| SECTION A | | | | | | | |
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| **QUALIFICATION DEVELOPER** | **GABORONE UNIVERSITY COLLEGE OF LAW AND PROFESSIONAL STUDIES** | | | | | | |
| **TITLE** | **CERTIFICATE V IN WELDING AND FABRICATION** | | | | **NCQF LEVEL** | **5** | |
| **FIELD** | **MANUFACTURING, ENGINEERING AND TECHNOLOGY** | | **SUB-FIELD** | | **WELDING AND FABRICATION TECHNOLOGY** | | |
| New qualification | ✓ | | Review of existing qualification | | | | |
| **SUB-FRAMEWORK** | General Education | | TVET | ✓ | Higher Education | | |
| **QUALIFICATION TYPE** | Certificate | ✓ | Diploma | | Bachelor | | |
| | Bachelor Honours | | Master | | Doctor | | |
| **CREDIT VALUE** | | | | | **126** | | |

**RATIONALE AND PURPOSE OF THE QUALIFICATION**

**Rationale**

The HRDS has indicated that there is an acute shortage of engineering skills in Botswana. This shortage has a huge negative impact on the ability of the country to expand its economic abilities and realize its full potential. More so, the shortage of engineering skills reduces Botswana's ability to create more jobs for its citizens. This qualification is an enhancement of engineering qualifications particularly at the lowest level possible. The qualification is a great foundation to people aspiring to higher level mechanical engineering.

The NDP 11 indicates the need to expand the country's engineering skills. A certificate in welding and fabrication is vital to expanding the engineering skills in Botswana. The qualification complements the mechanical engineering. This qualification opens more opportunities for people in the manufacturing sector. This aligns well to the country's Vision 2036 that seeks to equip the citizens with hands-on skills as well as self-relying skills. More so, this qualification builds a firm foundation for people aspiring to study further engineering qualifications at levels 6 and 7

The needs assessment survey conducted affirms the need for a welding and fabrication qualification particularly for artisan professional. This enhances the performance of other engineering sectors such as the motor vehicle maintenance and repairs sector. The survey also discovered that this qualification is supported by stakeholders for its practical essence that enables the graduates to practice welding and fabrication.

**Purpose**

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

- Produce complex components using a variety of fabrication methods
- Lay out and mark off complex shapes; set up and use powered machinery
- Develop and fabricate from complex drawings and sketches
- Cut and join components using welding and other mechanical methods
- Apply safety practices and procedures in fabrication and welding industry and
- communicate effectively using various ways in welding and fabrication industry.

This qualification will provide learners, education and training providers and employers with the standards and the range of learning required to work effectively in various industries making use of complex engineering fabrication processes and methods.

**ENTRY REQUIREMENTS (including access and inclusion)**

i. A minimum entry of NCQF level 4 or equivalent.
ii. Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) will be considered for access and inclusion of prospective candidates.

| QUALIFICATION SPECIFICATION: SECTION B | |
|---|---|
| **GRADUATE PROFILE (LEARNING OUTCOMES)** | **ASSESSMENT CRITERIA** |
| 1. Demonstrate knowledge of communication, IT and entrepreneurial skills in the welding and fabrication environment. | 1.1 Apply written, verbal and non-verbal aspects of communication within the welding and fabrication industry.<br>1.2 Use technology to produce reports and communicate accordingly within the welding and fabrication industry.<br>1.3 Interpret information effectively to implement |

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| | instruction in the welding and fabrication industry.<br>1.4 Prepare formal and informal business communiqués.<br>1.5 Plan and conduct appointments with clients<br>1.6 Plan and deliver business presentations. |
| 2. Use mathematical concepts and processes to calculate and solve welding and fabrication related issues | 2.1 Apply mathematical principles and methods to facilitate effective measurements for welding and fabrication.<br>2.2 Calculate basic measurements in a range of electronic applications and equipment for welding and fabrication.<br>2.3 Draw and interpret technical drawings for welding and fabrication |
| 3. Use mechanical and welding technology, techniques, processes and skills, as applied in the fabrication and welding industry, using appropriate tools and measuring equipment. | 3.1 Explain and apply mechanical and welding technology concepts, techniques and processes in the welding and fabrication context.<br>3.2 Demonstrate understanding of using tools, equipment and welding and fabrication materials in accordance with required standards.<br>3.3 Clean and store welding machinery and tools in accordance with required standards. |
| 4. Demonstrate knowledge of using and applying a variety of plate and pipe welding processes according to the required performance standards. | 4.1 Use measuring instruments to interpret resistance, capacitance, inductance, voltage, current and frequencies needed for welding.<br>4.2 Apply welding processes in accordance with required standards.<br>4.3 Apply oxyfuel in joining and cutting processes in accordance with required standards.<br>4.4 Demonstrate understanding of using Fillet welding technique. |
| 5. Apply safety practices and procedures in welding and fabrication industry | 5.1 Demonstrate knowledge of occupational health and safety policies and procedures |

