SECTION A:	***QUALIFICATION DETAILS***														
QUALIFICATION DEVELOPER (S)	Botswana International University of Science and Technology														
TITLE	Bachelor of Science Honours in Statistics											***NCQF LEVEL***	*8*		
FIELD	Natural, Mathematical and Life Sciences		***SUB-FIELD***	Statistics								***CREDIT VALUE***	*120*		
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:

1.1.1 Justification for the Qualification

The Bachelor of Science Honours in Statistics is needed to ensure that Botswana produces highly qualified graduates to play a crucial role in transforming the country to a knowledge-based economy. Tertiary Institutions therefore need to impart mathematical and statistical knowledge by providing rigorous teaching at the highest level, and to advance such knowledge by facilitating faculty research of both academic staff and students.

1.1.2 Needs Assessment Analysis

The government of Botswana through NDP11 (2017) mandated universities to produce graduates with Mathematics and Statistics skills. The Human Resource Development Council (HRDC) research conducted in

2016 has identified professions in Statistics as instrumental in transforming the economy to a knowledge-based economy.

1.1.3 Stakeholders Involvement

Stakeholders from various specialized sectors in Botswana have been consulted and remained actively engaged in the design of this qualification. The invaluable input from the industry stakeholders also helped the qualification developers to have an insight on the current and future needs in the areas where graduate of this qualification is required.

PURPOSE:

The purpose of this qualification is to produce graduates who have highly specialized knowledge and advanced skills and competences to:

- Apply fundamental principles and techniques of mathematics and statistics to solve practical problems in different sectors of the economy such as finance, wildlife, agriculture, health, education, and other sectors.
- Communicate in technical and non-technical terms, concepts of probability and statistics in different sectors of the economy.
- Analyse and represent various form of data using ICT skills.
- Create jobs in the field of Statistics (entrepreneurial skills).

ENTRY REQUIREMENTS (including access and inclusion)

Minimum Entry Requirements

- Bachelor's Degree (NCQF level 7) in the same or a cognate field of study.

- Applicants who do not meet the above criteria but possess relevant industry experience may be considered through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) institutional policies in line with National RPL and CAT Policies for access.

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
LO 1. Apply a range of technical concepts and principles of Statistics to real life problems.	1.1 Solve real life problems through principles of statistics. 1.2 Recognize the limitations of basic techniques used in Statistics. 1.3 Exemplify the significance of discovered scientific knowledge in a contemporary context. 1.4 Illustrate how Statistical concepts and ideas become generally accepted.
LO 2. Analyse statistical information to make valid inference.	2.1 Assess the quality of information using Statistical reasoning. 2.2 Perform data analysis on data arising from a variety of sources. 2.3 Employ appropriate statistical procedures to produce valid inference from data. 2.4 Interpret results of statistical analyses correctly.
LO 3. Design and implement statistical tools to produce scientific information.	3.1 Generate relevant information, with due concern for bias and for any ethical or safety considerations. 3.2 Manage statistical information with due concern for bias and ethical or safety considerations. 3.3 Conduct appropriate Statistical procedures such as graphical, computational techniques, and deductive reasoning. 3.4 Analyse data with scientific evidence and present valid arguments and conclusions.
LO 4. Evaluate statistically derived solutions against key scientific reasoning skills.	4.1 Appraise naïve and flawed statistical reasoning using logical thinking. 4.2 Evaluate a solution to a statistical problem.

