BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS																	
QUALIFICATION DEVELOPER(S)	Botswana International University of Science and Technology																	
TITLE	Bachelor of Science in Actuarial Science											**NCQF LEVEL**	7					
STRANDS (where applicable)	*Not applicable*																	
FIELD	Business, Commerce and Management Studies.		**SUB-FIELD**	Finance								**CREDIT VALUE**	480					
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

1. RATIONALE:

1.1. Justification for the Qualification

As Botswana's economy continues to grow and diversify by moving from a resource-based economy to a knowledge-based economy that is anchored on science, technology, and innovation to drive skills, capability and industry growth, there is an increasing demand for skilled professionals in the field of actuarial science. Actuaries play a crucial role in managing financial risks and making informed decisions that impact both individuals and organisations. However, there is currently a shortage of qualified actuarial professionals in Botswana, which poses a challenge to the country's economic development.

To address this need, we propose a Bachelor of Science in Actuarial Science qualification. This qualification will provide students with the knowledge and skills necessary to become competent and ethical professionals in the field of actuarial science and will help meet the growing demand for qualified actuaries in Botswana. Actuarial science is a field that deals with the application of mathematical and statistical methods to assess and manage risk in various industries such as insurance, finance, and healthcare. The National Development Plan (NDP 11) highlights the importance of enhancing the quality of education and increasing the number of skilled professionals in Botswana. Additionally, Botswana's Vision 2036 seeks to transform Botswana into a high-income country with a diversified economy that is driven by knowledge-based industries. Offering a Bachelor of Science in Actuarial Science is one way to support these national objectives. This qualification is also supported by the Tertiary Education Policy, as approved by the National Assembly on the (2008:10).

1.2. Needs Assessment Analysis

The Botswana Human Resource Development Council (HRDC) recognizes that the country's human capital development is critical for achieving Botswana's Vision 2036 pillars, which include sustainable economic growth, social development, and human and institutional capacity building. In line with the nation's Vision 2036 Pillars 1 and 2, the tertiary education providers are mandated to provide quality training opportunities for the increasing number of school leavers. A qualification in Bachelor of Science in Actuarial Science is thus in line with this mandate as a contribution to the realisation of Vision 2036's National Development Plan (NDP 11). The HRDC identifies the need for "priority skills" in the science, technology, engineering, and mathematics (STEM) in their published Priority skills 2023/2024 recommendation for external training and development of new programmes document. Actuarial science is a critical component of the financial services industry, and Botswana's economy will be heavily reliant on the financial sector in the future. A qualification in Actuarial Science will provide students with the skills and knowledge required to work in insurance, pensions, investments, and other financial sectors. According to a report by PricewaterhouseCoopers (PwC), Botswana's insurance industry is projected to grow by 7.1% annually, which highlights the growing need for skilled actuarial professionals in the country.

In addition to the growing demand for actuarial professionals, the HRDC has identified a shortage of skilled professionals in Botswana. The NDP 11 aims to address this shortage by increasing access to higher education and enhancing the quality of education. Offering a Bachelor of Science in Actuarial Science will provide students with the opportunity to gain skills that are in high demand on the job market. Actuarial Science is a field that requires a high level of mathematical and statistical proficiency, and students who graduate with a degree in this field will be well-positioned to pursue careers in various industries both locally and internationally.

Reference

(2023) PRIORITY SKILLS 2023/2024 RECOMMENDATION FOR EXTERNAL TRAINING AND DEVEL-OPMENT OF NEW PROGRAMMES. rep. Human resource Development Council. Available at: https://www.hrdc.org.bw/sites/default/files/External%20Training%20-%202023-2024%20Recommendation%20for%20External%20Training%20and%20Development%20of%20New%20Programmes.pdf (Accessed: 03 March 2024).

1.3. Stakeholders Involvement

Stakeholder involvement was critical in the design and development of this qualification, as it ensured that the proposed Bachelor of Science in Actuarial Science curriculum is relevant to the needs of the industry. The qualification developer has been engaging with industry experts, prospective employers, and professional bodies to identify the skills and knowledge required by actuarial professionals. This will help to ensure that the curriculum is aligned with the needs of the job market and that graduates are well-prepared to meet the demands of the industry. By involving stakeholders in the development of the training qualification, the developer is certain that the curriculum is up-to-date and relevant. Actuarial Science is a field that is constantly evolving, so the developer will continue to receive feedback from stakeholders to help in the curriculum's regular review in line with the Botswana Qualifications Authority (BQA) requirement. Involving industry experts and professional bodies in the development of the curriculum will help to ensure that it reflects the latest industry trends and best practices.

