QUALIFICATION SPECIFICATION SECTION A						
QUALIFICATION DEVELOPER	**BA ISAGO University**					
TITLE	Master of Science in Financial Engineering			**NCQF LEVEL**	9	
FIELD	Business, Commerce and Management Studies	**SUB-FIELD**		Finance		
New qualification	✓	**Review of existing qualification**				
SUB-FRAMEWORK	General Education		TVET		Higher Education	✓
QUALIFICATION TYPE	Certificate		Diploma		Bachelor	
	Bachelor Honours		Master	✓	Doctor	
CREDIT VALUE	259					

RATIONALE AND PURPOSE OF THE QUALIFICATION

The Human Resources Development Council (HRDC) Top Occupations in High Demand (2016) has identified financial planners, investment and financial analysts as occupations in high demand in Botswana under the business and financial services sector. These occupations have been prioritized based on the sub-sector's potential for growth and creation of employment. In addition the report highlight that the skills in this were scarce, as a result the country relied on imported of labour. Therefore, the need to train the locals with the aim of localizing the occupations in the near future. Furthermore, this is validated the Human Resource Development Council- Priority Skills and Employment Trends which also identified the financial planning and financial analyst as future skills required I the business sector.

Furthermore, the Botswana Vision 2036 and the National Development Plan 11 (NDP 11) seek to achieve economic diversification through human capital development. This effort is also corroborated by the National Human Resource Development Strategy (NHRDS) 2016, which calls for diversification of the economy from natural resource to human resource development. Therefore, this qualification would help drive the envisioned plans of the country by enabling degree holders to articulate into a higher qualification.

The purpose of the M.Sc. in Financial Engineering is to equip candidates with the analytical skills and technical

competencies to:

i. Analyze and interpret project structures through use of recognized financial engineering techniques and tools.
ii. Design financial instruments for banks, insurance companies, consultancy firms, and other private and governmental organizations operating on the financial market.
iii. Conduct financial planning, derivatives valuation, portfolio management, and financial risk analysis
iv. Assess and solve financial problems using mathematical models.

ENTRY REQUIREMENTS (including access and inclusion)

i. Candidates should have at least a Bachelor's Degree (NCQF level 7) in Finance, Risk and Insurance, Actuarial Science, Quantitative Social Science, Applied Mathematics, Operations Research, Statistics and Computer Science from a recognized institution.

OR

ii. Special Entry: Candidates who do not have the minimum academic qualifications stated above, but have been or is working in a tax environment or similar, will be considered through a Recognition of Prior Learning (RPL) process which shall be administered according to the institutional and national RPL Policy. There will also be provision for Credit Accumulation Transfer to the learner in a case they are transfer in from another institution as per the institutional and national policy on CAT.

QUALIFICATION SPECIFICATION **SECTION B**

GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1. Apply statistical/mathematical/quantitative modelling methodologies to analyse and propose operational solutions to financial problems.	1.1 Apply the statistical/mathematical/quantitative and data mining methods to handle data 1.2 Solve the formulated problems using a range of statistical/mathematical/quantitative techniques. 1.3 Analyse statistical/mathematical/quantitative data to aid in interpretation of relationships between variables for accurate decision making. 1.4 Interpret findings from statistical/mathematical/quantitative data to relevant users of information to enable them to make useful conclusions.
2. Formulate financial and operational structures in projects, using recognized financial engineering	2.1 Plan operational and financial structures in projects.

techniques and big data analysis tools.	2.2 Apply principles of corporate finance, asset and liability management and cost accounting in managing financial structure of projects. 2.3 Use financial engineering techniques and best practices to analyse financial and operational structures of projects. 2.4 Price a range of financial instruments using financial engineering models such as Black Scholes, Black-Derman-Toy, Heath-Jarrow Morton, and Cox-Ross-Rubinstein.
3. Assess risks related to financial business in the fourth industrial revolution and develop mitigation strategies	3.1 Determine the different risk sources affecting financial institutions posed by changing technology. 3.2 Evaluate the current risk trends of the global financial landscape. 3.3 Propose solutions to deal with emerging issues that are likely to disrupt the finance sector such as cryptocurrencies, Fintech, RegTech, Artificial Intelligence (AI) 3.4 Apply stochastic calculus to the hedging of financial derivatives as a way of mitigating financial risks. 3.5 Implement relevant risk management procedures to handle identified risks. 3.6 Apply volatility models such as Heston and Hull-White to analyse stochastic volatility of market prices.
4. Evaluate portfolios and their risk profiles using portfolio management theory	4.1 Build a selection of investments that will meet the long-term financial goals and risk tolerance of an investor. 4.2 Assess strengths, weaknesses, opportunities and threats across a spectrum of investments 4.3 Advise on maximization of the investments' expected return within an appropriate level of risk exposure

