BQA NCQF Qualification Template

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QUALIFICATION SPECIFICATION **SECTION A**								
QUALIFICATION DEVELOPER	MINISTRY OF EMPLOYMENT, LABOUR PRODUCTIVITY AND SKILLS DEVELOPMENT							
TITLE	Certificate III In Fitting and Machining				**NCQF LEVEL**	3		
FIELD	Manufacturing, Engineering and Technology		**SUB-FIELD**	Engineering and Engineering Trades				
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	134 credits							
RATIONALE AND PURPOSE OF THE QUALIFICATION								

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.

The purpose of this qualification National Credit Qualification Framework (NCQF) Level 3 is to produce a semi-skilled worker with knowledge, skills, and competences in producing components using a variety of machining methods and operations, meeting output requirements and working safely with due care for fellow workers and the environment. Selecting and applying appropriate inspection methods to determine component compliance with specifications. Fault finding, dismantling, maintaining, assembling, and installing a variety of mechanical assemblies and making close tolerance adjustments to equipment and process. Lubricating systems and the ability to maintain such systems. Interpreting detailed engineering drawings.
The qualification also allows students to perform a range of functions including Communication skills, Information and Communication Technology, Numeracy, Safety Health and Environmental Risk Quality (SHERQ), Basic metal work, introduction to Automotive, Auto Body alignment, Basic pneumatic and hydraulics, Engineering drawing, Maintenance schedules, Workshop practices and Work-based learning

ENTRY REQUIREMENTS (including access and inclusion)

- JC or any other qualification equivalent to NCQF Level 2 acceptable to the institution.
- Any relevant part qualification at NCQF Levels 3 may render the candidate eligible for exemptions or credit transfer in accordance with applicable policies.
- Candidates with relevant unaccredited prior learning may be considered for admission and or exemption through Recognition of Prior Learning (RPL) Assessment.

QUALIFICATION SECTION B	**SPECIFICATION**
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
Apply basic mathematical problem-solving techniques to perform work related calculations.	• Use number operations to carry out work related calculations. • Determine ratios, proportions and percentages as needed for specific purposes. • Apply measurement techniques for length, area, perimeter, volume and mass when performing work related calculations. • Determine the cost of production in relation to labour, materials, and overheads in project undertakings. • Identify the main features of work-related data and use suitable summary statistics (mean, mode and median) to interpret the data. • Solve work related mathematical problems through simple algebraic expressions.
Demonstrate knowledge and understanding of Safety health, Environmental and Risk Quality (SHERQ) and exhibit appropriate behaviors for the protection of the environment, home and	• Interpret and apply legislative requirements, industry standards, and best practices in a variety of workplaces to comply with Safety health and Environmental Risk Quality (SHERQ) standards. • Identify hazards in the workplace that pose a danger or threat to own safety or health, or that of others. • Maintain a register of hazards and accidents in accordance with organizational requirements. • Observe the importance of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors. •

workplace as well as personal health and safety	• Apply appropriate action to control unsafe or unhealthy hazards and propose methods to eliminate identified hazards and risks.
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	• Examine the nature of work to be carried out to determine types of materials to be used.

materials and their properties in the selection of materials for specific projects.	• Apply knowledge of characteristics / properties of metallic and nonmetallic 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
Clean and finish the interior, exterior of machinery and equipment.	• 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
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 and tidy up the work area in accordance with organizational requirements.
Apply basic knowledge of dismantling and assembling of equipment and 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 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
Design and build basic hydraulic and pneumatic systems.	• Examine the job specification to determine materials, tools, and equipment to be used. • Select the appropriate materials, tools, and equipment to be used to design and build the circuit according to the job specification • Use the appropriate materials and equipment to design and build the circuit according to job specification • Tests run the circuit. • Perform fault finding and rectify faults accordingly in hydraulic and pneumatic systems. • 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.

Examine hydraand pneumatic system ide to faults accorda in established ccwith practices manufacturer of instructions	• Examine the system and identify faults or defects. • Develop job specification in accordance with job specification. • Obtain appropriate materials, tools and equipment required for the job in line with job specification. • Perform tasks as per job specification adhering to SHER and quality standards. • Perform quality checks on the work done in line with job specifications 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.
Conduct removal, refitting and alignment of body panels.	• 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 the work to be done. • Perform tasks as per job specification adhering to SHER and quality standard. • Perform quality checks on the work done in line with job specifications 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

Produce basic drawings using Computer Aided Design (CAD)	• Examine the job specification to determine the software to be used • Select the appropriate software to be used. • Produce basic drawings using Computer Aided Design (CAD) in line with the job specification. • Adhere to health, safety, and quality standard. • Perform quality checks on the job done for adherence to quality standards and 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
Implement maintenance schedule in accordance with Manufacture's Specifications and organisational 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 MOS. • 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.
Apply basic knowledge of spray painting to finish auto body panels in accordance with the job specification.	• Examine the job specification to determine the tools and equipment. • Select appropriate materials, tools and equipment for the job. • Carry out tasks as per job specification, adhering to SHERQ. • Perform quality checks on the job done for adherence to quality standards and job specification.