The developer's engaged stakeholders are made up of various sectors in Botswana who have been brought together to form a standing Industrial Advisory Board (IAB). The involvement of this diverse group of stakeholders is important in ensuring that graduates are well-prepared for the job market. These prospective employers and industry experts will occasionally provide valuable insights into the skills and knowledge that are required by actuarial professionals. By involving these stakeholders in the development of the training qualification, we ensure that graduates are equipped with the skills and knowledge that are in high demand on the job market.

2. PURPOSE: (itemise exit level outcomes)

This purpose of this qualification is to produce graduates with specialised knowledge, skills, and competences to be able to:

- Apply appropriate mathematical and statistical tools to solve a variety of problems encountered in financial and actuarial applications.
- Design and analyse models that predict financial effects of events.
- Manage risk for businesses such as insurance companies, pension funds, banks, and investment firms.
- Critically analyse and interpret financial information.
- Conceptualise, design, and implement research to contribute to the existing body of knowledge in the actuarial industry and other closely linked sectors.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

Entry into this qualification is through any one of the following requirements.

(i) Certificate IV, NCQF level 4 (General Education or TVET) in a related field with provisions for exemptions, where applicable, in line with Credit Accumulation and Transfer (CAT) policy.

(ii) 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) policies for access.

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

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Understand and critically apply foundational and additional mathematical skills required for successful actuarial practice.	1.1. Use simple numerical techniques to calculate the roots of equations and evaluate integrals. 1.2. Apply the basic rules of differentiation (including the chain rule and implicit differentiation) to calculate first, higher-order, and partial derivatives. 1.3. Determine the extreme points of a function of two variables, including using Lagrange multipliers for constrained problems. 1.4. Evaluate double and triple integrals and calculate areas and volumes of simple geometric shapes. 1.5. Apply simple numerical integration techniques such as the trapezium rule and Simpson's rule to estimate the value of definite integrals. 1.6. Use appropriate techniques to determine convergence or boundedness sequences and series in simple cases. 1.7. Solve simple first order differential equation models for various applications with given conditions and use the solution to find the values of any parameters involved. 1.8. Determine whether a given matrix is diagonalizable and, if so, find a diagonalising matrix. 1.9. Apply linear and non-linear programming in solving real-world optimization problems. 1.10. Apply a variety of established techniques with proficiency and accuracy to perform calculations and manipulate materials to solve problems in linear programming, non-linear programming, and

	approximation methods. 1.11. Analyse and evaluate the effectiveness of different tools and techniques in a variety of contexts beyond those initially studied, demonstrating critical thinking and problem-solving skills. 1.12. Utilise appropriate software effectively and appropriately to enhance problem-solving capabilities in the field of linear and non-linear programming. 1.13. Carry out arithmetic with complex numbers, explore the system of complex numbers and their properties, and demonstrate their usefulness in certain areas of actuarial work such as the analysis of certain stochastic processes, complex financial models, and the study of complex-valued functions used in actuarial science.
2. Analyse the financial environment in which most actuarial work is undertaken to identify the key products and principles of insurance, pensions, and other areas of traditional and emerging actuarial practice.	2.1. Identify and categorize the different types of national and international financial markets and illustrate their roles in the global economy to identify financial advantage for actuaries. 2.2. Compare the influence of private and personal interests in decision making in government and private institutions and interpret the concepts of agency theory and prohibitions of conflicts of interest and duty. 2.3. Evaluate the objectives and roles of key participants in financial markets, such as investment banks, retail banks, investment management companies, pension funds, insurance and reinsurance companies, non-financial corporations, sovereign funds, micro-finance providers, and unregulated organizations, through analysis and interpretation and their effectiveness in achieving their objectives. 2.4. Compare typical operating and corporate governance models of insurance companies, reinsurance companies, pension funds, retail banks, and investment management companies, and evaluate their effectiveness in achieving their objectives. 2.5. Classify and differentiate various types of social security benefits and financial products and