5. Apply economic modeling and forecasting to financial markets	5.1 Examine the asymmetry and non-linear properties in variance of financial assets. 5.2 Forecast stock market returns using economic modelling methods. 5.3 Recommend the most appropriate forecasting techniques for developed, emerging, and frontier markets.
6. Develop financial instruments for private and governmental organizations operating in the financial market.	5.1 Assess characteristics of financial instruments to match them with the most relevant sector. 5.2 Design mechanisms that may help private and governmental organizations development in emerging financial markets 5.3 Monitor changes in the business environment to recommend appropriate financial instruments.
7. Conduct research and the development of new methods within the broad field of financial engineering, recognizing their roles in the innovation process.	4.1 Identify a research topic and formulate it into a specific research problem 4.2 Formulate research questions to guide the research project and assist in the construction of a logical argument 4.3 Construct hypothesis to discriminate between alternative explanations for events or patterns 4.4 Compile a literature review based on primary & secondary data 4.5 Design a theoretical framework or empirical model for the study 4.6 Interpret existing theories, models, methods and results, both qualitatively and quantitatively, within the field of financial engineering 4.7 Select appropriate research methodologies for different research studies 4.8 Use statistical and/or mathematical modelling software for data analysis and interpretation of results 4.9 Draw research finding and make recommendations.

QUALIFICATION STRUCTURE			**SECTION C**
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	Research Methodology	8	18
CORE COMPONENT Subjects / Units / Modules /Courses	Advanced Financial Econometrics and Data Analysis	9	14
	Stochastic Analysis and Optimisation in Finance	9	12
	Financial Statement Analysis and Planning	9	12
	Advanced Corporate Financial Strategy	9	12
	Advanced Asset Pricing Theory and Practice	9	12
	Derivative Securities	9	15
	Quantitative Risk Management	9	15
	Financial Computing	9	15
	Dissertation	9	80
	Product Design and Engineering	9	15
	Financial Modelling and Trading Rules	9	15
ELECTIVE COMPONENT Subjects / Units / Modules /Courses	***Choose 2***		
	Foreign Exchange Exotic Options	9	12
	Intellectual Property and Contracts Law	9	12
	Financial Time Series Analysis	9	12
	Advanced Capital Budgeting	9	12
	Structured Finance	9	12

Rules of combinations, Credit distribution (where applicable):

Level 8 credits =18

Level 9 credits =241

Total Credits=259

The credit combination for this qualification is made of 18 from fundamental component, 217 from core component and 24 from elective component where candidates would choose only two (2) modules.

ASSESSMENT AND MODERATION ARRANGEMENTS

ASSESSMENT

Formative Assessment

The weighting of formative assessment is 60 % of the Final assessment mark.

Summative Assessment

The weighting of summative assessment is 40 % of the Final assessment mark.

Pass Mark

A student will be considered to have passed each module upon attainment of a weighted mark of 50% and above.

MODERATION

Internal moderation requirements

i. All assessment instruments should be internally moderated before administration
ii. All marked scripts should be moderated internally
iii. The preparation of the moderation should be accompanied by the Assessment Matrix.

External moderation requirements

External moderation is a final check, by external subject experts, that the examination and marking is at the right standard for the type and level (with NCQF Level 9) of the qualification. It ensures that an assessment instrument and outcome are fair, valid and reliable and that the assessment criteria have been applied consistently.

i. Following Internal Moderation, a sample of assessment items will be reviewed by the External Examiner.
ii. The role of the External Examiner is to provide an objective, external engagement with the assessment items to ensure that they have been graded reliably and reflect the required academic standards set. External moderation will be carried as follows:
    - The sample size within a module will be at least 10% of work from each assessment item.
    - The sample should be taken from all modules in those levels which contribute to the final award classification.
    - The sample will contain items that were chosen for internal second marking and those that were not.
    - A copy of the Assessment Moderation Form is available to all External Examiners for recording purposes.

Assessment and moderation will be carried out by BQA registered and accredited assessors and moderators in line with BQA/ national policies.

RECOGNITION OF PRIOR LEARNING (if applicable)

Recognition of Prior Learning (RPL) and Credit Accumulation Transfer (CAT) will be applicable for consideration for

award in this qualification.

