QUALIFICATION SPECIFICATION								
								SECTION A
QUALIFICATION DEVELOPER	Botswana University of Agriculture and Natural Resources							
TITLE	Doctor of Philosophy (PhD) in Animal Science					**NCQF LEVEL**		10
FIELD	Agriculture & Nature Conservation		**SUB-FIELD**			Animal Science		
New qualification	√	Review of existing qualification						
SUB-FRAMEWORK	General Education		TVET			Higher Education		√
QUALIFICATION TYPE	Certificate		Diploma			Bachelor		
	Bachelor Honours		Master			Doctor		√
CREDIT VALUE						360		

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE

The Tertiary Education Policy of 2008 aims at development of the country's high level human resource and research and innovation capacity of Botswana (Government of Botswana, GoB 2008). There is a widespread recognition that universities and other tertiary education institutions (TEIs) are major drivers of economic competitiveness in an increasingly knowledge-driven economy (TEC 2011). Therefore, this PhD qualification in Animal Science will contribute to this vision. TEIs are in their nature provide graduates with the capacity to translate knowledge into useful application, who can build research excellence that generates new ideas and entrepreneurial advantage (TEC 2011). The Tertiary Education Policy further recognises that tertiary education has a significant role to play in ensuring Botswana's successful transition from being a primary resource driven economy to a diversified economy (GoB 2008).

It is generally believed that an important motive behind acquiring more education is to gain a stronger foothold in the labour market and thus lower the risk of unemployment (Blöndal, Field and Girouard 2001). Therefore, in periods of high unemployment, a wise strategy is to train at a higher degree levels (Masters and Doctorate) as this will impact higher skills and knowledge needed by high performing organisations. This is because the opportunity costs for education decline as the difficulties of finding employment increase (OECD (2009).

Besides benefiting the individual, the Government of Botswana recognise the need for tertiary education system to play a leading role in transforming Botswana into a knowledge driven innovative society (GoB 2008). This is premised from the fact that most often, for research and innovative intensive universities, the mainstay of such achievements is based on post-graduate training. Therefore, for Botswana to

beneficiate her livestock industry, investment in PhD training in Animal Agriculture (Animal Science and Animal Health) is required.

As a country, Botswana has made visible stride in the livestock agriculture, particularly in the beef industry due to her ability to access and maintain the EU market for beef. This has been the results of attaining stringent EU requirement for sanitary and traceability and in most part, this has been attained due to human resource development at technical level by BUAN since 1967. But with the advent of challenges emanating from animal diseases especially FMD, climate change and droughts, maintaining quality standards and sustaining markets, new innovative thinking is needed and normally this is obtained through higher education training and research. Emergence of high technologies in breeding, reproduction (molecular biology), nutrition, product development (meat and dairy) and vaccine production, means that animal production is becoming more advanced and sophisticated and therefore the need to train at higher level of PhD, where skills in methodologies and evaluation of systems are imparted.

A report by HRDC (2015) indicate that data from Botswana 's labour market show that agriculture is the largest single employer of labour at 25 percent. In most cases this labour is unskilled and therefore to add value to agriculture labour value chain, niche programmes are needed. Hence MSc and PhD training is needed to provide evidence-based policy reforms for the sector (HRDC 2015). This report by HRDC (2015) summarised indicative numbers per annum for skills in high demand as follows; Veterinarian (30), Animal Science (20), Food Science (20) Range Ecology/Manager (20), Research Scientists (20), and Animal Product Processors (20) while skills with technical impetus are as follows; Food science (100), Animal Breeder (80), Animal Nutritionist (60), Dairy Scientists (80), Poultry/Ostrich Producer (100), Dairy Processors (50) and Livestock Producers (50).

A 2016 report on Top Occupations in High Demand emphasized the way forward for and gave guidelines on how to use data that identified gaps in the human development value chain that hamper economic advancement and technological development of Botswana. These top 20 occupations included six (6) animal agriculture subject areas; being Veterinarians, Animal Scientists and Breeders, Range Ecologists, Dairy Scientists/Technologists, Feed Specialists and Artificial Inseminators. Cross cutting disciplines that are entrenched in the training of PhD in Animal Science were also identified as Research, Innovation and Technology, Food Science and Environmental Science (HRDC 2016). Hence the recommendation by HRDC for HEI to develop niche programmes to align them to the top occupations in high demand.

PURPOSE

The purpose of this qualification is to:

- impart skills to evaluate and critic prevailing livestock production models and propose relevant management solutions based on appropriate sound science.
- equip candidates with critical skills for innovation and technology development in animal agriculture to bring efficiency to the industry and policy making arena.
- impart skills that would enable devising new, innovative and creative frameworks and concepts that will bring profitability, environmental stewardship and professional ethics to the livestock industry.
- inculcate ideals of advocacy, responsibility and accountability to the profession.
- instil self-management, independent thinking, authority and high impact scholarship in the livestock industry

ENTRY REQUIREMENTS (including access and inclusion)

Minimum entry requirement for this qualification is:

NCQF level 9 (MSc) in Animal Science or Equivalent i.e., MSc in Biological Science, Veterinary Science, Pasture Science, Rangeland Science or Ecology and Zoology with course work and research.