	assess how they meet the objectives of issuers and beneficiaries. 2.6. Analyse and evaluate the main principles of insurance and pensions and how they impact social security benefits and financial products. 2.7. Assess and evaluate the major factors affecting the development of financial systems, such as demographic changes, economic development, technological changes, and climate change. 2.8. Critically evaluate the main elements and purpose of prudential and market regulation and their impact on financial systems. 2.9. Evaluate and prioritize the main risks to the stability of national and global financial systems through analysis and interpretation.
3. Utilise the specialised concepts of economics to interpret financial events that affect the economic system.	3.1. Demonstrate a systematic knowledge and critical awareness of economic theory in the areas of finance. 3.2. Use a range of mathematical techniques to solve economic problems in the financial industry. 3.3. Demonstrate the use of relevance of economic theory to the business environment and the links between economic theory and its application in business. 3.4. Analyse and apply basic microeconomic and macroeconomic theory to business problems. 3.5. Perform calculations using commonly used utility functions to compare investment opportunities. 3.6. Explain how market data can be used to construct a yield curve. 3.7. Demonstrate a clear understanding of the assumptions of mean-variance portfolio theory and its principal results.
4. Apply core statistical techniques to actuarial applications in insurance, pensions, and emerging areas of actuarial practice to quantitatively assess risk	4.1. Define basic univariate distributions and use them to calculate probabilities, quantiles, and moments. 4.2. Apply basic tests for the one-sample and two-

	sample situations involving the normal, binomial, and Poisson distributions, and apply basic tests for paired data. 4.3. Apply the method of maximum likelihood for constructing estimators of population parameters. 4.4. Use appropriate software to fit a multiple linear regression model to a data set and interpret the output. 4.5. Use generating functions to establish the distribution of linear combinations of independent random variables. 4.6. Identify the applications for which a moment generating function, a cumulant generating function, and cumulants are used and the reasons why they are used. 4.7. Estimate empirical survival and loss distributions, for example, using a) Kaplan-Meier estimator, including approximations for large data sets, b) Nelson Aalen estimator, c) Cox proportional hazards, and d) Kernel density estimators. 4.8. Explain what is meant by a contingency (or two-way) table and use a chi-square test to test the independence of two classification criteria. 4.9. Explain the fundamental concepts of Bayesian statistics and apply them to parameter estimation, hypothesis testing, model selection, and empirical Bayesian credibility models. 4.10. Explain the empirical Bayes approach to credibility theory and use it to derive credibility premiums in simple cases. 4.11. Outline the processes of identification, estimation, and diagnosis of a time series, the criteria for choosing between models, and the diagnostic tests that may be applied to the residuals of a time series after estimation. 4.12. Describe simple applications of a time series model, including random walk, autoregressive and cointegrated models, as applied to security prices and other economic variables.

	4.13. Develop deterministic forecasts from time series data, using simple extrapolation and moving-average models, applying smoothing techniques, and seasonal adjustment when appropriate. 4.14. Explain what is meant by the Markov property in the context of a stochastic process and in terms of filtrations. 4.15. Derive the Kolmogorov equations for a Markov process with time-independent and time/age-dependent transition intensities. 4.16. Demonstrate how Markov jump processes can be used as a tool for modelling and how they can be simulated.
5. Utilise asset valuation techniques and investment theory to construct actuarial models.	5.1. Explain the theoretical and historical relationships between the total returns and the components of total returns on the main asset classes and key economic variables. 5.2. Utilise the Capital Asset Pricing Model and a multifactor model to compute the required return on a particular asset, given appropriate inputs, and subsequently evaluate the value of the asset. 5.3. Evaluate the principles and objectives of investment management and appraise the investment needs of an institutional or individual investor. 5.4. Compare and contrast methods for the valuation of asset portfolios and assess their appropriateness in different situations. 5.5. Compute an optimum portfolio using mean-variance portfolio theory and assess the limitations of this approach. 5.6. Compute the expected return and risk of a portfolio of many risky assets using mean-variance portfolio theory, given appropriate inputs, and discuss the implications. 5.7. Analyse how asset-liability modelling can be used to formulate an appropriate investment strategy. 5.8. Evaluate various methods of quantifying the risk of investing in different classes and sub-classes

