QUALIFICATION SPECIFICATION							SECTION A
QUALIFICATION DEVELOPER	MINISTRY OF EMPLOYMENT, LABOUR PRODUCTIVITY AND SKILLS DEVELOPMENT						
TITLE	Certificate III in Automotive Engineering				**NCQF LEVEL**	3	
FIELD	Manufacturing, Engineering and Technology	**SUB-FIELD**	Automotive Mechatronics				
New qualification	√	Review of existing qualification					
SUB-FRAMEWORK	General Education		TVET	√	Higher Education		
QUALIFICATION TYPE	Certificate	√	Diploma		Bachelor		
	Bachelor Honours		Master		Doctorate/ PhD		
CREDIT VALUE					**40 credits**		

RATIONALE AND PURPOSE OF THE QUALIFICATION

Rationale

The Botswana Vision 2036 states that development of the human capital and the informal sector and the micro and small enterprises (MSES) are essential in achieving the VISION 2036 pillars, in particular Sustainable Economic Development and Human and Social Development. Although Botswana has been fortunate to experience unprecedented economic growth since independence, this has not generated enough jobs to reduce unemployment. The most severely hit group amongst the unemployed is the youth, who account for about 51.7 % of the total unemployed, with the 15-19 age group most affected.

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 our education and training towards fulfillment of social and economic aspirations identified in our Revised National Policy on Education (RNPE) 1994, 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 training outputs are more closely aligned to socio economic development needs of the country. In line with this strategic goal, the Human Resource Development Council (HRDC 2016) report on top occupations in demand has identified

mechanics inclusive of heavy plant, hydraulics, diesel and auto electrical as some of the priority skills for Transport and Logistics and Mining Mineral Energy and Water Resources Sectors.

According to Botswana Investment and Trade Center (BITC 2019), The Botswana motor industry is faced with a growing automotive market. It has a vehicle ownership rate of 206 vehicles per 1,000 people which is far above the African average of 43 vehicles per 1,000 people. Botswana's automotive market is expected to receive a boost in terms of sales growth in the short to medium term due to the development of domestic coal deposits and the unlocking of agricultural opportunities hence this qualification comes to dispel challenges related to the automotive labor market by providing training opportunities that promote knowledge and skills acquisition.

Purpose

The purpose of the Certificate III in Automotive Engineering is to:

- Equip candidates with insightful competencies and exposure to introduction to automotive systems, engineering drawing, engineering materials and workshop practices in accordance with established codes of practice and relevant legislation.
- Equip candidates with skills in automotive service and repair.
- Introduce candidates to the use of tools, equipment, materials, and processes found in the industry through Theoretical and Practical activities.
- Prepare candidates for employment or advanced training in the automotive industry.
- Address technological challenges faced by the industry in the advent rise of the use of ICT in the automotive sector.

People holding this qualification should be able to perform routine work under close supervision and take some responsibility for own learning and completion of work.

ENTRY REQUIREMENTS (including access and inclusion)

- **Minimum Entry Requirements**

NCQF Level II or equivalent shall be required for candidates to be accepted into Certificate III in Automotive Engineering.

- **CAT and RPL**

Applicants who do not meet the above criterion but possess relevant industry experience may be considered using RPL and CATS policies for access.

QUALIFICATION SPECIFICATION	SECTION B
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
Communicate with clients, colleagues and others using appropriate forms of communication techniques.	• Use written, verbal, non-verbal communication appropriate to the target audience. • Interpret stipulated instructions or requirements. • Apply information acquired in the performance of tasks or discussions with other people. • Apply relevant definitions, terminology, abbreviations and language. • Present information using appropriate language and formats. • Construct clear sentences to produce a written logical and coherent piece of writing. • Use appropriate presentation formats and styles of writing to produce error free business documents.
Use Information Communication technology (ICT) for information retrieval and processing as well as communication and collaboration with others.	• Use ICT responsibly and ethically. • Manage information using ICT. • Communicate and collaborate locally and globally using ICT. • Research, access and retrieve information using ICT. • Gather, analyze and organise data and information using ICT. • Organise and synthesise information using ICT. • Implement data loss prevention strategies using ICT. • Present information in a variety of formats using ICT
Select and use appropriate tools and equipment for an engineering application in accordance with job specification.	• Examine job specification to determine the tools and equipment to be used in relation occupation safety code. • Select appropriate tools and equipment to be used in line with the job requirements. • Carry out the tasks in line with job specification. • Service and maintain tools and equipment in accordance with Original Manufacturers Specification (OMS) where applicable. • Perform quality checks on work done and make improvements where needed.