Recognition of Prior Learning (RPL):

There will be access through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in accordance with the RPL and CAT National Policies.

QUALIFICATION SPECIFICATION SECTION B	
GRADUATE PROFILE (LEARNING OUTCOMES) Graduates from this qualification should be able to:	**ASSESSMENT CRITERIA**
• Apply the evaluation skills on the current livestock farming systems.	• Demonstrate a comprehensive knowledge base in Animal Agriculture which demonstrates a depth of insights in the area. • Gain mastery of livestock production systems, through independent evaluation to identify gaps, problems and opportunities. • Demonstrate an understanding of the principles and theories in modern Animal Production and the ability to critique current research and thus advancing scholarship in Animal Agriculture. • Prove the ability to make sound theoretical judgments based on current evidence which lead to epistemologically thinking at PhD level.
• Design of a testing protocols, implement and independently manage a project.	• Demonstrate skills on methodological design that reflect evidence of the alignment of theory/hypothesis with industry. • Prove mastery of selection and application of the methodological challenges to new concepts and theories. • Exercise self-management, supervisory skills and team work on project execution and data collection. • Select, apply and manage appropriate statistical software, instruments and techniques in the analyses of quantitative data or research samples. • Apply analytical skills on complex problem matrices and demonstrate them on real world situations.
• Produce scholarly report of high scientific standard.	• Identify, critically analyse, synthesize and independently evaluate quantitative and / or qualitative data. • Demonstrate an ability for written communication of academic work to reach cohesive conclusions.

	• Challenge or defend established principles using evidence-based data. Demonstrate technical, language and scholarly writing standards associated with PhD research and professionalism. • Apply various forums such as Flyers, Brochures, posters and digital forms to disseminate research information.
• Maintain and follow profession standards and code of ethics	• Demonstrate ethical sensitivity for subjects used (animals and/or humans). • Adhere to professional integrity and ethics.

QUALIFICATION STRUCTURE

SECTION C

FUNDAMENTAL COMPONENT Subjects / Units / Modules / Courses	**Title**	**Level**	**Credits**
	Proposal Development and Presentation	10	120
CORE COMPONENT Subjects / Units / Modules / Courses	**Research and Thesis writing and Seminar**	10	240
ELECTIVE COMPONENT Subjects / Units / Modules / Courses	N/A		
	Total	**360**	

ASSESSMENT AND MODERATION ARRANGEMENTS

ASSESSMENT ARRANGEMENTS

Both Formative and Summative assessments will be used.

Formative Assessment

Formative assessment will include seminars and drafting of research proposal and thesis which will collectively contribute **20%** of the final grade.

Summative Assessment

There shall be a thesis which will be submitted to Department at the end of the studies. The thesis shall contribute **80%** of whole PhD work. The thesis shall be examined by External Examiner according to the University's regulations and procedures.

MODERATION

Internal and external moderators to be engaged will be BQA accredited subject specialists in relevant fields with relevant industry experience and academic qualifications.

Both internal and external moderation shall be done in accordance with applicable policies and regulations.

RECOGNITION OF PRIOR LEARNING (if applicable)

There shall be provision for award of the qualification through Recognition of Prior Learning (RPL) in accordance with institutional Policies in line with the National RPL Policy.

Candidates may submit evidence of credits accumulated in related qualification in order to be credited for the qualification they are applying for.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathways

Horizontal Articulation

- Doctor of Philosophy in Pasture Science
- Doctor of Philosophy in Range Ecology
- Doctor of Philosophy in Wildlife Management
- Doctor of Philosophy in Animal Health
- Doctor of Philosophy in Food Science

Employment Pathways

- Academics (Researchers and Trainers).
- Private Sector (Researchers, Trainers, Consultants).
- Public Service as Researchers, Scientists and Extension Officers.
- Non-Governmental Organisations.
- Self-employment (Farmers, private consultants in the livestock industry, Suppliers of goods and Services).

QUALIFICATION AWARD AND CERTIFICATION

For a Candidate to achieve this qualification they must have acquired a minimum of **360** credits. The Candidate should pass all the **FUNDAMENTAL and CORE,** modules.

Certification

A **Doctor of Philosophy (PhD) in Animal Science** will be awarded to a Candidate upon completion of the qualification in accordance with applicable policies. A certificate and transcript will be issued at award.

REGIONAL AND INTERNATIONAL COMPARABILITY

Regional and International Comparability

An extensive regional and international comparability analysis was done with various countries in Southern Africa, Europe, Americans, and the Pacific based on their reputation in PhD qualifications.

Selected metrics were used for comparing PhD in Animal Science. Qualification name, credit load, duration of the study, qualification structure as well as entry requirements were used to compare with the following universities: University of Zimbabwe, Stellenbosch University, University of Forte Hare, University of Pretoria, Massey University, Wageningen University and Utah State University. University of Pretoria offer their qualification as theory and research while Wageningen University final grade is weighed as follows; 15% education, seminar, conference, and workshops and 75% research.

REVIEW PERIOD

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