	of investment. 5.9. Describe the utilization of a risk budget for controlling risks in a portfolio and its importance. 5.10. Evaluate the performance of an investment portfolio relative to a benchmark and provide recommendations for improvement.
6. Analyse and interpret real-world datasets using methods from statistics and computer science to answer business and other questions with a focus on long- and short-term insurance, social security, retirement benefits, healthcare, and investment.	6.1. Define the meaning of the terms statistical learning and machine learning and differentiate between supervised learning and unsupervised learning. 6.2. Analyse various problem-solving scenarios, including the differences between discrete and continuous approaches, to determine when machine learning is an appropriate approach and develop an understanding of the types of problems typically addressed by machine learning. 6.3. Assess the characteristics of the data and the desired analysis to select the most appropriate tool(s) and utilise them for cleaning, restructuring, and transforming data to make it suitable for analysis. 6.4. Apply a computer package to fit statistical distributions, single or multiple linear regression models, survival models, and generalized linear models to a dataset, and evaluate the quality of fit using appropriate goodness-of-fit measures, interpreting the output to draw meaningful conclusions. 6.5. Employ an appropriate computer package to implement neural network and decision tree techniques in solving simple machine learning problems, evaluate the performance of the models, and recommend improvements based on the results. 6.6. Create and design effective data visualizations to communicate the key conclusions of an analysis and evaluate their effectiveness in conveying the intended message to the target audience. 6.7. Analyse the main issues that need to be addressed by a data governance policy, including the ethical and regulatory issues involved in working with

	personal data and extremely large data sets, and recommend solutions to ensure data privacy and security. 6.8. Synthesise the importance of reproducible research, identify the elements required to ensure a data analysis is reproducible, develop a detailed plan for replicating a data analysis, and assess its reproducibility based on established criteria.
7. Utilise the basic principles of financial theory, accounting, corporate finance and financial mathematics to interpret financial statements.	7.1. Describe the basic principles of personal and corporate taxation, as well as the taxation of investments held by institutions. 7.2. Explain the value of reporting on environmental, social, and economic sustainability, as well as alternative methods to traditional financial reporting, and describe the possible contents of such reports. 7.3. Explain the basic structure of company and group accounts, the purpose of the main components of company accounts, and how to interpret them. 7.4. Construct simple statements of financial position and profit or loss. 7.5. Calculate and interpret financial and accounting ratios. 7.6. Explain the characteristics of various forms of equity capital and long-term debt capital from the perspective of both the issuer and the investor. 7.7. Describe the characteristics of various forms of short and medium-term finance from the perspective of both the issuer and the investor, including the methods that a company may use to raise capital through the issue of securities. 7.8. Describe the role of derivative securities and contracts in corporate finance. 7.9. Calculate the present and accumulated values of cash flows using deterministic interest rates, including rates compounding over different intervals

	and continuously. 7.10. Illustrate the principal concepts and terms underlying the theory of a term structure of interest rates and demonstrate its application to modelling various cash flows, along with the calculation of sensitivity of the value to changes in the term structure. 7.11. Explain how duration and convexity are used in the immunization of a portfolio of liabilities. 7.12. Calculate expected present values and variances of cash flows using the simple stochastic theory of interest. 7.13. Describe possible sources of finance for a business and explain the factors that influence the choice of capital structure and dividend policy. 7.14. Calculate investment return on a project using different methods and evaluate each method.
8. Design and develop stochastic processes and actuarial models to actuarial work, specifically applications in long- and short-term insurance, social security, retirement benefits, healthcare, and investment.	8.1. Analyse the reasons for using models, including pricing, reserving, capital modelling, and describe their characteristics. 8.2. Compare and contrast stochastic and deterministic models and analyse their advantages and disadvantages. 8.3. Describe the features, applications, and differences between scenario-based, proxy, and extreme value models. 8.4. Determine the suitability of a model for a specific application and evaluate its potential output. 8.5. Distinguish between short-run and long-run properties of a model and assess their relevance to decision-making. 8.6. Define and describe desirable properties of a risk measure and compute risk measures, such as Value at Risk and Tail Value at Risk, and interpret their properties, uses, and limitations. 8.7. Conduct sensitivity and stress testing of assumptions and explain their importance in the modelling process.