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| | fabrication and welding industry.<br>5.2 Identify and report basic auto-electrics related problems and hazards according to workplace standards.<br>5.3 Identify and check personnel protective equipment needed for welding and fabrication to ensure that they are safe to use in accordance with work policies and procedures. |

**QUALIFICATION STRUCTURE: SECTION C**

| | **Title** | **Level** | **Credits** |
|---|---|---|---|
| **FUNDAMENTAL COMPONENT** Subjects / Units / Modules /Courses | Information and Communication Technology Skills | 5 | 12 |
| | Technical Drawing | 5 | 15 |
| | Entrepreneurial Skills | 5 | 12 |
| **CORE COMPONENT** Subjects / Units / Modules /Courses | Sheet Metal Work | 5 | 15 |
| | Gas Welding and Cutting | 5 | 15 |
| | Structural Steel Work | 5 | 15 |
| | Metal Arc Welding | 5 | 15 |
| | General Metal Work | 5 | 15 |
| | Health, Safety and Occupation | 5 | 12 |
| **ELECTIVE COMPONENT** Subjects / Units / Modules /Courses | **NONE** | | |
| | | | |
| | | | |
| | | | |
| | **Total** | | **126** |

**Rules of combinations, Credit distribution**

All modules at level 5.

**FUNDAMENTAL COMPONENT- 39credits**

**CORE COMPONENT- 87 credits**

**Total - 126 credits**

## MODERATION ARRANGEMENTS

**Assessment**

Assessment shall be conducted by BQA accredited assessors.

The assessment for this qualification shall comprise of both formative and summary assessments weighted according to institutional guidelines and policies. Both formative and summative assessment processes are accounted for to monitor progress during the qualification and to determine competence of the learners at the end of the qualification.

The formative assessment shall contribute **60%.**

Summative assessment shall make up the remaining **40%.**

**Moderation**

**Internal Moderation**

- Internal moderators to be engaged will be BQA accredited subject specialists in relevant fields with relevant industry experience and academic qualifications.
- Internal moderation shall be done in accordance with applicable policies and regulations.

**External Moderation**

- External moderators to be engaged will be subject specialists in relevant fields with relevant industry experience and academic qualifications.
- External moderation shall be done in accordance with applicable policies and regulations.

## RECOGNITION OF PRIOR LEARNING

There will be provision of RPL for award of the qualification using ETP RPL Policy in line with the National RPL Policy

## PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

***LEARNING PATHWAYS***

The graduates can progress vertically or horizontally into the following qualifications.

**Horizontal Progression**

- Certificate V in Mechanical Engineering
- Certificate V in Electronic Technology
- Certificate V in Electrical Installations

**Vertical Progression**

- Diploma in Fabrication and Welding
- Diploma in Electronics
- Diploma in Mechanical Engineering

***EMPLOYMENT PATHWAYS***

Upon successful completion of this qualification graduates have a great chance securing employment such as;

- Pipeline Welder
- Structural Welder,
- Pipe fitter Welder
- Boilermaker Welder
- Aerospace Welder.

**QUALIFICATION AWARD AND CERTIFICATION**

Upon successful completion of 126 credits the candidate will be awarded a Certificate V in Welding and Fabrication qualification.
The graduate will be given a transcript and a certificate.

**REGIONAL AND INTERNATIONAL COMPARABILITY**

To establish comparability, benchmarking was conducted on 3 identified similar qualifications internationally and regionally. The benchmarking was looking at title of the qualification, entry requirements, credits allocation, NQF level at country of origin and either exit level outcomes or modules.

***Harper College (USA) Welding Fabrication Certificate***

The qualification has 33 credits, no NQF level and entry requirements were indicated. However, the qualification has few modules similar to the proposed qualification such as Basic Technical Mathematics, Welding, Cutting Processes which are core.

***Fife College (UK) HNC: Welding, Fabrication, and Inspection***

The qualification is at SCQF level 7 which when mapped into the NCQF equates to NCQF level 5 of the proposed qualification. No credits indicated. The qualification has most modules similar to the proposed qualification like Communication: practical skills, Welding principles and application, and Fabrication: preparing joining and assembly.

***Speciss College (Zimbabwe) Welding Certificate***

There is no NQF level and credits indicated for this qualification. Entry requirement is O Level which is equivalent to NCQF level 4 of the proposed qualification. Both qualifications have core modules such as which are similar but may differ with names Safety in the workshop, Introduction to welding in general, Gas welding theory and practical, Brazing theory and practical, Arc welding theory and practical, Metalwork: Introduction to metals in general, and technical drawing and calculations.

**REVIEW PERIOD**

The qualification will be reviewed every 5 years.