	• Clean tools and equipment and store them in an appropriate place after use. • clean and tidy up the work area in accordance with organizational requirements.
Perform measurements on engineering components according to job specifications in line with adopted International System Organization (ISO).	• Examine job specification to determine the tools and equipment to be used. • Select appropriate measuring instruments according to specified limits, fits and tolerance on the job. • Plan and prepare for work in the workplace in accordance to job specification. • Select and state the importance of correct operating specifications for limits, fits and tolerances in the engineering environment. • Measure all dimensions in accordance with standard specifications and tolerances by using various precision measuring instruments. • Record, compare and confirm measurements results in line with standard specifications. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.
Apply knowledge of metallic and non-metallic materials and their properties in the selection of materials for specific projects.	• Examine the nature of work to be carried out to determine types of materials to be used. • Apply knowledge of characteristics / properties of metallic and non-metallic materials to select materials for specified projects. • Carry out simple tests to distinguish between metallic and non-metallic materials where applicable.

Perform basic metal removal processes in a specified job.	• Examine the nature of work to be done inclusive of material to be worked on to determine tools and measuring instruments to be used. • Select and use tools and equipment in line with job specification. • Carry out tasks as per job specification, adhering to health, safety and quality standard. • Perform quality checks on the job done until specification is met. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.
Apply basic fastening and joining techniques in a specified job.	• Examine the nature of work to be done inclusive of material to be worked on to determine fasteners, tools, equipment to be used and joining techniques to be applied. • Select and use appropriate fasteners and joining techniques for specific purposes. • Carry out tasks as per job specification, adhering to health, safety and quality standard. • Perform quality checks on the job done. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.
Carry out simple forming techniques in the fabrication of projects.	• Examine the job specification to determine materials, forming techniques, tools and equipment to be used. • Select appropriate materials, forming techniques, tools and equipment in line with the job specification. • Carry fabrication of the project in accordance with established codes of practice and job specification. • Perform quality checks on work done and make improvements where needed. • Clean tools and equipment and store them in appropriate places after use.

	• Clean/tidy up the work area in accordance with organizational requirements.
Apply knowledge and skills of corrosive preventative technique on metals in accordance to job specification.	• Plan and prepare to undertake basic painting in accordance to job specification. • Assess surface condition in accordance with legislative requirements, workplace procedures and manufacturer's specification. • Prepare surface according to job requirements. • Mix paint in accordance to manufacturer's specification. • Apply paint in accordance to job requirements. • Clean, check, maintain and store equipment in accordance with the organization's procedures.
Clean and finish the interior, exterior of machinery in accordance with manufacturers specification.	• Examine the nature of work to be done to determine materials, tools and equipment to be used. • Select appropriate materials, tools and equipment to carry out the task. • Perform tasks as per job specification, adhering to health, safety and quality standard as well as established codes of practice. • Perform quality checks on the job done and make improvements as needed. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements
Apply basic knowledge of dismantling and assembling of machinery.	• Examine the nature of work to be done to determine tools and equipment to be used in dismantling and assembling. • Identify parts of equipment and machinery to be dismantled and assembled. • Select appropriate tools and equipment to carry out the task. • Perform tasks as per job specification, adhering to health, safety and quality standard. • Perform quality checks on the job done.

	• Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.
Build and maintain basic electrical circuits.	• Examine the job specification to determine materials, tools and equipment to be used. • Select appropriate materials, tools and equipment to be used to design and build the circuit according to the job specification. • Construct electrical circuits on panel board according to established codes of practice and job specification. • Use an appropriate electrical tester and measuring instruments to test electrical circuits on panel board according to job specification. • Perform fault finding and rectify faults accordingly in electrical circuits. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.
Perform removal, refitting and alignment of panels, bearings and pulleys on machinery and equipment.	• Examine the work to be done to determine tools and equipment to be used. • Select tools and equipment to be used in line with the nature of work to be done. • Perform tasks as per job specification adhering to SHERQ and quality standard. • Perform quality checks on the work done in line with job specification and make improvements where necessary. • Clean tools and equipment and store them in an appropriate place after use. • Clean and tidy up the work area in accordance with organizational requirements.