	8.8. Develop an audit trail that enables detailed checking and high-level scrutiny of a model. 8.9. Identify factors to consider when communicating model results and producing appropriate documentation. 8.10. Identify distributions suitable for modelling the frequency of losses, calculate relevant moments, probabilities, and other distributional quantities for collective risk models, and evaluate the effect of coverage modifications and inflation on aggregate models. 8.11. Apply multiple-state Markov chain and Markov process models, derive maximum likelihood estimators for transition intensities in models of transfers between multiple states with piecewise constant transition intensities, and calculate and interpret standard probability functions, including survival and mortality probabilities, forces of mortality, and complete and curate expectations of life. 8.12. Describe heterogeneity within a population and how selection can occur. 8.13. Define and evaluate simple contracts for contingent payments dependent on the state of a single entity and calculate the means and variances of the present values of the payments under these contracts. 8.14. Apply survival models to solve problems in long-term insurance, pensions, and banking, such as calculating premiums and reserves for life insurance contracts and predicting potential defaults on loan portfolios. 8.15. Define and evaluate simple contracts for contingent payments dependent on the state of multiple entities and calculate the means of the present values of the payments under these contracts. 8.16. Apply methods of projecting and valuing expected cash flows that are contingent upon multiple state and multiple decrement events and apply these contracts to insurance and pension problems. 8.17. Apply projected cash flow techniques in

	pricing, reserving, and assessing the profitability of contracts for contingent payments, with appropriate allowance for expenses such as life insurance, short-term insurance, and pension fund applications. 8.18. Describe and apply techniques for analysing delay (or run-off) triangles and projecting the ultimate position.
9. Evaluate the risk management issues faced by an entity, apply core aspects of individual risk management and enterprise risk management, and recommend appropriate solutions.	9.1. Apply the concepts of the actuarial control cycle to the risk management process and use them to develop a risk management plan for an organization. 9.2. Explain the concept of enterprise risk management (ERM) and analyse the relevance of the legislative and regulatory environment, financial and investment markets, sustainability and environmental factors, and the operating sector of the organization to the ERM process. 9.3. Describe and classify different types of risk, including financial risk, insurance risk, environmental risk, operational risk, and business risk, and explain how the design and characteristics of different products and services affect the risk exposure of the parties to a transaction. 9.4. Analyse the exposures for a particular transaction by considering the risk appetite and risk culture of key stakeholders and explaining the difference between risk (measurable) and uncertainty (immeasurable). 9.5. Explain the concept of risk pooling and the portfolio approach to overall risk management and use models for risk management in the context of pricing, reserving, valuation, and capital management. 9.6. Describe different methods of risk aggregation and explain their relative advantages and disadvantages, and apply these models to practical problems in insurance, pensions, or an emerging area of actuarial practice. 9.7. Explain the most common risk mitigation and management techniques, including avoidance, acceptance, reduction, transfer, and monitoring, and

	recommend an appropriate risk management strategy for a particular business issue. 9.8. Explain the principles of asset-liability management and apply them to the main types of liability held by financial institutions and analyse the risk management aspects of a particular business issue. 9.9. Explain the implication of risk for capital requirements, including economic and regulatory capital requirements, and describe the principles and process of setting assumptions for model inputs. 9.10. Explain how data collection and analysis for monitoring risk experience depend on the other stages of the control cycle, produce a data collection plan for a given risk profile, and use experience monitoring to revise models and assumptions and improve future risk management. 9.11. Describe risk measures and explain the importance of risk reporting to managers and stakeholders.
10. Communicate scientific understanding orally and in writing using visual, symbolic, graphic and/or other forms of representation to the target audience.	10.1. Produce written reports that communicate disciplinary and interdisciplinary ideas and information effectively for the intended audience and purpose. 10.2. Produce oral presentations that communicate disciplinary and interdisciplinary ideas and information effectively for the intended audience and purpose.
11. Identify topics for research, plan and conduct research, analyse results, and communicate the findings to the satisfaction of the subject experts.	11.1. Design and implement research work to contribute to the existing body of knowledge. 11.2. Produce research, or other scholarly work, of a quality to satisfy peer review, and to merit publication. 11.3. Use appropriate methodologies to address research question. 11.4. Work collaboratively with other researchers; demonstrate effective communication and problem-solving skills. 11.5. Present research work in a conference setting.

