BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	**QUALIFICATION DETAILS**
QUALIFICATION DEVELOPER (S)	University of Botswana

TITLE	Master of Science in Applied Microbiology	**NCQF LEVEL**	9

STRANDS (where applicable)	1. Food Microbiology 2. Environmental Microbiology 3. 4.

FIELD	Natural, Mathematical and Life Sciences	**SUB-FIELD**	Biological Sciences	**CREDIT VALUE**	240

New Qualification		Legacy 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 current focus for Botswana is to shift from being a resource-based economy to a knowledge-based economy as a result, there is need to develop innovative graduates that will enable this transition. Botswana is a developing country and therefore needs research in microbiology for the country to effectively exploit its natural resources of plants, animals, as well developing the food processing industry.

The purpose of the MSc Applied Microbiology qualification is providing technical support to life science research, analysis and testing of microorganisms (including pathogens), and development and application

of products and processes resulting from research in Microbiology. The MSc Applied Microbiology qualification supports the training of personnel that, according to the 2008 Botswana Standard Classification of Occupations (BOSCO), provide support in designing, setting up and conducting experiments; setting up, calibrating, operating and maintaining laboratory instruments and equipment; collecting and preparing specimens and samples, chemical solutions and slides and growing cultures for use in experiments; perform routine field and laboratory tests; monitor experiments to ensure adherence to correct laboratory quality control procedures and health and safety guidelines; making observations of tests and analysing, calculating, recording and reporting test results using appropriate scientific methods; preserving, classifying and cataloguing specimens and samples.

The HRDC (2019) *Priority Skills (Current and Future)* has listed Life Science Professionals (that include microbiology) among the top professionals in high demand in Botswana. These are among the technical and soft skills occupations in high demand in Botswana.

The qualification also addresses the Botswana ETSS Plan whose mandate is to strengthen the match between qualifications and labour market requirements, thereby ensuring that graduates are more closely aligned to current and future employment needs. The ETSS also facilitates improved outcomes for all learners by addressing issues of quality and relevance, among others.

The MSc Applied Microbiology qualification also addresses the African Union Agenda 2063 (Aspiration #1, Goals 2, 3, 5, 6 and & 7) as well as the UN Sustainable Development Goals – 2030 Agenda (# 2, 3, 4, 6, 9, 13, 14 and 15), making our graduates relevant and competitive in a global market.

PURPOSE: (itemise exit level outcomes)

The purpose of the qualification aims to produce graduates with advanced knowledge, skills and competence to:

1. Execute routine and specialized microbiological laboratory skills, including laboratory safety, data analysis and reporting.
2. Study and conduct experiments concerning the factors involved in food/environmental-related problems.
3. Practice flexible, professional skills needed for careers in microbiology and related scientific and professional fields.
4. Conduct independent research in Microbiology and disseminate scientific findings appropriately.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- Bachelor's degree, NCQF Level 7 or its equivalent.
- There shall be provision for access through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in line with Institutional policies.

(Note: Please use Arial 11 font for completing the template)

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Apply advanced knowledge and understanding of principles in applied microbiology in field/laboratory.	1.1 Isolate and identify microorganisms and/or their products from food/environmental settings. 1.2 Use microorganisms to solve pertinent problems in food/environment. 1.3 Use appropriate techniques to characterise microorganisms and/or their products from food/environment
2.Address new questions in applied microbiology using an evidence-based approach.	2.1 Formulate a research question in areas related to food/environmental microbiology. 2.2 Identify and solve complex and unpredictable problems using the scientific method approach in areas relating to food/environmental microbiology. 2.3 Justify the choice of methods used in research activities. 2.4 Independent thinking and problem solving in food/environmental microbiology.
3. Communicate applied microbiology concepts, experimental results, and analytical arguments clearly.	3.1 Present research findings to various audiences. 3.2 Communicate knowledge to scientific community and general public.