	• 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
Prepare for turning operations in accordance with job specification.	• Examine the nature of work to be carried out. • Interpret drawings, instructions, and specifications to establish job requirements. • Carry out tasks as per job specification adhering to health, safety, and quality standard • Perform quality checks on work done in line with job specification and make necessary improvements • Clean tools and equipment and store them in an appropriate place after use. • Clean or tidy up the work area in accordance with organizational requirements
Perform turning operations in accordance with job specification.	• Examine the nature of work to be carried out. • Interpret drawings, instructions, and specifications to establish job requirements. • Machine and finish components to specified tolerances, without damage to machine and tools adhering to health, safety, and quality standard. • Perform quality checks on work done in line with job specifications and make necessary improvements. • Clean and dispose machine waste material in accordance with worksite procedures and store tools and equipment in appropriate places after use. • Clean and tidy up the work area in accordance with organizational requirements

QUALIFICATION STRUCTURE			SECTION C
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	NCQF Level	**Credits**
	Communication skills	3	10
	Information and Communications Technology (ICT)	3	10
	Numeracy	3	10
	Occupational safety, health, environmental principles, and risk management	3	10
CORE COMPONENT Subjects / Units / Modules /Courses	Basic metal work	3	6
	Introduction to Automotive	3	6
	Auto body alignment	3	6
	Basic pneumatics and hydraulics	3	6
	Engineering drawing	3	6
	Implement Maintenance schedule	3	6
	Workshop practice	3	34
	Work based learning / Projects	3	24
ELECTIVE COMPONENT Subjects / Units / Modules /Courses	N/A		

Rules of combinations, Credit distribution (where applicable):

A candidate is required to achieve a minimum of 134 credits inclusive of 40 credits for fundamental and 94 credits for core units. The candidate is also required to complete the required period of work-based learning / Projects and associated portfolio of evidence in line with the stipulated exit outcomes and associated assessment criteria to be eligible for the award of 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 clinical practice or care settings. The contribution of formative assessment to the final grade shall be **60%**.

Summative assessment

Learners 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. To pass a course, a candidate must achieve a minimum of 60%. A candidate who scores between 50 and 59% shall be eligible for one re-assessment. A candidate who is not eligible for re-assessment or does not meet the minimum requirements on re-assessment, may apply for a re-take. All summative practical assessments must be conducted in simulated or real work settings.

A Learner who does not meet the minimum requirements after one re-take or has not met the minimum assessment requirements for a specified number of courses in a given semester shall be withdrawn and *advised to* apply for re-admission after a minimum of two semesters or one year.

MODERATION

The following shall apply for both internal and external moderation in accordance with applicable policies and regulations:

Documentation

All necessary documents including qualification documents, alignment matrices, assessment instruments and Assessment criteria/rubrics should be available.

Pre-assessment Moderation

Before administering any assessments that contribute towards the award of credits, moderation must take place. This should entail but not limited to the following:

- Ascertaining that the assessment strategy to be used is appropriate for the learning outcome to be assessed.
- Ascertaining that the assessment instrument adequately captures the learning outcomes against which assessment is to be carried out.
- Ascertaining whether the assessment tasks or questions can enable the assessor to collect sufficient evidence that is typical of relevant exit level descriptors.
- Checking if the cover page contains all necessary information.
- Checking if the assessment instrument layout is appropriate and that wording of assessment tasks or questions is appropriate.

Post-assessment Moderation

Moderators must verify that the assessment has been done in compliance with assessment principles. This should include the following:

- Checking if all scripts have been assessed using the same criteria.
- Verifying if assessment judgments and decisions have been done consistently and that principles such as validity, authenticity, currency and sufficiency have been considered.
- Checking if calculation of marks has been done correctly.
- Checking if necessary records and reports have been completed.

Sampling Procedure for Moderation

The total number of scripts to be sampled depends on the total number of candidates. If the number of candidates is 20 or less, the moderator should go through all the papers. For more than 20 candidates, the

sample shall be 20 candidates plus 25% of the remaining total number of Scripts. The sample should be representative of the population of candidates in relation to performance, gender, etc.

Moderation reports

A moderation report shall capture, but not limited to the following:

- Sample size and sampling procedures.
- Observations about the performance of candidates.
- Consistency of assessment judgments and decisions.
- Assessment instruments and alignment to learning outcomes.
- Recommendations for improvement.

