| ***SECTION A:*** | ***QUALIFICATION DETAILS*** | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***QUALIFICATION DEVELOPER (S)*** | University of Botswana | | | | | | | | | | | | | | | | | |
| ***TITLE*** | Bachelor of Education (Mathematics) | | | | | | | | | | | | | | ***NCQF LEVEL*** | | *7* | |
| ***FIELD*** | Humanities and Social sciences | | ***SUB-FIELD*** | | Mathematics Education | | | | | | | | | | ***CREDIT VALUE*** | | *508* | |
| *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 economic strength of any country is linked to the advancement in Science, Mathematics, Technology, and Engineering (STEM) disciplines. This sentiment is embraced globally and is articulated well in the Sustainable Development Goals (SDGs) and the Africa Agenda 2063. Provision of STEM education could contribute to the achievement of SDG4 -equitable and quality education for sustainable development and sustainable lifestyles and social equity.The Government of Botswana has since realized this, as evidenced in policy documents such as Vision 2016, Vision 2036 (Pillar 1 – Sustainable Economic Development – to produce productive and

competitive human resources that drive growth across economic sectors including emerging industry, and 2) Pillar 2 - Human and Social Development– Education and Skills Development – to provide relevant quality education that is outcome-based with an emphasis on technical and vocational skills as well as academic competencies) and in the series of National Development Plans, the Revised National Policy on Education (RNPE, 1994), and the Education and Training Sector Strategic Plan (ETSSP, 2015-20) policy. These policies call for training mathematics, science, and computer studies teachers to assist the country in its endeavor to improve and diversify its economy.

**PURPOSE:**

The purpose of this qualification is to equip learners for secondary schools as well as vocational and technical colleges with knowledge, skills and competences to.

1. Carry out continuous assessment and evaluate teaching and learning in mathematics.
2. Demonstrate ability to use technology to enhance teaching and learning in mathematics.
3. Demonstrate a culture of creativity, innovation, and knowledge creation in mathematics context.

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

- Certificate IV NCQF Level 4 (BGCSE or equivalent).
- Entry through Recognition of Prior Learning (RPL) or Credit Accumulation Transfer (CAT) is allowable through institutional policies in-line with national RPL and CAT policies.

| ***SECTION B*** | ***QUALIFICATION SPECIFICATION*** |
|---|---|
| ***GRADUATE PROFILE (LEARNING OUTCOMES)*** | ***ASSESSMENT CRITERIA*** |
| 1. Demonstrate knowledge of mathematics content, pedagogy, and learners to design and execute classroom instruction. | 1.1. Sequence content to meet the cognitive level of the learners. |

| | |
|---|---|
| | 1.2. Demonstrate knowledge of the relationship of topics within and between disciplines.<br>1.3. Design instructional strategies that are appropriate to achieve effective teaching and learning. |
| 2. Undertake continuous assessment and evaluation of teaching and learning in mathematics. | 2.1. Utilise multiple assessment strategies and systematically gather data to monitor learners' academic progress.<br>2.2. Use assessment data to evaluate teaching and learning to guide decision making on instructional processes. |
| 3. Create learning environments that support all learners. | 3.1. Provide activities that support learners' academic, intellectual, and social development.<br>3.2. Cater for learners' diverse socio-cultural backgrounds and needs. |
| 4. Demonstrate knowledge of using technology to enhance teaching and learning in Mathematics. | 4.1. Utilise appropriate technologies in teaching and learning.<br>4.2. Empower learners to use available technologies in learning and in real life situations/applications. |
| 5. Appraise the value of continuous professional development. | 5.1. Engage in on-going reflective practices and use evidence for instruction to meet the needs of the learner.<br>5.2. Engage in school-based professional development activities to address contextual challenges affecting teaching and learning. |

| | |
|---|---|
| | 5.3. Participate in professional development activities at local and global level to foster collaboration within and between professions.<br>5.4. Conduct action research on issues affecting teaching and learning. |
| 6. Demonstrate competency about knowledge base underpinning the ethics of the teaching profession. | 6.1. Adhere to the legal aspects of teaching including the rights of learners and parents, as well as the legal rights and responsibilities of the teacher.<br>6.2. Evaluate effects of learner actions and choices to provide remediation. |
| 7. Cultivate a culture of creativity, innovation, and knowledge creation. | 7.1. Demonstrate critical thinking and problem solving, and entrepreneurship skills.<br>7.2. Engage learners in activities that foster creativity, innovation, and entrepreneurship skills.<br>7.3. Demonstrate the ability to conduct and produce research report. |
| 8. Demonstrate wider knowledge and problem-solving skills in Mathematics. | 8.1. Demonstrate a general understanding of the basic principles of mathematics.<br>8.2. Demonstrate knowledge through analysis of different forms of mathematical data. |