Read, interpret and draw Engineering Drawings for specific purpose.	• Analyse the drawings to be done to determine appropriate drawing equipment to be used. • Select the appropriate drawing equipment to be used. • Produce drawings according to task specification; adhere to health, safety and quality standard. • Perform quality checks on the job done for adherence to quality standard. • Clean tools and equipment and store them in appropriate places after use. • Clean and tidy up the work area in accordance with organizational requirements.
Implement maintenance schedule in accordnance with orgnaisational requirements.	• Examine the nature of maintenance work to be carried out to determine the materials, tools and equipment to be used. • Obtain the required materials, tools and equipment in line with the job requirements. • Prepare and carry out maintenance work in accordance with job specifications and adhere to SHERQ and OMS. • Perform necessary tests to confirm functionality. • Clean, store and secure tools and equipment in appropriate places after use. • Clean and tidy up the work area in accordance with organizational requirements. • Keep records and report to immediate supervisor as needed.

	QUALIFICATION STRUCTURE		**SECTION C**
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	Communication skills	3	3
	Information and Communications Technology (ICT)	3	3
CORE COMPONENT Subjects / Units / Modules /Courses	Introduction to Basic Metal Work	3	14
	Introduction to Automotive Practice	3	10
	Introduction to Engineering Materials	3	4
	Introduction to Engineering drawing	3	6
		Total	**40**

ELECTIVE COMPONENT Subjects / Units / Modules /Courses	N/A		

Rules of combinations, Credit distribution (where applicable):

A candidate is required to achieve a total **40 credits** inclusive of **6 credits** for fundamental and **34 credits** for core components to be awarded the qualification.

ASSESSMENT AND MODERATION ARRANGEMENTS

ASSESSMENT

All assessments, formative and summative, leading/contributing to the award of credits or a qualification should be based on learning outcomes and/or sub-outcomes.

Formative assessment

Formative assessment or continuous assessment contributing towards the award of credits should be based on course outcomes. This can include tests, assignments and projects as well as simulated and real work settings. The contribution of formative assessment to the final grade shall be **60%**.

Summative assessment

Candidates may undergo assessment including written and practical and simulated projects. The final examination for each course contributes **40%** of the final mark for that course. All summative practical assessments must, as far as possible, be conducted in real work settings.

Moderation Arrangements

There will be internal and external moderation undertaken by moderators registered and accredited by BQA. All processes and procedures will be in line with NCQF requirements. This will be conducted in reference to the institution's moderation policy and procedures.

RECOGNITION OF PRIOR LEARNING (if applicable)

- Learners may submit evidence of prior learning and current competence and/or undergo appropriate forms of RPL assessment for the award of credits towards the qualification in accordance with applicable university RPL policies and relevant national-level policy and legislative framework. Implementation of RPL shall also be consistent with requirements, if any, prescribed for the field or sub-field of study by relevant national, regional or international professional bodies.

- Learners with relevant prior learning through formal, informal and non-formal education shall be considered for award and or exemption through Recognition of Prior Learning (RPL).

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation

Enhances semi-skilled workers with basic practical skills and knowledge within areas of Foundation Certificate in Automotive Engineering NCQF Level 3.

- Certificate III in Heavy Plant Mechanics
- Certificate III in Auto body repair and refinishing
- Certificate III in Welding and fabrication
- Certificate III in Borehole Mechanics
- Certificate III in Fitting and machining
- Certificate III in Maintenance fitting
- Certificate III in Air conditioning and Refrigeration

Vertical Articulation

The holder of these NCQF level 3 qualifications may progress to NCQF Level 4 or equivalent on the following fields.