12. Demonstrate knowledge in business and entrepreneurship for running and managing a successful business enterprise.	12.1. Apply entrepreneurial skills to identify and create business opportunities, and ideas that can be transformed into new products or services that may be commercialised successfully. 12.2. Identify, research and analyse issues and problems in financial sector and/or businesses and recommend suitable and well justified solutions.
13. Demonstrate effective, practical, and professional application of technical knowledge and skills in personal and actuarial professional practice.	13.1. Explain and apply common techniques for effective written and oral communication in technical contexts. 13.2. Produce effective technical communications for various audiences (peers, managers, clients) related to a work project. 13.3. Summarize technical actuarial results comprehensively and produce effective executive summaries for work products. 13.4. Identify matters to be addressed in a summary of conclusions following a peer review and prioritize stakeholder needs when designing a solution. 13.5. Evaluate a problem with a manager to ensure understanding and consider material factors when designing a solution. 13.6. Explain and ensure effective communication of uncertainty surrounding a solution where relevant. 13.7. Create appropriate permanent documentation for a work product and apply the actuarial control cycle appropriately. 13.8. Apply a decision-making process to a case study and describe the elements of an effective decision-making process. 13.9. Explain the benefits of teamwork and time management and use common project management techniques to design a work plan. 13.10. Distinguish material factors from other factors (e.g., material external forces from other external forces) and analyse typical situations that could lead to an accusation of professional misconduct. 13.11. Understand the structure and governance of

	the actuarial association, the role of the actuarial association, and the actuary's obligations to clients, regulators, other stakeholders, and the wider public. 13.12. Explain the importance of professional standards and ethics, prioritizing professional responsibility and public interest over personal gain with respect to a work assignment. 13.13. Analyse situations where an actuary's integrity could come under pressure and develop a plan for handling the situation successfully. 13.14. Understand the importance of documenting work and acceptable documentation elements to achieve a satisfactory audit trail and checking work, including peer review. 13.15. Apply professional standards and ethics appropriately to a case study and monitor changes to standards of practice to determine their application to a particular work assignment. 13.16. Evaluate current level of professional development and personal limitations to accept a specific actuarial work assignment.

SECTION C		***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***				***Total Credits***
		Level [5]	***Level [6]***	***Level [7]***	***Level [8]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	**Fundamental Component**					**60**
	Mathematical Foundations	24				24
	Computing	12				12

	Foundations					
	Principles of Risk Management and Insurance		12			12
	Introduction to Actuarial Science		12			12
CORE COMPONENT *Subjects/Courses/ Modules/Units*	**Core Component**					**384**
	Economics		24			24
	Financial Accounting		24			24
	Computer Programming		24			24
	Mathematical Statistics		24			24
	Calculus		36			36
	Algebra		12			12
	Financial Mathematics			24		24
	Actuarial Mathematics			36		36
	Real Analysis			12		12
	Risk Theory for Actuaries			12		12
	Differential Equations			12		12
	Linear Programming and Game Theory			12		12
	Project in Actuarial			12		12

	Science					
	Work Integrated Learning			12		12
	Applied Linear Regression			12		12
	Probability and Inference			24		24
	Stochastic Processes			12		12
	Bayesian Statistical Theory			12		12
	Finance, Investment and Portfolio management			24		24
	Survival Analysis			12		12
	Financial Derivatives				12	12
ELECTIVES/OPTIONAL COMPONENT		***Credits Per Relevant NCQF Level***				***Total Credits***
		Level [5]	***Level [6***	***Level [7]***	***Level [8]***	
	Elective Component					***36***
	Financial Analysis and Valuation			06		06
	Financial Reporting			06		06
	Actuarial Control Cycle				12	12

	Financial Modelling			12		12
	Time Series Analysis			12		12
	Credit Risk Modelling				12	12
	Professionalism and Ethics in Actuarial Science			06		06
	Complex Analysis			12		12
	General Insurance			12		12
	Life Insurance			12		12
	Pension and Retirement Benefits			12		12
	Non-Linear Optimization			12		12

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
5	*36*
6	*174*
7	*246*
8	*24*
TOTAL CREDITS	***480***

Rules of Combination:

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

This qualification has 480 credits and takes four years to complete.

