Provide replacement parts quotations from approved dealers. 6.6 Record, quote/estimate and communicate out-sourced work. 6.7 Consult with vehicle insurance assessors and other stakeholders after making quotations/estimates.
LO7: Perform estimates on vehicle major (structural) and minor (non-structural) damage.	7.1 Cost estimate structural and non-structural parts or components that are repairable and those damaged beyond repair. 7.2 Estimate repair/replacement cost of vehicle mechanical and electrical works and systems. 7.3 Establish and recommend the correct and appropriate repair methods based on estimated costs. 7.4 Make valid written recommendations to the customer and stakeholders on the viability of repair or loss. 7.5 Perform quality checks per specified tasks or job-specific quality standards, during and at the end of the repair.
LO8: Demonstrate knowledge and skill of cost estimating vehicle collision repair materials.	8.1 Establish and recommend the appropriate refinish materials to be used in the repair process. 8.2 Demonstrate knowledge and skill in calculating refinish materials, utilities and ancillary costs for different jobs. 8.3 Select the correct paint for specific jobs. 8.4 Estimate accident re-alignment fees.
LO9: Demonstrate knowledge and skill of labour costing vehicle collision repairs.	9.1 Determine between flat-rate, shop and overlap labour rates during estimation. 9.2 Demonstrate knowledge and use of industry 9.3 Estimating Guides for labour rates and times. 9.4 Demonstrate knowledge and skill of calculating labour and ancillary costs for different jobs.

LO10: Apply knowledge and skill to perform vehicle valuation.	10.1 Explain the legal requirements for vehicle appraisal or valuation. 10.2 Communicate with customers or stakeholders during the vehicle valuation process. 10.3 Perform vehicle valuation calculations based on industry policy and procedures. 10.4 Compute for vehicle total loss and replacement. 10.5 Prepare and present detailed vehicle valuation report to customers or stakeholders.
LO11: Demonstrate knowledge of vehicle insurance and related regulatory policies and procedures.	11.1 Explain and observe different parties' legal obligations in respect of an accident. 11.2 Demonstrate knowledge of the Road Traffic Act pertaining to vehicle insurance policy/ cover. 11.3 Demonstrate knowledge of contractual, policy and procedural obligations and processes between the repair work provider, customer and other stakeholders. 11.4 Demonstrate knowledge of the implications of vehicle insurance clearance certificates and other service level agreements.
LO12: Demonstrate knowledge and skill to perform vehicle accident reconstruction.	12.1 Visit the scene of the accident (if possible) to aid reconstruction. 12.2 Ability to investigate accident circumstances, from concerned parties. 12.3 Identify the direction, point of impact and severity of impact on the accident-damaged vehicle(s). 12.4 Demonstrate knowledge and skill to perform traffic accident reconstruction inspection techniques. 12.5 Draw and produce detailed sketches to simulate accident circumstances.

	12.6 Demonstrate knowledge and application of traffic accident reconstruction calculations and formulas. 12.7 Record and confirm actual damage relative to accident circumstances. 12.8 Prepare and present detailed vehicle traffic accident reconstruction reports to relevant stakeholders.
LO13: Demonstrate knowledge and skill to operate automotive collision software systems.	13.1 Identify a vehicle's parts and components and their respective codes. 13.2 Ability to use Audatex, Mitchell Estimating System, Procedure Pages (P-pages) and other Estimating Guides. 13.3 Demonstrate knowledge and skill in the operation of computer-generated estimating programs. 13.4 Perform video imaging to prepare itemized estimates on collision-damaged vehicles.
LO14: Demonstrate knowledge of customer care standards and maintenance of industrial and stakeholders' rapport.	14.1 Attend to customer service requirements. 14.2 Select appropriate communication formats to target customers and industry stakeholders. 14.3 Determine appropriate language to interact with customers and industry stakeholders. 14.4 Communicate with customers or industry stakeholders, relevant information regarding loss or damage to vehicles.
LO15: Utilize CAD/CAM software to prepare technical graphics appropriate to the automotive engineering industry.	15.1 Construct block diagrams of engineering components/circuits used in day-to-day life. 15.2 Generate solid models and 2-D drawings of products adhering to standards. 15.3 Generate part model assembly of various machine components and systems using modelling packages.

	15.4 Generate solid models and 3-D drawings for simple components. 15.5 Demonstrate knowledge of various codes and specifications of International Standards (ISO) concerned with engineering drawings. 15.6 Perform computer-aided production planning, numerical control, and Computer Numerical Control (CNC) programming. 15.7 Apply the principle of automation, the drafting and geometric modelling of database structure for graphics modelling.
LO16: Demonstrate knowledge, skill and overall understanding of office productivity tools.	16.1 Capture data, and sort data into usable meaningful information using Information Communication Technology (ICT). 16.2 Communicate internally, externally and globally using Information Communication Technology (ICT). 16.3 Apply Information Communication Technology (ICT) to present work in different digital formats. 16.4 Apply Information Communication Technology (ICT) to enhance customer satisfaction and experience. 16.5 Analyse data and information using Information Communication Technology (ICT) to make informed work-related decisions.
LO17: Demonstrate Entrepreneurial and Innovation skills.	17.1 Demonstrate knowledge and understanding on creating a business plan. 17.2 Demonstrate the ability to market one's services and ideas. 17.3 Demonstrate the ability to mobilize people and resources.