- Certificate IV in Heavy Plant Mechanics
- Certificate IV in Auto body repair and refinishing
- Certificate IV in Welding and fabrication
- Certificate IV in Borehole Mechanics
- Certificate IV in Fitting and machining
- Certificate IV in Maintenance fitting
- Certificate IV in Air conditioning and Refrigeration

Employment Pathways

On completion of the course the candidates can either get employed or become a self-employed Entrepreneur in any one of the following fields:

- Spare Parts Sales Assistant / Manufacturer's Representative
- Private Fleet and Garages Attendance
- Workshop Storekeeper
- Spare Parts Dealer
- Spare Parts Salesman

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

A learner is required to achieve the stipulated minimum of 40 credits inclusive of 6 credits for the fundamental and 34 core credits to be awarded the qualification.

Certification

Learners meeting prescribed requirements will be awarded the qualification in accordance with standards prescribed for the award of the qualification and applicable policies.

REGIONAL AND INTERNATIONAL COMPARABILITY

a) **Namibia Training Authority. Certificate in Automotive Engineering (level 1)** with compulsory units **worth 46 credits**. The main objective of level 1 program is to develop knowledge, skills and competence in occupational health and safety; use of basic metal processing tools; metal joining techniques; use of basic automotive mechanics service tools and equipment; cleaning and finishing components of an automobile; planning and organizing work, engineering drawing, servicing, fitting wheels and tyres; soft soldering; engineering mathematics, engineering science and business communication as well as awareness of HIV and AIDS. The qualification also seeks to promote entrepreneurship skills. Assessment strategies include continuous assessment with emphasis on practical demonstration of skills and knowledge-based assessment administered in writing or orally. Education pathways include progression to level 3 and horizontal articulation has not been indicated. Employment pathways include servicing and repair of motor vehicles under less supervision or self-employment in the automotive sector.

b) **New Zealand Qualification Framework: New Zealand Certificate in Light Automotive Engineering (NQF level 3 Credits worth 120)**. This qualification provides the automotive industry with individuals who can service general automotive systems. The qualification is designed for people who are beginning a career in the industry and are to work under limited supervision. The qualification places emphasise on workplace policies and procedures, relevant legislation and occupational health and safety, use of tools and equipment, basic workshop engineering tasks, servicing vehicle engine, driveline systems, minor repairs on electrical and electronic systems, application of automotive steering, suspension and brake systems. People holding this qualification may progress to level 4 qualifications in automotive Engineering. Graduates of this qualification will have the skills and knowledge to take up entry level positions in the automotive industry. This qualification can be awarded by any education organization which has an approved programme of study or industry training programme leading to the qualification. Evidence will include end user surveys (e.g. graduates, employers, industry associations) to determine how well graduates are meeting the outcomes in the workplace, evidence of monitoring to ensure changes in industry practice are identified and incorporated into training requirements and evidence of effective internal and external moderation of assessment practice. General conditions for the programme leading to the qualification expect that: programmes will include a practical experience component relevant to the automotive industry and programmes must maintain pace with workplace policies and current industry techniques/technology.

c) **Ministry of Labour and Human Resource; Thimphu, Bhutan: National Certificate in Automobile Mechanic (NC1 worth 24 credits)** It provides school leavers with generic and industry specific skills and demands a level of performance that will enable new recruits to the industry to be immediately productive. The qualification comprises four units of Competency Standards that cover the essential knowledge and skills required of auto mechanics in performing work related to servicing suspension systems, steering systems, brake systems and clutch system of automobiles. Assessment strategies for this qualification include continuous assessment with emphasis on practical demonstration of skills and knowledge-based assessment administered in writing or orally. Competency may be assessed in the actual workplace or in a simulated workplace setting. Holders of National Certificate in Light Automotive Mechanics can progress to NC 2. Upon completion of this program, graduates may work in industries that do servicing and repair of light motor vehicles or be self-employed in the automotive sector.

Summary

A direct comparison with these international qualifications indicates that the qualifications are closely comparable, and that the method of assessment is more or less the same as generally assessments are normally through on-the-job observation and questioning which actually confirms learners can demonstrate competence in the workplace. Candidates are assessed to underpin knowledge, understanding and work-based performance.

The research has indicated that what sets the proposed qualification apart from the examined foreign qualifications is that the proposed qualification encompasses communication skills, Information and Communication, Technology, basic metal work, Engineering drawing, Maintenance schedules and Engineering materials and furthermore combines aspects of vehicle mechanical and electrical systems.

REVIEW PERIOD

This qualification will be reviewed every five **(5)** years.