RECOGNITION OF PRIOR LEARNING (if applicable)

Recognition of Prior Learning (RPL)

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.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation enhances semi-skilled workers with basic practical skills and knowledge within areas of Foundation Certificate in fitting and machining NCQF level 3.

- Heavy plant Mechanics
- Auto body repair and refinishing
- Welding and fabrication
- Borehole Mechanics
- Automotive Engineering
- Maintenance fitting
- Instrumentation
- Electronics
- Electrical installation
- 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.

- Fitting and Machining
- Maintenance fitting
- Auto mechanic & Auto electrics
- Heavy plant Mechanics
- Auto body repair and refinishing
- Borehole Mechanics
- Welding and fabrication
- 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.

- Handyman or Semi-skilled Craftsman
- Store person
- Workshop attendant

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

A candidate is required to achieve the stipulated total credits inclusive of the fundamental, to be awarded the qualification.

Certification

Candidates meeting prescribed requirements will be awarded the qualification in accordance with standards prescribed for the award of the qualification and applicable policies. Candidates who do not meet the prescribed minimum standards may, where applicable, be considered for appropriate exit awards in accordance with applicable policies

REGIONAL AND INTERNATIONAL COMPARABILITY

The foreign qualifications of South African Qualification Authority (SAQA) and Australia Qualification Framework (**AQF**) examined are generally comparable and the differences noted are as follows:

Characteristics of SAQA

The foreign qualifications examined are generally comparable. It was noted that the two qualifications frameworks regional and international the South African Qualification Authority (**SAQA**) and Australian Qualification Framework (**AQF**) have the following similarities :

1. They both have credits values and levels.
2. The terms or conditions of awarding certificates are the same.
3. They both recognize Recognition of Prior learning **(RPL**).

The foreign qualifications of South African Qualification Authority (SAQA) and Australia Qualification Framework (**AQF**) examined are generally comparable and the differences noted are as follows:

Characteristics of SAQA

1. Level 3 - Credit value:174
2.The status and relevance of this qualification will attract and retain quality learners and employees, who may even have the potential to progress to further in the field of engineering Fitting and machining where the learner will be able to specialize
3. The South African Qualification Authority does not require learners to have ascertained First Aid Certificate in order to pursue the course.

Characteristics of AQF

1. Level 3 - Credit value:158
2. On successful completion of this qualification graduates may progress to Samoa certificate lll in Fitting and Machining.
3. This qualification recognizes competence to work within the fitting and machining industry at the level of an assistant in Machining and Fitting.
4.The qualification is designed to maximize the international opportunities for recognition of the skills inherent in the certificate
5. Australia Qualification Framework **(AQF**) requires learners to have ascertained First Aid Certificate in order to pursue the course.

Characteristics of Proposed Qualification

1.Level 3 - Credit value :134
2. This qualification will be awarded to people who have met the requirements of the learning outcomes of the compulsory modules for Level 3.
3. Learners must undergo First Aid Training.
4. This qualification is designed to maximize the international opportunities for recognition of the skills inherent in the certificate.
5. This qualification is designed to recognize RPL.

COMPARABILITY AND ARTICULATION OF THE PROPOSED QUALIFICATION WITH THE ONES EXAMINED

After the research was made, it was found that the proposed qualification is almost similar to **SAQA** and **AQF** based on the credit value, level, main exit outcomes and education and work pathways. Having made observations to the two qualifications we strongly recommend that the proposed Qualification must have a requirement for First Aid Certificate in order to pursue Level 4 and must also maximize the International opportunities for recognition of the skills inherent in the certificate.

REVIEW PERIOD

This program shall be reviewed every five (5) years; however, a review may be undertaken earlier as needed.

OTHER INFORMATION

Criteria for Selection of Assessors and Moderators

- A minimum of Diploma in a relevant field plus evidence of competence in assessment and moderation
- At least two years of relevant work experience.
- Assessors and moderators must have valid registration and accreditation with relevant bodies such as Botswana Qualifications Authority (BQA) and others as needed.

- Assessors and moderators holding qualifications below NCQF Level 6 (DIPLOMA) should have at least a qualification higher than the level being assessed plus five years of relevant work experience, qualification in assessment and moderation as well as valid registration and accreditation with BQA and other relevant entities.

Class or group size

- Considering the nature of exit outcomes and associated assessment criteria for this qualification, class or group size shall not exceed 20 learners.
- Each learner shall have a workstation with necessary tools and equipment and shall be allowed a minimum of 14 hours per week for practical work.

Work-based learning / work experience and associated portfolio of evidence

- A minimum of 240 hours shall be allowed for work-based learning including practical activities and projects in real or simulated work settings. These may include providing services to the community or participating in relevant projects carried out by or for individual members of the community.
- A candidate shall complete the required period of work experience and submit a portfolio of evidence in line with stipulated exit outcomes and associated assessment criteria to be eligible for the award of credits for this component.