BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS														
QUALIFICATION DEVELOPER (S)	BA ISAGO University														
TITLE	Master of Science in Data Analytics											**NCQF LEVEL**	9		
STRANDS (where applicable)	1. Statistical Data Analytics 2. Business Analytics 3. Artificial Intelligence														
FIELD	Natural, Mathematical and Life Sciences											**CREDIT VALUE**	240		
SUB FIELD	Mathematics and statistics														
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 need for advanced training in Data Analytics within Botswana is strongly evidenced by the Human Resource Development Council (HRDC) Priority Skills Report 2023/24, which identifies “Numerical & Data analysis skills” as a critical priority across sectors. This designation underscores that data analytics capabilities are not only emerging but are essential across industries, including Information and Communication Technology, Finance, Research & Innovation, and Agriculture, among others.

At the strategic level, Vision 2036 articulates the country’s transformation into “a high-income country, with an export-led economy underpinned by diversified, inclusive and sustainable growth driven by high levels of productivity”. Scholars emphasize that this aspiration includes developing Botswana into “a high-income, knowledge-based economy”, thus placing technology, innovation, and data-driven

inquiry at the heart of national economic empowerment. Complimenting this vision, the Eleventh National Development Plan (NDP 11, 2017–2023) mandates higher education institutions to cultivate graduates with strong competencies in Mathematics and Statistics—essential capabilities underpinning careers in Data Science and Analytics.

In response to these strategic priorities, the Master of Science in Data Analytics qualification is purposefully designed to build highly skilled data specialists across three streams: Statistical Data Analytics, Business Data Analytics and Artificial Intelligence, each tailored to meet the needs of diverse economic sectors. The programme delivers robust training in foundational and advanced disciplines—including Statistics, Mathematics, Computer Science, Data Science, and Data Analytics, as emphasised in the HRDC report.

The curriculum goes beyond theory, offering learners substantial opportunities to apply theoretical knowledge through practical laboratory sessions, hands-on projects, and a meaningful research component. This dual approach, combining formal taught modules with a research-intensive component, enables students to effectively synthesise their learning and apply it to real-world challenges within the field of Data Science and Analytics.

PURPOSE: (itemise exit level outcomes)

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

- Conduct independent research that advances knowledge in Data Analytics, Data Science, and Statistics through the application or development of appropriate methodologies.
- Demonstrate critical and analytical thinking to provide leadership in big data, Artificial Intelligence, data management, and statistical applications.
- Apply data-driven approaches to generate insights, support decision-making, and contribute to business performance and socio-economic development.
- Communicate complex concepts in data science, machine learning, probability, and statistics effectively to both technical and non-technical audiences.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

i. Applicants must hold a minimum of bachelor's degree, NCQF Level 7 or equivalent.

OR

ii. Candidates who do not meet the above minimum entry requirements will be considered through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) as

specified in policies by the Education and Training Provider (ETP) in line with the National RPL and CAT policies.

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SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1. Apply advanced mathematical, computing, and statistical theories and principles to analyse complex datasets, interpret results, and solve real-world problems in data analytics.	1.1 Graphically display and numerically summarise data using methods of descriptive statistics 1.2 Apply probability rules and probability models for data analysis. 1.3 Apply concepts of discrete and continuous random variables and probability distributions 1.4 Explain sampling techniques, determine sample sizes, and identify population parameters. 1.5 Compute statistical hypothesis tests. 1.6 Apply a range of regression techniques, including linear, multiple, polynomial, and generalized linear models, using different statistical software such as R.
2. Develop data analysis and programming skills applicable to business, science and the economy using tool such as Python, R, PowerBI, etc.	2.1 Apply programming techniques to clean, transform and query data 2.2 visualise different data types using appropriate techniques and software. 2.3 Utilise standard programming libraries to perform dataset analyses. 2.4 Apply programming concepts to solve real-world data problems. 2.5 Apply Linux commands to perform basic system and file operations
3. Test novel statistical hypotheses to support informed, data-driven decision-making.	3.1 Explore data sets and establish appropriate hypotheses needed for data analysis in data science problems.

