QUALIFICATION SPECIFICATION							SECTION A
QUALIFICATION DEVELOPER	Botswana Accountancy College						
TITLE	Bachelor of Science in Business Intelligence and Data Analytics				**NCQF LEVEL**	7	
FIELD	Business, Commerce, and Management		**SUB-FIELD**	Business Intelligence and Data Analytics			
New qualification	✓		Review of existing qualification				
SUB-FRAMEWORK	Computing		TVET		Higher Education	✓	
QUALIFICATION TYPE	Certificate		Diploma		Bachelor	✓	
	Bachelor Honours		Master		Doctor		
CREDIT VALUE	480						

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE:

Modern enterprises grow to become more digitally complex, corporations spreading out globally, and competition becoming fiercer, it is essential for Business Executives to seek information and stay competitive to improve the bottom line. The operational systems provide information to run day-to-day operations but, the executives need different kinds of information to make strategic decisions. Business Intelligence and Data Analytics tools, technologies & solutions seeks to answer strategic, tactical and operational needs about business, the performance of various operations, the business trends, and about what can be done to improve the business. [1] *Association for Computing Machinery (ACM) & IEEE Computer Society*.

In recent surveys of the local business sector, there have been growing focus on ICT as part of the business value additions.[4] *Botswana Accountancy College: Needs assessment report 2019.* Consequently, the ICT field is being given more attention at strategy and planning level [1] *Association for Computing Machinery (ACM) & IEEE Computer Society*.

However, there have been concerns about the level and type of skills availability in the local market to drive effective applications of Business Data Analytics. The human resource development needs in the areas of Research and Innovation and, Finance and Business Services, there is evident need for skilled expertise in areas of business informatics, business information analysis and Intelligent Business Data and Analytics. [2]

Human resources and Development Council, Top Occupations in demand, December 2016 [3] *Malebogo Bakwena* and Zibanani Kahaka†Botswana (nd). Notes and Records, Volume 45 206 The Botswana National Information and Communication Technology Policy and Economic Diversification: How Have We Fared Thus far?* [4] *Botswana Accountancy College: Needs assessment report 2019*

The qualification taps into disciplines such as business process management, business intelligence, data warehousing, strategic management, data visualization, data storage, and statistics across the disciplines of computer science and information systems.

PURPOSE:

The qualification is designed to produce graduates who have the capability to:

- Develop and demonstrate specialized knowledge and understanding of using Data Analytics tools and methodologies to produce business solutions.
- Apply analytical skills and decision-making skills in the formulation of Business Intelligence societal solutions, establish and exhibit intellectual capability that is universally acceptable and all encompassing.
- Be self-reliant, innovative, entrepreneurial, and assertive and able to function effectively in a team and take accountability for their own work output and that of others within the field. Graduates with this qualification should be able to employ a range of Intelligence Techniques to extract and communicate seamless business data to solve problems, manage process within broad parameter for specific domain and work outputs.

In the qualification, graduates are exposed to not just knowledge and skill on business and data analytics but are also required to undertake a work or industry placement module. This not only affords graduates an exposure to the real work environment but also affords graduates the opportunity to engage in professional ethics and ethical behavior scenarios as well and the development of soft skills.

There is a wide range of careers opportunities such as data scientists, business intelligence analysts, data mining analysts, enterprise architects, process coordinators, process architects, big data specialists and other data analytics professions have emerged across all industries that use data extensively, including government, business, healthcare, online commerce and more.