Recognition of Prior Learning (RPL) is a form of assessment for eligibility into the qualification. It allows recognition of skills and knowledge acquired through informal learning such as work or life experience. RPL is granted where the candidate is able to provide sufficient evidence of their competence in a module as determined by the institutional policies.

Candidates wishing to apply for RPL assessment submit their applications three months prior to the commencement of the qualification they seek to enroll in. All prospective students will complete an application form and attach all required evidence, in the form of following:

- In-house training certificates
- Examples of work produced
- Workplace reference
- Statement of duties
- Project Work
- Newspaper cuttings of achievements
- Minutes of meetings attended or conducted
- Documents showing organizing/supervisory skills
- Awards, commendations, certificates of merit

The institution will review all evidence presented and will match that evidence against the Performance Criteria stated in the Unit of Competency. The learning provider may find it necessary to ask questions about the evidence or ask the candidate to perform an activity or undergo a test to provide evidence where there are gaps between what has been provided and what is required.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathways

Horizontal Articulation

- Charted Financial Analysts
- Master of Science: Banking and Financial Risk Management
- Master of Science: Finance and Investment Management
- Master of Science: Risk Management and Insurance

Vertical Articulation

- PhD: Finance and Financial Management
- PhD: Accounting and Financial Management
- PhD: Financial Management

Diagonal Articulation

- PhD: Project Management
- PhD: Risk Management and Insurance
- PhD: Investment management

Employment Pathways

- Financial Planner
- Financial Analyst
- Corporate Finance Adviser
- Portfolio Manager
- Credit Risk Manager
- Financial Regulator
- Derivatives Analyst
- Stockbroker
- Actuary
- Budget Accountant
- Financial Aid Officer
- Credit Analyst

QUALIFICATION AWARD AND CERTIFICATION

Candidates meeting the prescribed requirements will be awarded the qualification in accordance with the qualification composition rules and applicable policies. To be eligible for the award, candidates must have successfully completed all fundamental, core and elective modules and passed examinations in accordance with regulations set by the Faculty. The Master of Science Financial Engineering certificate will be awarded to candidates who have obtained a minimum of 257 credits. The Master of Science of Science in Financial Engineering will be completed in 2 year.

REGIONAL AND INTERNATIONAL COMPARABILITY

- **Master of Science in Financial Engineering- Reykjavik University (Iceland), worth 120 credits at**

NCQF Level 9

The qualification runs for a duration of two years like the proposed MSc. Financial Engineering, the qualification draws on natural science, engineering and social sciences to create a knowledgebase that equips students to deal with a range of problems and challenges characterized by increasing interdisciplinary, international and cross-cultural activities. Both the proposed qualification and that of Reykjavik University combine broad knowledge with a deep understanding of the core discipline of Financial Engineering. The knowledge imparted to the student is transferable across many types of projects, organizations and environment. However, Reyjavik University has made research an option while the proposed qualification makes research compulsory as research is viewed as an indispensable component.

- **Master of Science in Financial Engineering- University of Pretoria (South Africa), worth 180 credits at NCQF Level 9**

  Like the proposed qualification, the University of Pretoria MSc. Financial Engineering qualification has duration of two years and compulsory dissertation. University of Pretoria makes it mandatory for the student to produce a concept article for a reputable journal or conference for submission during research while the proposed qualification makes only dissertation compulsory. While the University of Pretoria consists of two mandatory non-credit bearing master's coursework modules the proposed qualification has 11compulsory and two optional coursework modules.

- **Master's in Financial Engineering- WorldQuant, (USA) worth at NCQF 9**

  The qualification is offered at the same NCQF Level which is 9 and runs for 2 years. The university uses online mode of delivery unlike the proposed qualification that uses block release mode. Both qualifications follow the same structure in terms of having core modules in mathematics, finance and risk management.

- **Master of Science in Financial Engineering- Mohammed IV Polytechnic (Morocco), worth 24 credits at NCQF Level 9**

  This qualification offers 8 taught modules which, although they bare different names, they cover what the proposed qualification covers. The duration of the qualification is however ten weeks unlike the proposed qualification which has duration of two years. Unlike the proposed qualification which has a compulsory research component, this qualification has compulsory practical research seminar attendance.

REVIEW PERIOD

This qualification will be reviewed after 5 years upon registration.
Other information – please add any supplementary information to help the application for this qualification for NCQF Registration.
Refer to Appendix 1: Needs Assessment Report for the **Master of Science in Financial Engineering.**

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**	