	3.2 Apply the statistical concepts relevant to experimental design and big data analysis. 3.3 Develop validated models with continuous response variables using t-test, ANOVA, multiple regression and ANCOVA. 3.4 Apply appropriate parametric and non-parametric statistical techniques to analyse complex datasets, and interpret results using advanced analytics software. 3.5 Build validated statistical models with categorical response variables using logistic regression. 3.6 Report statistical results using software output.
4. Articulate key components of a Big Data Analytics problems and generate insights using machine learning methods.	4.1 Explore the history, concepts, and technologies of data science and analytics. 4.2 Identify approaches for developing data analytics project cycle. 4.3 Perform data exploration and analysis using relevant software. 4.4 Identify patterns and insights via statistical modelling or analytics techniques. 4.5 Build and validate statistical/machine learning models in business and science contexts. 4.6 Develop a deep understanding of data protection, privacy and ethics.
5. Deploy novel machine learning/AI solutions for Big Data applications.	5.1 Identify appropriate machine learning methods for given data applications. 5.2 Apply appropriate algorithms to datasets from specific domains. 5.3 Test the validity of machine learning algorithms across domains. 5.4 Interpret machine learning results effectively. 5.5 Evaluate the predictive model accuracy using standard methods. 5.6 Implement machine learning algorithms for real-life datasets.

	5.7 Develop advanced analytical models, including neural networks, deep learning architectures, decision trees and ensemble methods such as random forests, to generate insights for real-world applications. 5.8 Implement optimization algorithms for solving complex high-dimensional problems.
6. Apply advanced computing and research skills to independently solve real world Big Data problems and provide actionable recommendations.	6.1 Undertake a specialised data analytics research project, including the formulation of research questions and objectives. 6.2 Conduct a comprehensive literature review of up-to-date methodologies, techniques, and relevant models. 6.3 Apply research methodologies to address real-world constraints and analyse solutions to identified problems. 6.4 Produce a dissertation detailing the methodology, findings, analysis, and recommendations. 6.5 Present research findings effectively using professional visual and oral communication.

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SECTION C	**QUALIFICATION STRUCTURE**				
COMPONENT	**TITLE**	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [7]	**Level [8]**	**Level [9]**	
FUNDAMENTAL COMPONENT	Advanced Research Methods			15	15
Subjects/ Courses/ Modules/Units					

CORE COMPONENT Subjects'/Courses/ Modules/Units	Probabilistic Modelling and Statistics for Data Analytics			20	20
	Foundational Programming for Data Analytics			20	20
	Applied Machine Learning			15	15
	Advanced Data Analytics and Visualisation			20	20
	Data Mining and Statistical Modelling			15	15
	Dissertation			80	80
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [7]	**Level [8]**	**Level [9]**	
1. Statistical Data Analytics	Database Management and SQL			15	15
	Applied Time Series for Data Science			20	20
2. Business Analytics	Financial Data Analytics for Business			15	15
	Advanced Machine Learning and App Deployment			20	20
3. Artificial Intelligence	Applied Generative AI			15	15
	Neural Networks and Deep Learning			20	20
Electives	Bayesian Statistics			20	20
	Computational Statistics with R			20	20

	Large Language Models			20	20

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)**	
The credit combination for this qualification is made up of 15 credits from fundamental component, 205 credits from the core component, and 20 credits from the elective component where candidates would choose one module.	

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ASSESSMENT ARRANGEMENTS

All assessments which are leading to the award of the qualification should be based on learning outcomes and associated assessment criteria. The assessments will be as follows:

i. Formative Assessment

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

ii. Summative Assessment

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

MODERATION ARRANGEMENTS

There will be provision for internal and external moderation.

RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning (RPL) will be applicable for consideration for award in this qualification.