| ***SECTION C*** | ***QUALIFICATION STRUCTURE*** | | |
|---|---|---|---|
| | ***TITLE*** | | ***Total***<br>***(Per** Subject/* |

| ***COMPONENT*** | | ***Credits Per Relevant NCQF Level*** | | | *Course/ Module/ Units)* |
|---|---|---|---|---|---|
| | | ***Level [5]*** | ***Level [6]*** | ***Level [7]*** | |
| ***FUNDAMENTAL COMPONENT*** *Subjects/ Courses/ Modules/Units* | Computer Skills Fundamental I | ***8*** | | | ***8*** |
| | Computer Skills Fundamental II | | ***8*** | | ***8*** |
| | Communication and Academic Literacy Skills (Science) | ***12*** | | | ***12*** |
| | Academic and Professional Communication (Science) | | ***12*** | | ***12*** |
| | Introduction to Research Methods in Mathematics and Science | | | ***8*** | ***8*** |
| | Introduction to ICT in Mathematics Education | | | ***8*** | ***8*** |
| | Information and Communication Technology in Mathematics Education | | | ***8*** | ***8*** |
| | Introductory Mathematics I | ***16*** | | | ***16*** |

| | | | | | |
|---|---|---|---|---|---|
| ***CORE COMPONENT***<br>*Subjects/Courses/ Modules/Units* | Introductory Mathematics II | | ***16*** | | ***16*** |
| | Introduction to Educational Psychology | ***12*** | | | ***12*** |
| | Historical, Philosophical and Sociological Foundations of Education | | ***12*** | | ***12*** |
| | Teaching Practice I | | ***12*** | | ***12*** |
| | Teaching Practice II | | | ***12*** | ***12*** |
| | Introduction to Set and Number Theory | | ***12*** | | ***12*** |
| | Calculus I | | ***12*** | | ***12*** |
| | Calculus II | | | ***12*** | ***12*** |
| | Introductory Linear Algebra | | ***12*** | | ***12*** |
| | Basic Teaching Methods in Secondary School Mathematics | | ***12*** | | ***12*** |
| | Practicum in Secondary School Mathematics | | ***12*** | | ***12*** |
| | Abstract Algebra | | | ***12*** | ***12*** |
| | Real Analysis | | | ***12*** | ***12*** |

| | | | | | |
|---|---|---|---|---|---|
| | Differential Equations | | | ***12*** | ***12*** |
| | Introduction to Exceptional Children | ***12*** | | | ***12*** |
| | Teaching Strategies for School Mathematics | | | ***12*** | ***12*** |
| | Advanced Practicum in School Mathematics Teaching | | | ***12*** | ***12*** |
| | Functions of a Complex Variable | | | ***12*** | ***12*** |
| | Mathematical Methods | | | ***12*** | ***12*** |
| | Advanced Teaching Methods in School Mathematics | | | ***12*** | ***12*** |
| | Mathematics and Society | | | ***8*** | ***8*** |
| ***ELECTIVE/ OPTIONAL COMPONENT***<br>*Subjects/Courses/ Modules/Units* | ***Choose TWO (2) Basic Sciences cognate areas (64 Credits)*** | | | | ***64*** |
| | General Chemistry I | ***16*** | | | ***16*** |
| | General Chemistry II | | ***16*** | | ***16*** |
| | Geometrical Optics and Mechanics | ***16*** | | | ***16*** |

| | | | | | |
|---|---|---|---|---|---|
| | Electricity, Mechanism, and Elements of Modern Physics | | ***16*** | | ***16*** |
| | Principles of Biology | ***16*** | | | ***16*** |
| | Diversity of Animals and Plants | | ***16*** | | ***16*** |
| | **Applied Mathematics Options: Choose 2 Modules** | | | | ***24*** |
| | Vectors and Introductory Mechanics | | ***12*** | | ***12*** |
| | Introduction to Mathematical Statistics | | ***12*** | | ***12*** |
| | Computing I | | ***12*** | | ***12*** |
| | Newtonian Mechanics | | ***12*** | | ***12*** |
| | **Applied Mathematics Options: Choose 1 Modules** | | | | ***12*** |
| | Computing II | | | ***12*** | ***12*** |
| | Vector Calculus | | | ***12*** | ***12*** |
| | **Pure Mathematics Options: Choose 2 Modules** | | | | ***24*** |