	4.3 Show statistical thinking and reasoning processes.
LO 5. Communicate scientific understanding orally and in writing using visual, symbolic, graphic and/or other forms of representation to the target audience.	5.1 Formulate scientific report on practical or academic work, by means of coherent written documents, which follow appropriate scientific conventions. 5.2 Present Statistical/Scientific information verbally in front of others. 5.3 Practise appropriate referencing conventions in which plagiarism is avoided and intellectual property is respected.
LO 6. Apply highly specialized quantitative models, Statistical skills, theories, concepts, and principles to solve real-world problems.	6.1 Formulate both concrete and abstract statistical problems. 6.2 Balance the complexity or accuracy of statistical models and the timely delivery of solutions. 6.3 Carry Out research that society can positively benefit from.
LO 7. Utilise high-level computational methodology to tackle complex real-life events.	7.1 Develop computer programs for implementation of statistical models. 7.2 Discover patterns and relationships in high dimensional and complex data sets. 7.3 Categorize appropriate statistical computational techniques for different types of data sets.
LO 8. Apply sophisticated stochastic modelling (e.g., in financial planning, agricultural research, wildlife management, weather forecasting, epidemiology).	8.1 Demonstrate the general principles of stochastic processes, and their classification into different types for problems that arise from different application areas. 8.2 Explain what is meant by the Markov property in the context of a stochastic process and in terms of filtrations.

	8.3 Demonstrate the use of Markov Chains as a tool for statistical modelling. 8.4 Simulate Markov Chains using appropriate computational software.
LO 9. Utilise specialised Statistical knowledge to conduct surveys and clinical trials	9.1 Operate effectively as a member of a team or group in scientific projects or investigations. 9.2 Identify the socio-economic impact of scientific interventions in society. 9.3 Develop Statistical models that offer solutions regarding populations. 9.4 Make ethically and culturally sensitive decisions on the effects of scientifically based activities on the society. 9.5 Affect scientific knowledge for the direct benefit of others.
LO 10. Develop entrepreneurial concepts and appraise business plans and effectively communicate the result to appropriate audiences.	10.1 Formulate ideas and / or methods that can be transformed into new products or services. 10.2 Evaluate a given business plan. 10.3 Produce written reports that communicate complex disciplinary and interdisciplinary ideas and information effectively for the intended audience and purpose. 10.4 Conduct oral presentations that communicate complex disciplinary and interdisciplinary ideas and information effectively for the intended audience and purpose
LO 11. Transmit specialised knowledge, technical skills and ideas in the implementation and application of sophisticated risk modelling	11.1 Articulate principles of probability and inference that are relevant to risk modelling. 11.2 Affect these principles to given situations, for both financial and non-financial organisations.

in financial and non-financial organisations.	11.3 Analyse hypothetical scenarios in relation to risk modelling. 11.4 Develop appropriate proposals or recommendations in relation to risk modelling.

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SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Relevant NCQF Level***			***Total Credits*** ***(Per** Subject/ Course/ Module/ Units)*
		Level [6]	***Level [7]***	***Level [8]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	**Fundamental Component Total Credit Hours**				
CORE COMPONENT *Subjects/Courses/ Modules/Units*	**Core Component Total Credit Hours**			***96***	**96**
	Advanced Project in Statistics			36	36
	Advanced Probability and Inference			24	24
	Advanced Applied Statistics			24	24
	Advanced Statistical Computing			12	12
Mathematical Biology I ***ELECTIVE/ OPTIONAL COMPONENT***	**Elective/Optional Component Total Credit Hours**			**24**	**24**
	Advanced Statistics I			12	12
	Advanced Statistics II			12	12

Subjects/Courses/ Modules/Units	Experimental Design			12	12
	Categorical Data Analysis			12	12
	Biostatistical Methods			12	12
	Time Series			12	12
	Measure Theory			12	12
	Mathematical Biology I			12	12
	Mathematical Biology II			12	12
	Mathematical Biology III			12	12
	Financial Mathematics			12	12
	Advanced Computing I			12	12
	Advanced Computing II			12	12

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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
Level 8	***120***
TOTAL CREDITS	***120***

Rules of Combination:

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

This qualification will have at least **120 credits** and take at least one (1) year to complete.

The credit combination for the qualification is from **96 core components** and **24 from elective/optional component**.

For Elective Components Choose at least **24 credits** from a pool of modules in Advanced Statistics I & II, Experimental Design, Categorical Data Analysis, Biostatistical Methods, Time Series, Mathematical Biology I, II, & III, Measure Theory, Financial Mathematics and/or Advanced Computing I & II.