CREDIT ACCUMULATION AND TRANSFER

Credit Accumulation Transfer (CAT) will be applicable for consideration for award in this qualification.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal progression:

- Master of Science in Data Science,
- Master of Science Business Analytics
- Master of Science Statistical Data Science
- Master of Science Computational Data Sciences

Vertical Progression:

- Doctor of Philosophy in Data Analytics
- Doctor of Philosophy in Computational Statistics
- Doctor of Philosophy in Business analytics
- Doctor of Philosophy in Financial Data Science

Employment Pathways:

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

- Data Analysts
- Business Analysts
- Statistical Analyst
- Data Scientist
- Statistical Consultant
- Financial and Business Consultants
- Assistant Lecturer
- Teaching Instructor
- Data Manager
- Statistical Modeler (Public health and infectious disease, risk and insurance analysists, weather, and climate)

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 of the Master of Science in Data Analytics candidates should have passed all course work assignments and the final examination and obtained a minimum of 240 credits. A certificate will be issued to learners who are awarded the qualification.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

The proposed qualification was benchmarked against the following:

- Georgetown University (USA) – Master of Science in Data Analytics
- Queen Mary University of London – Master of Science in Data Analytics
- University of the Witwatersrand – Master of Science in Data Science

The benchmarking exercise reveals that the proposed Master of Science in Data Analytics compares favourably with the above regional and international qualifications in terms of level positioning, learning outcomes, assessment criteria, credit structure, qualification purpose, and notional learning time. All the qualifications are pitched at NCQF Level 9, as denoted within the respective national qualification frameworks adopted by each country (NCQF, FHEQ, NQF and US frameworks).

Although the qualification offered by the University of the Witwatersrand is titled Master of Science in Data Science rather than Data Analytics, it is comparable in scope and depth. The differences in nomenclature primarily reflect institutional preference and disciplinary orientation rather than substantive variation in academic level or complexity. The qualifications share strong commonalities in core and elective components, with emphasis on statistical modelling, machine learning, programming, data management, and applied analytics. The qualifications also share common goal of capacitating graduates with advanced knowledge, skills, competencies, and appropriate professional attitudes to apply data-driven approaches to generate insights, support decision-making, and contribute to business performance and socio-economic development.

Furthermore, all qualification structures cover common domains such as Probability Modelling and Mathematical Foundations for Data Analytics, Data Visualisation, Machine Learning, Programming for Data Analytics, and a Dissertation or Research Project component. The assessment strategies across all qualifications incorporate both continuous formative assessment and summative assessment in the form of assignments, projects, tests, and examinations to evaluate the achievement of the stated learning outcomes. The award of each qualification requires learners to obtain the prescribed minimum credits and successfully complete the dissertation or equivalent capstone project.

Differences are primarily attributable to the qualification frameworks of the respective countries, particularly regarding credit weighting and duration of study. The proposed qualification carries 240 credits with a duration of 2 years while the Georgetown University's qualification carries 30 credits and has a duration of 16 months on a full-time basis and three years on a part-time basis. By comparison, the qualifications offered by Queen Mary University of London and University of the Witwatersrand are typically completed within one year on a full-time basis with 180 credits each.

In terms of articulation and progression, all the qualifications provide comparable academic and employment pathways. The proposed MSc in Data Analytics is similar to those offered by the University of the Witwatersrand and Strathmore University in relation to learning outcomes, programme components, and structural design, including the balance between core and elective modules. The programmes provide a strong foundation for progression to doctoral studies (PhD) in Data Science, Data Analytics, or related fields. Furthermore, they prepare graduates for employment in both the public and private sectors in roles such as Data Analyst, Research Analyst, Data Scientist, Software Engineer, Data Engineer, Machine Learning Engineer, Consultant, and Quantitative Analyst, among others.

REVIEW PERIOD
This qualification will be reviewed after 5 years upon registration.

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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**	