The credit combination for the qualification is made up of 60 credits from the fundamental component, 384 credits from the core component and 36 credits from the elective component.

The elective component is based on selection of at least three modules with a total of 36 credits.

ASSESSMENT ARRANGEMENTS

All assessments, formative and summative, leading to the award of credits in this qualification shall be based on module learning outcomes, and the qualification exit-level outcomes.

- Formative Assessment - A formative assessment aligned to the module learning outcomes and exit-level outcomes will be administered continuously throughout the learning period in each module. The recommended weights of the formative assessment should be at least 50% and should not exceed 60% of the final marks for that module.
- Summative Assessment - Learners shall undergo a summative assessment which may include a written examination at the end of learning period in each module. The recommended weights of the summative assessment will vary from 50% to 40% of the final marks for that module. All summative practical assessments must, as far as possible, be conducted in real-work settings.

MODERATION ARRANGEMENTS

Pre-assessment moderation will be carried out before administering assessments that contribute towards the award of credits in this qualification and post-assessment moderation will be carried out after the assessment tasks have been marked.

- Internal Moderation - Both formative assessment and summative assessment instruments shall be subjected to internal moderation by BQA registered and accredited Assessors and Moderators, who are specialist in the field before administering to ensure fairness, validity, reliability and consistency of assessments.
- External Moderation - Exit level assessment instruments shall be moderated by an External Moderator to ensure fairness, validity, reliability and consistency of assessments. Qualified external moderators shall be appointed from an accredited Education Training Providers (ETPs).

RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning (RPL) will be considered in the award of the qualification in accordance with applicable RPL policy of the ETP which are aligned to BQA/National policies on the same.

CREDIT ACCUMULATION AND TRANSFER

Credit transfer will be awarded in accordance with applicable ETP CAT policies and guidelines which are aligned to BQA / National policies on the same.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

LEARNING PATHWAYS

This qualification is intended to provide learners with both horizontal and vertical articulation pathways, nationally, regionally, and internationally:

Horizontal Articulation

The qualification articulates horizontally with various local, regionally and international Bachelor of Science degrees. Qualifications of similar level at NCQF Level 7 include:

- Bachelor of Science in Financial Engineering,
- Bachelor of Science in Mathematical Finance,
- Bachelor of Science in Financial Mathematics,
- Bachelor of Science in Mathematical Science,
- Bachelor of Science in Statistics,
- Bachelor of Science in Industrial Mathematics.

Vertical Articulation

The qualification provides vertical articulation to higher level qualifications at NCQF Level 8 and 9. The graduate of this qualification can thus progress to enrol to related postgraduate qualification(s) such as Bachelor's Honours Degree, Postgraduate Diploma, and Master of Science in:

- Master of Science in Actuarial Science.
- Master of Science in Financial Mathematics,
- Master of Science in Financial Engineering,
- Master of Science in Mathematical Finance,
- Master of Science in Quantitative Finance,
- Master of Science in Financial Risk Management,

The graduates will be qualified to hold high-level positions/roles such as:

- Actuarial Consultant,
- Healthcare Actuary,
- Pension Actuary,
- Catastrophe Risk Analyst,
- Financial Planner,
- Chief Financial Officer,
- Data Scientist,
- Director of Risk Management,
- Investment Strategist,
- Financial Analyst,

- Underwriter,
- Quantitative Analyst,
- Chief Risk Officer,
- Big Data Analyst, and
- Research and Development Manager.

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

Candidate(s) will be awarded the degree of Bachelor of Science in Actuarial Science after attaining the stipulated minimum credits of 480 as specified in the rules of combination and credit distribution.