ENTRY REQUIREMENTS (including access and inclusion)	
(a) Certificate IV (NCQF Level 4), BGCSE or equivalent (b) There is provision for RPL and CAT	
QUALIFICATION SPECIFICATION	**SECTION B**
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
LO 1: Develop and demonstrate specialized knowledge and understanding of using Data Analytics tools and methodologies to produce business solutions.	1. Demonstration the understanding of the mathematical, statistical and computing principles required for study of Business Intelligence & Analytics (BIDA) disciplines. 2. Demonstrate the understanding of the fundamental computing and information systems concepts applicable to BIDA systems. 3. Demonstrate the understanding of the fundamental Business Analysis tools and methodologies of BIDA systems. 4. Demonstrate the understanding of the Communication of technical information using written, oral and visual techniques.
LO2: Apply analytical skills and decision-making skills in the formulation of Business Intelligence societal solutions.	1. Use IT & Modelling standards for presentation, calculation, simulation and design purposes. 2. Structured application of skills to solution of BIDA problems and design tasks. 3. Employ mathematical, statistical and computing concepts to the analysis of business intelligence problems. 4. Make effective use of information systems/technology methods, tools and techniques for presentation and analysis. 5. Demonstrate a logical and conceptual approach to problem solving and design.
LO 3: Establish and exhibit intellectual capability that is universally acceptable and all encompassing.	1. Demonstrate a passionate interest in providing computer techno-based solutions to business problems. 2. Ability to model good professional practice and lead by example (e.g. understand code of conduct).

	3. Demonstrate desire for high expectation for achievements and ability to set stretching targets for oneself. 4. Commitment to enabling team dynamics.
LO 4: Employ a range of Intelligence Techniques to extract and communicate seamless business data to solve problems, manage process within broad parameter for specific domain and work outputs.	1. Demonstrate Coherent, effective communication using written, graphical and oral means. 5. Reflection on and critical awareness of personal development and study skills. 6. Demonstrate Presentation and argument skills when putting across concepts 7. Show Collaboration and interpersonal skills in self-expression 8. Display professional Ethics and code of conduct all round 9. Demonstrate Technical writing and preparation of technical reports
LO 5: Demonstrate self-reliant, innovative, entrepreneurial, and assertive and able to function effectively in a team and take accountability for own work output and of others within the field.	2. Recognize and apply the appropriate numerical & analysis techniques to solution of analytical problems. 3. Effective decision making for the identification, formulation and solution of business intelligence & analytics problems. 4. Appreciate the broader context of BI & Analytics in business and the impact of Analytics on society and the environment. 5. Work effectively both independently and in teams to achieve assigned objectives. 6. Participate effectively in interdependent learning activity and function effectively as an independent learner.
LO 6: Demonstrate personal, professional and ethical qualities necessary for effective adaptation to socio-economic and technological environment.	1. Apply basic methods to solve a range of relatively simple problems. 2. Exercise diligence in efficient resource use and take responsibility for their actions. 3. Analyze the impact of their application of new knowledge and understanding to produce socio-economic problems. 4. Evaluate and discuss the application of a range of algorithms to solve more complex problems.

	5. Demonstrate data mining application and concepts in green technology and environmental impacts.		
QUALIFICATION STRUCTURE			**SECTION C**
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	Computer Technology	5	**15**
	Systems Development	5	**20**
CORE COMPONENT Subjects / Units / Modules /Courses	Computer-Related Mathematics & Statistics	5	**20**
	Web Development Basics	**5**	**20**
	Fundamentals of Business Intelligence	5	**20**
	Business Process Analysis	6	**20**
	Introduction to Data Analytics (Excel)	6	**20**
	Python Programming	**6**	**20**
	Innovation Project	6	**20**
	Data Warehousing (MS SQL Server)	6	**20**
	Intelligent Systems (Python)	6	**20**
	R Programming		
	Advanced Data Analytics (SPSS)	7	**20**
	Industry Attachment	7	**60**
	Research	7	**25**
	Product Development	7	**20**
	Business Intelligence & Strategy	7	**20**
	Advanced Data Technologies	7	**20**
	User Experience Design	7	**20**
	Artificial Intelligence	7	**20**
ELECTIVE COMPONENT (Choose 2 modules) Subjects / Units / Modules /Courses	Business Management	6	20
	Database Design and Development	6	20
	Quantitative Analysis for Business	6	20
	Total Credits		**480**

Rules of combinations, Credit distribution (where applicable):

The total number of credits at level 5 is 95; level 6 is 140 and at level 7 is 205. There are 2 electives to be chosen, which are 20 credits each. A qualification will be awarded upon accumulating a minimum of 480 credits.