	3.3 Produce reports that is readable and scientifically written.
4. Apply self-discipline and organizational skills by meeting deadlines and taking responsibility for self-development and learning of applied microbiology.	4.1 Make informed and rational decisions in applied microbiology research. 4.2 Complete assigned tasks on time. 4.3 Work independently to solve problems in applied microbiology.
5. Engage with new applied microbiology ideas and ways of working as an active member of the communities in which you study, live or work.	5.1. Contribute effectively to group work. 5.2 Produce reliable methodologies and results as a team member. 5.3 Take initiative as a leader in food/environmental microbiology-related concepts and complement other team members. 5.4 Demonstrates mastery of professional practice in food/environmental microbiology.

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SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [ ]	Level [ ]	Level [9]	
FUNDAMENTAL COMPONENT Subjects/ Courses/ Modules/Units					
CORE COMPONENT Subjects/Courses/ Modules/Units	Bacteriology			15	15
	Mycology			15	15
	Virology			15	15
	Molecular genetics			15	15
	Research Seminar			15	14
	Dissertation			106	106
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level			Total Credits
		Level [ ]	Level [ ]	Level [9]	
1. Food Microbiology	Food Microbiology and Hygiene			15	15
	Industrial Microbiology			15	15
	Food Science and Technology			15	15
	Food Toxicology			15	15
2. Environmental Microbiology	Environmental Toxicology			15	15
	Microbial Ecology			15	15

	Phycology			15	15
	Soil Microbiology			15	15
Electives					

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
9	***240***
TOTAL CREDITS	***240***

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

A Master of Science in Applied Microbiology qualification is composed of 240 credits at NCQF Level 9. Its qualification structure is made of:

Core components – 180 credits.

Students choose between Stream 1 and Stream 2

Stream 1: Food Microbiology - 60 credits

Stream 2: Environmental Microbiology - 60 credits

Total credits - 240

(Note: Please use Arial 11 font for completing the template)

ASSESSMENT ARRANGEMENTS
Formative assessment weighting of 50% Summative assessment with the weighting of 50% Assessment shall be carried out by qualified assessors within each cognate area.
MODERATION ARRANGEMENTS
Internal and external moderation shall be carried out by moderators with a minimum of a doctoral degree in a cognate area in line with ETP moderation policies.
RECOGNITION OF PRIOR LEARNING
Recognition of Prior Learning (RPL) will be applicable for consideration for award in this qualification and will be in line with relevant ETP policies.
CREDIT ACCUMULATION AND TRANSFER
Credit Accumulation Transfer (CAT) will be applicable for consideration for award in this qualification and will be in line with relevant ETP policies.
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)
Horizontal Articulation • Master of Science in Biotechnology, • Master of Science in Environmental Science, • Master of Science in Molecular Biology • Master of Science in Bioinformatics. **Vertical Articulation** • Doctor of Philosophy in Microbiology • Doctor of Philosophy Biotechnology. **Employment Pathways** • Microbiologist

- Ecologist
- Science writer
- Food technologist
- Microbiology Research Associate

QUALIFICATION AWARD AND CERTIFICATION

The minimum condition of award is 240 credits accrued as stipulated in the rules of combinations.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

- The title of MSc Applied microbiology offered is similar to the one in University of Embu in Kenya. The qualification is called MSc Microbiology in New Zealand, but that difference is immaterial.
- The exit outcomes for this qualification are aligned to the Botswana Standard for Classification of Occupations (BOSCO 2008) and the QAA Subject Benchmark Statement for Biomedical Science and Biomedical Sciences to ensure industry relevance.
- The NQF levels for all the qualifications are similar – Level 9.
- The credits vary from 180 to 240 to meet the minimum requirements for each NQF, hence this qualification has 240 Credits to meet the NCQF minimum requirements.
- The assessment criteria for all the qualification comprise a compulsory intensive research component making the qualifications to be similar.
- This qualification and the benchmarks offer graduates similar employment pathways as shown in the table.

Based on analysis, this Master of Science in Applied Microbiology qualification is similar to benchmarks offered in Kenya and New Zealand.

REVIEW PERIOD

The qualification will be reviewed every 5 years.

For Official Use Only:

CODE (ID)			
REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	

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