Certification

Candidates meeting prescribed requirements will be awarded the qualification in accordance with standards prescribed for the award of the qualification and applicable policies. A certificate of the award of the degree of Bachelor of Science in Actuarial Science will be given upon successful completion of the qualification. Candidates who do not meet the prescribed minimum standards may, where applicable, be considered for appropriate exit awards in accordance with applicable policies.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

The developer of the proposed Bachelor of Science in Actuarial Science qualification conducted a comparability study to evaluate its value and relevance in today's competitive job market. The study compared the proposed qualification with similar degree qualifications nationally, regionally, and internationally, outlining the key competencies, skills, and knowledge areas covered by each qualification. It also highlighted potential career paths and opportunities available to graduates, along with industry standards and benchmarks to measure their performance.

The study benchmarked the proposed Bachelor of Science in Actuarial Science with several institutions worldwide offering similar qualifications. The comparison revealed that the proposed qualification is highly competitive in terms of learning outcomes, content, level, and duration. The following universities are some of the benchmarked institutions:

(i) Bachelor of Commerce in Actuarial Science, BA ISAGO University, Botswana.

(ii) Bachelor of Science (Actuarial and Financial Mathematics), University of Pretoria, South Africa.

(iii) Bachelor of Actuarial Studies, University of New South Wales, Australia.

(iv) Bachelor of Actuarial Science, Australian National University, Australia.

(v) Bachelor of Science (Honours) in Actuarial Science, University of Kent, UK.

(vi) Bachelor of Science, Mathematics with Actuarial Science, University of Southampton, UK.

(vii) Bachelor of Science in Actuarial Sciences, Western New England University, USA.

The study identified several similarities and differences among the benchmarked qualifications, as follows:

Similarities:

- All the benchmarked qualifications focus on actuarial science and mathematics.
- All the benchmarked qualifications are undergraduate degrees that take 3–4 years to complete.
- All the benchmarked qualifications have a final-year project or dissertation component.
- All the benchmarked qualifications offer students the opportunity for industrial attachment or work experience.
- All the benchmarked qualifications cover similar topics, such as actuarial mathematics, probability theory, statistics, financial mathematics, risk management, and insurance.
- Most benchmarked qualifications afford students with similar exit learning outcomes, such as the knowledge of business, mathematical problem-solving skills, and the ability to communicate effectively.
- All the qualifications prepare students to be an actuary or financial manager of some sort.

Differences:

- The Bachelor of Commerce in Actuarial Science at BA ISAGO is a commerce qualification rather than a science qualification.
- The University of Pretoria in South Africa offers a qualification that combine actuarial science with financial mathematics, while the other qualifications focus exclusively on actuarial science.
- The University of Pretoria qualification is accredited by the Actuarial Society of South Africa, the Australian qualifications of UNSW and ANU are accredited by the Actuaries Institute of Australia and the UK qualifications of University of Kent and the University of Southampton are accredited by the Institute and Faculty of Actuaries.
- The University of Kent and the University of Southampton in the UK offer a Bachelor of Science (Honours) degree in Actuarial Science, which may require an additional year of study.
- The credits values vary widely for each university as they use different qualification frameworks.

In addition to the comparability study, the proposed Bachelor of Science in Actuarial Science qualification has been developed with input from industry experts and academics to ensure that it is aligned with current industry practices and standards. This collaboration has allowed for the inclusion of practical components in the curriculum, such as case studies, industry projects, and guest lectures, which will provide students with real-world insights and experience.

Furthermore, the qualification has been designed to enable students to pursue various professional certifications, including the Associate of the Actuarial Society of South Africa (ASSA), the Fellow of the Actuarial Society of South Africa (FASSA), and the Fellow of the Institute and Faculty of Actuaries (FIA). These certifications are highly respected in the industry and will increase the employment opportunities for graduates of the qualification.

In conclusion, the proposed Bachelor of Science in Actuarial Science is a well-rounded qualification that is comparable to other regional and international programmes. It covers a broad range of topics and provides students with the necessary skills and knowledge to succeed in the actuarial science field. With practical components and input from industry experts, the qualification prepares students for a successful career in the industry and enables them to pursue various professional certifications such as Master of Science in Actuarial Science, Master of Science in Financial Mathematics, Master of Science in Financial Engineering, etc. Employment pathways include HealthCare Actuary, Data Scientist, Pension Actuary, and Financial Analyst.

REVIEW PERIOD

The qualification will be reviewed after 5 years, after running its full cycle.

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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**	