BOTSWANA Qualifications Authority	**BQA NCQF QUALIFICATION TEMPLATE**

SECTION A:	**QUALIFICATION DETAILS**		
QUALIFICATION DEVELOPER (S)	University of Botswana		
TITLE	Master of Philosophy in Biological Sciences	**NCQF LEVEL**	9
STRANDS (where applicable)	N/A		
FIELD	Natural, Mathematical and Life Sciences	**CREDIT VALUE**	**240**
SUB FIELD	Biological Sciences		

New Qualification		Legacy Qualification	✓	Renewal Qualification	
				Registration Code	

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 Master of Philosophy in Biological Sciences (MPhil Biological Sciences) is a two-year research-based graduate qualification. The purpose of the MPhil degree is to produce graduates with a high level of expertise and deeper knowledge in Biological Sciences. It is intended to develop graduates who think critically and are equipped with the necessary skills to conduct research independently, be able to search literature on an identified problem, identify gaps in the knowledge and make an original contribution to the subject area.

The qualification builds capacity in various fields of Biological Sciences to meet the current and future needs of Botswana and the international community in accordance with Botswana's Vision 2036 Pillar 1. There is a need to train, develop and produce skilled graduates who are researchers in the field of biology. Research in Biological Sciences is needed to effectively exploit natural resources such as plants, animals and microorganisms as stated in the National Development Plan 11 Section 7.9 (2017). The Human Resource Development Council (2019), produced a list of "Priority Skills and

Employment Trends", and in that list, Life Science Professionals are listed as one of the Top Occupations in demand in Botswana.

The HRDC 'Priority Skills 2023/2024' document further specifically lists 'Scientific Researchers' as one of the occupations needed. Highly trained scientists in Biological Sciences will contribute to several specialist priority arears listed in the HRDC document such as aquaculture, bioinformatics, biotechnology, cytology, entomology, environmental engineering, epidemiology, fish pathology, food science, forensic science, genetics, horticulture, meat inspection, microbiology, molecular biology, nutrition, one health, plant ecology, plant anatomy & physiology, plant pathology, quality assurance, seed technology, toxicology, university and college educators, vaccinology, virology, waste management, weed science, wildlife ecology and management.

The qualification thus aims to produce science researchers who specialise in Biological Sciences. This qualification will also contribute towards the attainment of the African Agenda 2063 Aspiration 1 of a prosperous Africa based on inclusive growth and sustainable development in producing well educated citizens in science, technology, and innovation. Additionally, it will also contribute to the achievement of the United Nations Sustainable Development Goal 4 of ensuring inclusive and equitable education and the promotion of lifelong learning opportunities for all. It will ensure that all learners acquire the knowledge and skills needed to promote sustainable development. The MPhil qualification also prepares students for transition into PhD research.

PURPOSE: (itemise exit level outcomes)

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

- Synthesise knowledge of Biological Sciences to formulate solutions, through research, to address some societal challenges in the area of Biological Sciences
- Conduct specialized independent research in Biological Sciences field, and report their findings in a scholarly approach
- Communicate complex biological concepts, research findings, and interpretations to both specialist and non-specialist audiences through written, oral, and visual presentations, adhering to academic standards
- Work independently and collaboratively with other researchers to solve some societal problems through research in biological and allied sciences, contributing to knowledge creation and practical solutions within the field

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- NCQF Level 7 or its equivalent.
- Entry through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) is accessible to all candidates through institutional policies in line with the national RPL and CAT policies.

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SECTION B QUALIFICATION SPECIFICATION

GRADUATE PROFILE (LEARNING OUTCOMES)	ASSESSMENT CRITERIA
1. Review and integrate existing biological sciences knowledge to inform future studies and contribute towards the development of biological sciences	1.1 Assess current knowledge, theories, and discoveries in biological sciences, identifying gaps, inconsistencies, and areas for future research 1.2. Integrate information from various subfields of biological sciences, including molecular biology, ecology, genetics, and more, to form a comprehensive understanding that can be used to guide future research. 1.3. Analyze recent advancements in the biological sciences to identify emerging trends and areas where new research could contribute to scientific development and innovation. 1.4. Formulate clear, research-driven hypotheses or questions, informed by existing knowledge, to guide future studies that contribute to the advancement and development of biological sciences.
2. Analyze and synthesize current research to address complex problems in biological sciences	2.1. Identify and evaluate current scientific research related to complex biological problems, ensuring the use of high-quality, peer-reviewed sources 2.2. synthesize research findings from multiple studies, drawing connections between different scientific perspectives and integrating them into a cohesive understanding of the problem. 2.3. Formulate evidence-based solutions to address the identified biological problems, using synthesized research data to justify recommendations 2.4. Present synthesized research and proposed solutions, ensuring the communication of complex ideas in a structured, logical manner that is accessible to both scientific and non-scientific audiences.
3. Retrieve, evaluate, analyze and interpret biological information to	3.1. Gather/collect relevant biological data from a variety of credible sources,