ASSESSMENT AND MODERATION ARRANGEMENTS

Assessments

Assessments will be done by BQA accredited assessors. Formative assessments are undertaken to check and monitor the learner development progress towards achieving the learning outcome. This assessment will not attract any grade. Summative assessment has two components: examination and coursework. The final examination takes 60% at final grading, while coursework takes up 40%. Both coursework and examination make up 100%. The pass mark for each module is 40%.

Moderation

Internal Moderation Arrangements

Moderation will be done by BQA accredited moderators. The marking and moderation process are carried out internally first. All assessments are moderated internally by expert moderators in the field of Business Intelligence and Data Analytics who are competent at the level of the Qualification. The purpose of internal moderation is to establish that the assessment instruments can measure achievements of the learning outcomes and that learners have achieved the required standards.

External Moderation arrangements

The External moderation shall be undertaken by subject experts outside the institution to verify that the assessments instruments and marking are of the right standard for the qualification. The moderator is presented with a complete set of marks and a sample set of scripts/assignments, selected with a sample size based on the square root of the total number of scripts. Feedback on moderation comes in the form of reports.

RECOGNITION OF PRIOR LEARNING (RPL) (if applicable)

RPL shall be considered towards the awarding of the qualification, and this will be done in line with institution's RPL policy governed by the National RPL policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

LEARNING

Vertical pathways

Upon completion of the qualification, graduates can progress into:

- Honours degree in Business Intelligence Data Analytics (NCQF level 8).
- Post graduate certificate/diploma in Business Intelligence and Data Analytics (NCQF level 8)

Horizontal pathways

Learners can progress horizontal into:

- Bachelor of Science in Computer Systems Engineering (NCQF level 7)
- Bachelor of Science in Applied Business Computing (NCQF level 7)

EMPLOYMENT PATHWAYS

Upon completion, graduates can attain jobs in various computing and business disciplines beginning at entry level point for the positions. They could venture into industry as:

- entrepreneurs,
- business analytics,
- data miners.

QUALIFICATION AWARD AND CERTIFICATION

The minimum number of credits for award of the Bachelor of Science Degree in Business Intelligence and Data Analytics is 480 credits and should fulfil the prescriptions in rules of combination . Graduates will be certified with: Bachelor of Science Degree in Business Intelligence and Data Analytics. Upon completion graduates will be issued with a transcript and certificate.

REGIONAL AND INTERNATIONAL COMPARABILITY

The qualification was developed following the requirements of Quality Assurance associations such as Botswana Qualification Authority and Quality Assurance Agency to ensure that the skills students develop are relevant.

The relevant Quality Assurance Agency for higher education (QAA) subject benchmark statements (Refer to www.qaa.co.uk). In addition to the Quality Assurance Agency, qualification will go a long way in addressing

the scarce skills identified by Human Resource Development Council (HRDC) e.g. in ICT. Therefore the design of the qualification was informed by:

• The Norms and Standards of the National Credit & Qualification Framework (NCQF)

Local Benchmarking

The Norms and Standards of the National Qualification Framework (NQF) and Human Resource Development Council (HRDC) formed the basis for comparison of the qualification focusing on local needs. Locally Bachelor of Science in Business Intelligence and Data Analytics is driven by HRDC sector committee input on critical skills. There is no local institution currently offering similar qualification.

Regional Benchmarking

The qualification focuses on finding solutions to solving the large-scale data problems in a business. The qualification is designed in a way to enable or make it easy for students to obtain professional qualifications of international standing in the field of Data Science, Business Intelligence, Machine Learning and Big data should they wish to. The Degree is quite new in the offering worldwide. The College introduced a Degree in Business Intelligence and Data Analytics at an undergraduate level as a need to inform predictive models in diverse disciplines such as clinical research, intelligence, consumer behaviour and risk management continues unabated.