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ASSESSMENT ARRANGEMENTS

Formative and summative assessments will be used.

Formative assessment (Weighs more than Summative Assessment)

Will include continuous assignments that will collectively contribute to the final grade. Integrated assessment procedures to ensure that the purpose of the qualification is achieved.

Summative assessment (weighs less than Formative Assessment)

There shall be examinations that shall contribute to the final grade. Assessment will be in accordance with respective ETP's regulations and procedures.

MODERATION ARRANGEMENTS

Internal Moderation

Pre-moderation is done by relevant internal structures. Quality assurance of the assessment instruments is conducted prior to administration.

External Moderation

There will also be external moderation. Moderators must be BQA registered and accredited

RECOGNITION OF PRIOR LEARNING

There shall be an award of the qualification using Institutional RPL Policy in line with the National RPL Policy.

CREDIT ACCUMULATION AND TRANSFER

There shall be access and award of credits of the qualification using Institutional Credit Accumulation and Transfer (CAT) Policy in line with the National CAT Policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathways

Horizontal progression:

- Post-Graduate Diploma in Statistics
- Post-Graduate Certificate in Statistics

Vertical Progression:

- Master of Science in Statistics

Employment Pathways:

Statistics graduates apply their problem-solving skills to a wide variety of fields and upon successful completion of the degree, graduates qualify to work in:

- Business consultant
- Operations researcher,
- Information technology and computing specialist
- Data scientist
- Space and astronomy scientist
- Environmental modelling (resources, biodiversity, weather, and climate),
- Engineering (fluid mechanics, optimizing industrial processes),

QUALIFICATION AWARD AND CERTIFICATION

Qualification award:

The learners enrolled in the qualification will be able to obtain a Bachelor of Science Honours in Statistics. To obtain the Bachelor of Science Honours in Statistics the student must accumulate 120 credits.

Certification:

Candidates meeting prescribed requirements will be awarded a Bachelor of Science Honours in Statistics in accordance with standards prescribed for the award of the qualification and applicable policies.

REGIONAL AND INTERNATIONAL COMPARABILITY

The qualification compares favorably with other similar Bachelor of Science Honours degree qualifications; regionally and internationally around the world with regards to:

- learning outcomes and assessment criteria,
- number of credits,

- structure and purposes, and

notional learning time/duration

The qualification was benchmarked with a number of qualifications offered by different academic institutions. The following universities and qualifications were used for the comparisons:

i) Regional Institutions

BIUST BSc Honours in Statistics is similar to that of the University of the Witwatersrand in South Africa in terms of the number of credits (120 credits) that includes the requirement for mandatory 36 credits research project, learning outcomes, entry (BSc Level 7) and the duration (one-year). The difference is observed in the taught core modules which are not available for the University of Witwatersrand but BIUST has two taught core courses. However, there is flexibility in the options available for both programs.

Bachelor of Science degree (Honours) in Applied Statistics, Namibia University of Science and Technology-NUST, Namibia: This degree prepares students a consolidate and show a deepened knowledge in statistics, evaluate and apply statistical theories and techniques, use of statistical models and software to solve complex real-life problems like the proposed BIUST program.

ii) International Institutions

Bachelor of Science Honours degree in Statistics, University College of London, UK: A three years - Bachelor of Science Honours degree in Statistics worth a minimum of 120 credits per year (equivalent to 1200 notional hours per year) produces candidates with the following competence: High mathematical thinking and reasoning in problem solving, able to do real life modelling using statistical manipulations and handle abstract statistical concepts to think critically and logically.

The Bachelor of Science Honours degree offered in UK, South Africa and Namibia generally emphasizes development of competency in probability, mathematical statistics, data analysis and computing and interpretation at NCQF level 8. The qualification structure is similar and compares well in terms of learning

outcomes. The proposed Bachelor of Science Honours in Statistics incorporates workplace learning and modules that equip learners to be entrepreneurs.
REVIEW PERIOD
The qualification will be reviewed every five (5) years.

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