make informed judgments in various biological contexts.	including scientific databases, peer-reviewed journals, and experimental results. 3.2. Assess the quality, reliability, and validity of the retrieved biological information, identifying biases, limitations, and strengths in the data and its sources. 3.3. Apply appropriate analytical methods and scientific reasoning to interpret biological data, deriving meaningful insights and recognizing patterns, trends, or anomalies within different biological contexts. 3.4. Propose sound, evidence-based hypotheses, solutions, or judgments, ensuring that conclusions are logical, informed, and applicable to real-world biological scenarios.
4: Communicate scientific findings appropriately and effectively in the field of Biological Sciences using appropriate formats and methods tailored to diverse audiences.	4.1 Select appropriate communication formats and methods based on the audience's background and comprehension level 4.2 Break down complex biological concepts and findings into accessible and clear information, avoiding jargon where possible. 4.3 Use analogies, examples, or diagrams to enhance understanding without diluting scientific accuracy 4.4 Integrate visuals, such as graphs, tables, and images, to support and clarify key points. 4.5. Utilize verbal communication skills, including appropriate tone, pace, and engagement techniques to maintain audience interest and facilitate learning
5. Conduct specialized research and demonstrate capacity to develop and apply new skills and techniques to identify and solve problems in biological sciences.	5.1 Conduct a thorough literature review to identify unresolved issues or emerging questions within a specialized area of biological sciences. 5.2 Develop clear and focused research questions or hypotheses based on identified gaps to guide experimental design and investigation.

	5.3 Identify and, if necessary, develop specialized techniques and methodologies that align with the research objectives. 5.4 Acquire and refine new technical skills in areas such as molecular biology, bioinformatics, microscopy, or field research, depending on the study's focus. 5.5 Apply critical thinking to interpret complex data, identifying patterns, correlations, or anomalies that may indicate underlying biological phenomena. 5.6 Utilize problem-solving skills to troubleshoot experimental issues, optimize protocols, and adjust methodologies to overcome challenges. 5.7 Synthesize research findings to understand their implications within the field of biological sciences and contribute to existing knowledge. 5.8 Develop and communicate solutions or recommendations based on research results that address the original problem, considering potential applications and future research directions
6. Demonstrate independence and teamwork in conducting innovative investigations to address societal challenges in biological and allied sciences, contributing to both knowledge creation and practical solutions within the field	6.1 Set personal and team goals aligned with addressing specific societal challenges, ensuring alignment with the broader investigative aims. 6.2 Utilize regular meetings, progress updates, and open communication channels to facilitate information sharing, troubleshooting, and mutual support within the team. 6.3 Conduct independent research and propose innovative methods or techniques that could enhance the project's effectiveness and relevance. 6.4 Collaborate across biological and allied sciences (e.g., environmental science, public health, bioinformatics) to incorporate a range of perspectives,

	enriching the investigation's impact on societal challenges. 6.5 Draw on complementary skills and knowledge within the team to develop comprehensive, interdisciplinary approaches to complex issues. 6.6 Contribute ideas that bridge theoretical knowledge with practical solutions, addressing societal needs such as healthcare improvements, environmental conservation, or sustainable agriculture. 6.7 Evaluate the project's outcomes, considering both the scientific contributions and their potential impact on societal well-being. 6.8 Document and share findings through publications, presentations, or outreach, emphasizing the relevance of biological science in creating solutions to pressing societal challenges.
7. Manage research projects efficiently, including time management, resources allocation and adherence to ethical guidelines during the undertakings of Biological Sciences research projects.	7.1 Outline the research objectives, timelines, and key milestones, ensuring a structured approach to each phase of the project. 7.2 Create a realistic project timeline, allocating sufficient time for data collection, analysis, and reporting, and adjusting as needed for unforeseen challenges. 7.3 Identify the necessary materials, equipment, and budgetary requirements for each stage of the project. 7.4 Optimize resource use by prioritizing essential components and collaborating with team members or departments to share tools or facilities where possible. 7.5 Ensure compliance with ethical guidelines, including obtaining appropriate approvals from ethical review boards, particularly when involving human or animal subjects. 7.6 Maintain data integrity, confidentiality, and responsible conduct, adhering to

	best practices in data collection, storage, and reporting. 7.7 Review project progress against established milestones, identifying any delays or issues that may impact project success. 7.8 Implement problem-solving strategies and adjust timelines, resource allocations, or methods as necessary to keep the project on track while maintaining ethical standards.