	17.4 Demonstrate the ability to create value in service provision.

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	20			20
	Engineering Mathematics 2		20		20
	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*	Vehicle Design		10		10
	Vehicle Collision Estimation Fundamentals		20		20
	Automotive Fundamentals		10		10
	Engineering Design and Synthesis		10		10
	Major & Minor Vehicle Damage Estimation		10		10
	Accident Reconstruction		20		20

	Vehicle Collision Labour & Material Cost Estimation		10		10
	Non-structural Study		10		10
	Vehicle Collision Software Systems & Insurance Law		15		15
	Automotive Painting and Refinishing		10		10
	Industrial Placement		60		60
	Workshop Practice		45		45
	Final Year Project		15		15
ELECTIVE/ OPTIONAL COMPONENT *Subjects/Courses/ Modules/Units* ***Choose ONE***	Vehicle Product Features		***10***		
	Wiring, Lighting and Accessories		***10***		
	Computer-Aided Design		***10***		
	TOTAL				***360***

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
5	***75***
6	***285***
TOTAL CREDITS	***360***

Rules of Combination:

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

Rules of Combination:

Compulsory Components Credits:

- Core Modules 245 Credits
- Fundamental Modules 105 Credits

Elective Credits:

- Elective Modules 10 Credits

Distribution Rules:

- Level 5 with a maximum of 75 Credits
- Level 6 with a maximum of 285 Credits

ASSESSMENT ARRANGEMENTS
Formative Assessments shall constitute 50% Weighting on the Final Assessment, whilst Summative Assessments shall constitute 50%.
MODERATION ARRANGEMENTS
There shall be internal and external moderation arrangements done by BQA registered and accredited Moderators.
RECOGNITION OF PRIOR LEARNING
There will be a provision for awarding the qualification through RPL mode which will be in line with the national RPL Policy.
CREDIT ACCUMULATION AND TRANSFER
There will be a provision for awarding the qualification through CAT mode which will be in line with the national RPL and CAT Policy.
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)
Horizontal Articulation of the Diploma in Automotive Collision Estimation Technology (ACET) 1. Diploma in Automotive Electrical Technology 2. Diploma in Automotive Body Repair Technology 3. Diploma in Automotive Mechanical Technology 4. Diploma in Automotive Diesel/Heavy Plant Technology 5. Diploma in Motorcycle Technology 6. Diploma in Automotive Control Systems 7. Diploma in Automotive Mechatronics **Vertical Articulation for the Diploma in Automotive Collision Estimation Technology (ACET)**

1. Bachelors in Technology (B. Tech.) in Automotive Collision Estimation
2. Bachelors in Technology (B. Tech.) in Automotive Body Repair Technology
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 Collision Estimation Technology (ACET)

1. Automotive Collision Estimator
2. Automotive Collision Assessor
3. Motor Vehicle Damage Assessor
4. Automotive Insurance Adjuster
5. Vehicle Physical Damage Appraiser
6. Automotive Collision Consultant
7. Automotive Collision Instructor/Tutor
8. Automotive Workshop Supervisor
9. Automotive Collision Repair Technician
10. Automotive Insurance Claims Representative
11. Automotive Insurance Field Coordinator
12. Vehicle Collision Repair Business Manager
13. Auto Shop Owner
14. Auto Parts Professional

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

A candidate is required to achieve the stipulated **360** total credits inclusive of the fundamental, core and elective components, to be awarded the Diploma in Automotive Collision Estimation Technology.

Certification

Candidates meeting prescribed requirements will be awarded the **Diploma in Automotive Collision Estimation Technology (ACET)** in accordance with standards prescribed for the award and applicable policies.

REGIONAL AND INTERNATIONAL COMPARABILITY

The qualifications are an average of 3-year duration. The average number of modules per semester is 5 and totals an average of 24 modules over the entire course. The Diploma in Automotive Collision Estimation Technology (ACET) has 24. They do have different names, but the content is on averagely 70% to 90% similar. All qualifications offer internship or industrial attachment or apprentice. The exit learning outcomes in the programmes compared, correspond to the modules in the Diploma in Automotive Collision Estimation Technology (ACET). There is more coverage of advanced topics of vehicle damage cost estimation.

All qualifications do not offer electives. The Diploma in Automotive Collision Estimation Technology offers electives to enhance specialization and diversification. The idea is to produce graduates competent in the cost assessment of vehicle body framework, and mechanical and electrical damage. They do have different names, but the content is on averagely 70% to 90% similar. However, the Diploma in Automotive Collision Estimation Technology (ACET) tends to cover more on vehicle damage cost estimation, insurance, customer care services, entrepreneurship, and workshop management.

In the context of Botswana, the Diploma in Automotive Collision Estimation Technology (ACET) offers design and synthesis, entrepreneurship and IT skills, as mandatory components 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, compatible and compliant with other qualifications sampled in the regional arena.

All the institutes ran the qualification on a two/three-year duration. All the qualifications have assessment strategies which include key strategies like projects, internships, workshop practice, theoretical evaluations, and work-based assessments. Conceptually, the learning outcomes tend to cover key domain areas like communication skills, teamwork skills, computer literacy skills and technical skills in vehicle collision damage and repair cost analysis. Over 90% of the qualifications do internships and projects.

Though titles of the qualifications vary they deliver almost the same content. The qualification offers entrepreneurship, as a mandatory module, which is critical in the Botswana curriculum. All qualifications do not offer electives and entrepreneurship modules whereas this qualification goes with electives which allow for further specialisation, and allows the graduates to have an option to become an industrialist with complementary modules

The qualification is outcome-based learning therefore and therefore is a huge emphasis on hands-on, development of skills and competencies. Two important modules, accident reconstruction and vehicle insurance law and valuation, ensure continues practice of acquired knowledge and converted to skills and competencies. The qualification has also included industrial attachment to further support the outcome-based approach. The qualification is compatible and complaint to other qualifications sampled in the international

REVIEW PERIOD

This qualification will be reviewed after a period of 5 Years