Table 5.7.1 Regional comparable matrix

Programme Name	**Proposed Qualification**: **BSc Business Intelligence and Data Analytics**	**Bachelor of Science Honors in Data Science**	**BSc (Honors) in Big Data Analytics**
Country		South Africa	South Africa
University/College		Sol Plaatje University	Wits University
Modules	Business Process Analysis, Computer Technology, Computer Related Mathematics and Statistics, Python Programming , Web Development Basics, Fundamentals of Business Intelligence, Database Design and Development, Introduction to Business Statistics ,	**Elective modules** Multidimensional Signal Processing Special Topics in Data Science **Compulsory Modules** Research Project: Data Science, High Performance Computing	**Compulsory Modules** Research Project: Big Data Analytics Introduction to Research Methods Adaptive Computation and Machine Learning

	Data Modelling and Analytics, Research and Innovation Project, Advanced Data Analytics, Data Warehousing, Big Data, Digital Transformation, Cloud Computing, Student Industry Work Placement, Research, Product Development, Business Intelligence & Strategy, Advanced Statistics, User Experience Design, Artificial Intelligence	Computer Systems for Big Data Large Scale Optimisation Advanced Machine Learning Data Exploration and Visualisation Data Security and Cryptographic	Data Analysis and Exploration Introduction to Data Visualisation and Exploration Discrete Optimisation **Elective Module** Applications of Algorithms Computer Vision Distributed Computing High-Performance Computing and Scientific Data Management Special Topics in Computer Science Mathematical Foundations of Data Science Databases
			.

For Sol Plaatje University there is similarity in majority of modules with Business Intelligence and Data Analytics being broad. Over 75% similarity. In the Wits University there was similarity in majority of modules with Business Intelligence and Data Analytics being broad. There is over 80% similarity

International Benchmarking

The qualification was developed with a focus to equip graduates with top level skills in Business Intelligence and Data analysis. The qualification was informed by the need to tape into modern ERP. Internationally the qualification is considerably informed by University platforms on offer by bodies like SAP.

Table 5.7.2 International comparable matrix

Programme Name	**BSc Business Intelligence and Data Analytics**	**BSc Data Science and Business Analytics**	**Minor in Business Intelligence and Analytics**
Country		England	USA
University/College		University of London (London School of Economics)	Saint's Marry's University of MINNESOTA
Modules	Business Process Analysis, Computer Technology, Computer Related Mathematics and Statistics, Python Programming , Web Development Basics, Fundamentals of Business Intelligence, Database Design and Development, Introduction to Business Statistics , Data Modelling and Analytics, Research and Innovation Project, Advanced Data Analytics, Data Warehousing, Big Data, Digital Transformation, Cloud Computing, Student Industry Work Placement, Research, Product Development, Business Intelligence & Strategy, Advanced Statistics, User Experience Design, Artificial Intelligence	**Elective modules** Statistics 1 Introduction to economics Statistics 2 Algebra Calculus Mathematical Methods Information systems management Business Analytics Applied Modelling and Prediction Statistical Methods for Market Research Machine Learning Advanced Statistics: Distribution Theory Advanced Statistics: Statistical Inference Elements of Econometry Abstract Mathematics Research Project in digital Inovation	Introduction to Programming for Sciences. Business Statistics , Business Computer Applications Information Systems for Business Intelligence Data Analysis and Business Modeling Principles of Microeconomics Principles of Marketing or Principles of Management Calculus I with Precalculus (part 1) Database Design Production and Operations Management Digital and Social Analytics

			Data Mining for Decision Making Internship: Business Intelligence and Analytics Project Management Marketing Research Consumer Behavior

University of London (London School of Economics) is similarity in majority of modules with Business Intelligence and Data Analytics being broad. About 60% similarity. Saint's Marry's University of MINNESOTA is similar in majority of modules with Business Intelligence and Data Analytics being broad. Over 50% similarity.

REVIEW PERIOD

The qualification is reviewed every 5 years.