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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	Research Proposal			60	60
	MPhil Thesis			180	180
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level			Total Credits
		Level [ ]	Level [ ]	Level [ ]	
1.					
2.					
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 Philosophy in Biological Sciences qualification is composed of 240 credits at NCQF Level 9. Its qualification structure is made of:

Core components

1. Research Proposal – 60 credits
2. MPhil Thesis – 180 credits

Total credits - 240

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ASSESSMENT ARRANGEMENTS
Formative assessment weighting of 25% Summative assessment with weighting of 75% Assessment will be carried out by qualified assessors preferably with a Doctoral degree in Biological Sciences
MODERATION ARRANGEMENTS
Internal and external moderation shall be carried out by qualified moderators with a minimum Doctorate degree (NCQF level 10) in a relevant field and registered with a recognized regulatory body.
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 institutional and National 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 institutional and National policies
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation

- Master of Science Biotechnology,
- Master of Science Applied Microbiology
- Master of Science Environmental Science,
- Master of Science Molecular Biology and
- Master of Science Bioinformatics.

Vertical Articulation

1. Doctor of Philosophy in Microbiology
2. Doctor of Philosophy in Ecology
3. Doctor of Philosophy in Zoology
4. Doctor of Philosophy in Parasitology
5. Doctor of Philosophy in Biotechnology.
6. Doctor of Philosophy in Plant Sciences

Employment Pathways

- Microbiologist
- Biomedical Scientist
- Bioinformatician

- Pharmacologist
- Ecologist
- Botanist
- Zoologist
- Molecular Biologist
- Plant/Animal Systematists
- Science writer
- Food technologist
- Research Associate

QUALIFICATION AWARD AND CERTIFICATION

Candidates must earn 240 credits and satisfy all rules of combinations to be awarded a Master of Philosophy in Biological Sciences. MPhil Biological Sciences certification will be granted according to the institution's certification policies.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

Benchmarking has been done against other Master of Philosophy qualifications offered by the University of Cape Town, South Africa and Swansea University United Kingdom, in relation to graduate profiling, content, assessment criteria and employment pathways. The MPhil degrees in these universities had also been benchmarked against other reputable international universities. The outcomes of this process are highlighted below. (Also see compatibility matrix).

University of Cape Town (South Africa - Regional)

Title of Qualification is not the same but closely related to MPhil Biological Sciences. Botany is one component of Biological Sciences.

NQF Level & Credit Value or Duration: NQF level (9) and duration of the MPhil Degree Botany is similar to our MPhil Biological Sciences. There is difference in the total credits at University of Cape Town (120) and University of Botswana (240).

Main Exit Outcome(s): Main exit outcomes are similar to the proposed MPhil Biological Sciences.

Domains/Modules/Courses/Subjects covered (Fundamental, core & electives): Are similar to our MPhil Biological Sciences

Assessment strategies and Weightings: The degree at University of Cape town is similar to our MPhil Biological Sciences as they both require oral examinations. They are also similar in the examination of student by writing of dissertation, assessment of oral presentations, and thesis examined by external examiner.

Qualification rules and minimum Standards for the award of the qualification: Are not stated by the university.

Education and Employment Pathways – These are similar to the proposed MPhil Biological Sciences. For education, they both serve as entry points for PhD degrees, while for employment both degrees lead to similar employment opportunities.

Swansea University (Wales, UK - International)

Title of Qualification is the same to the proposed MPhil Biological Sciences

NQF Level & Credit Value or Duration: The degree at Swansea University (NQF level 7, can be at level 8) is different to the degree at University of Botswana (NQF level 9) There is difference in the minimum credits at Swansea University (120) and University of Botswana (240). Minimum credits for MPhil are 120 credits but can be more, compared to 240 credits for the proposed MPhil Biological Sciences. The duration is similar at both institutions at 2years (full-time) – 4 years (part-time).

Main Exit Outcome(s): Are similar to our MPhil Biological Sciences.

Domains/Modules/Courses/Subjects covered (Fundamental, core & electives): Are similar to our MPhil Biological Sciences

Assessment strategies and Weightings: The degree at Swansea University is like our MPhil Biological Sciences in requiring oral examinations. The University of Swansea specifies a minimum of four supervision meetings stipulated but the University of Botswana does not stipulate number of supervision meetings. The qualifications are similar in the examination of written thesis.

Qualification rules and minimum Standards for the award of the qualification: For a student to quality, the student should have passed all modules required at each level of study and successfully defend and pass the Masters dissertation.

Education and Employment Pathways – These are similar to the proposed MPhil Biological Sciences. For education, they both serve as entry points for PhD degrees, while for employment both degrees lead to similar employment opportunities.

Conclusion:

Overall, our MPhil Biological Sciences shares similarities regionally with MPhil Degree (Botany) at University of Cape Town and internationally with MPhil Biological Sciences at Swansea University.

REVIEW PERIOD

The qualification will be reviewed every 5 years.

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