| | | | | | |
|---|---|---|---|---|---|
| | Abstract Algebra II | | | ***12*** | ***12*** |
| | Real Analysis II | | | ***12*** | ***12*** |
| | Numerical Methods of Linear Algebra | | | ***12*** | ***12*** |
| | Dynamics | | | ***12*** | ***12*** |
| | **Mathematics Education Options: Choose 1 Module** | | | | ***8*** |
| | Philosophy and Psychology of Mathematics Teaching | | | ***8*** | ***8*** |
| | Mathematical Problem Solving | | | ***8*** | ***8*** |
| | **Pure Mathematics Options: Choose 2 Modules** | | | | ***24*** |
| | History of Mathematics | | | ***12*** | ***12*** |
| | Number Theory | | | ***12*** | ***12*** |
| | Abstract Algebra III | | | ***12*** | ***12*** |
| | Partial Differential Equations | | | ***12*** | ***12*** |
| | **Mathematics Education Options: Choose 1 Module** | | | | ***8*** |

| | | | | | |
|---|---|---|---|---|---|
| | Contemporary Issues in Mathematics | | | ***8*** | ***8*** |
| | Research Project in Mathematics/Science Education | | | ***8*** | ***8*** |
| | **Foundation of Education Options: Choose 1 Module** | | | | ***12*** |
| | Curriculum Theory and Instruction | | | ***12*** | ***12*** |
| | Contemporary Issues in Teacher Education in Botswana | | | ***12*** | ***12*** |

| ***SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL*** | |
|---|---|
| ***TOTAL CREDITS PER NCQF LEVEL*** | |
| ***NCQF Level*** | ***Credit Value*** |
| ***5*** | ***92*** |
| ***6*** | ***176*** |
| ***7*** | ***240*** |
| ***TOTAL CREDITS*** | ***508*** |
| ***Rules of Combination:*** | |

| ***(Please Indicate combinations for the different constituent components of the qualification)*** |
|---|
| The B Ed (Mathematics) is a four-year qualification composed of fundamental, core, and optional/elective modules. The qualification is a double major in Mathematics and Mathematics Education. To be awarded the qualification, a student must accumulate at least 508 credits composed of:<br>- 64 credits Fundamental modules<br>- 268 credits of Core modules<br>- 176 credits of Optional/elective modules |

| ***ASSESSMENT ARRANGEMENTS*** |
|---|
| • There shall be formative and summative assessment.<br>  ○ Summative assessment will be 50% and formative assessment will be 50%.<br>• Assessors shall all be registered with BQA. |
| ***MODERATION ARRANGEMENTS*** |
| • There shall be both internal and external moderation in line with the institutional policies in place for quality assurance purposes.<br>• All moderators shall be BQA registered and accredited. |
| ***RECOGNITION OF PRIOR LEARNING*** |
| There is provision for award of this qualification through RPL in-line with institutional and national RPL policies. |
| ***CREDIT ACCUMULATION AND TRANSFER*** |
| There is provision for credit accumulation transfer in-line with institutional policy. |
| ***PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)*** |

*Horizontal Articulation*

- Bachelor of Science
- Bachelor of Education (Biology)
- Bachelor of Education (Chemistry)
- Bachelor of Education (Physics)
- Bachelor of Nursing

***Vertical Articulation***

- Bachelor Degree (Honors)
- Master of Education (Mathematics)
- Masters in Science (Mathematics)
- Master of Education Degree in Curriculum and Instruction
- Master of Education Degree in Measurement and Evaluation

**Employment Pathways**

- Mathematics Teacher
- Mathematics Lecturer
- Mathematics Curriculum Developer
- Mathematics Education officer
- Researcher
- Banking sector

***QUALIFICATION AWARD AND CERTIFICATION***

***Qualification Award***

To be awarded a Bachelor of Education (Mathematics) degree qualification a candidate must acquire a minimum of 508 credits.

**Qualification Certification**

There will be issuance of a certificate and an official transcript at award.

***REGIONAL AND INTERNATIONAL COMPARABILITY***

The B Ed (Mathematics) qualification is comparable to similar B Ed qualifications from around the region (e.g., Fort Hare University, South Africa), and internationally (Victoria University and the Education University of Hong Kong).

**Similarities**

- Same duration, 4 years with comparable number of credits.
- Internship programmes are part of training in the qualifications.
- All have same entry level, level 7.

**Differences**

- Uses different names and variation to the qualification
- Some offer multiple teaching subjects, e.g., Physics and Chemistry combination whereas for some it's just one teaching subject.
- Different durations and structures for the internship programmes.

Possible employment pathways could be in the following fields:

- School mathematics teacher
  Education officer

***REVIEW PERIOD***

The qualification will be reviewed every five (5) years.