QUALIFICATION SPECIFICATION								SECTION A
QUALIFICATION DEVELOPER	Botswana Accountancy College							
TITLE	Bachelor of Science in Information and Communication Technology					**NCQF LEVEL**		7
FIELD	Information and Communication Technology		**SUB-FIELD**		Information Technology			
New qualification	✓		Review of existing qualification					
SUB-FRAMEWORK	General education		TVET		Higher Education			✓
QUALIFICATION TYPE	Certificate		Diploma		Bachelor			
	Bachelor Honours		Master		Doctor			
CREDIT VALUE					480			

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE

Today's businesses are largely driven by technology. Successful companies have taken the lead using modern, state of the art technological implementations that make use of sophisticated hardware and networked devices to address the information and communication requirements of today 's complex business processes.

Therefore, this qualification will equip students to be able to formulate an information systems and ICT strategy with the right mix of hardware, software, and communications technologies to adequately enable and drive business strategy for competitive advantage. It will cover all the fundamentals of computing and systems administration, the progress to information systems and how to manage IT.

The qualification is designed to ensure that students graduating from it will have educational grounding and intellectual development to take full advantages of career opportunities arising in the ever-changing industry of computing and information technologies. The qualification is well suited for students who wish to pursue careers as system administrators, developers, analysist and managers in information technology field.

In recent surveys of the local business sector, there have been growing focus on ICT as part of the business value additions. Consequently, ICT is being given growing attention at both the strategy and planning levels. However, the sector has expressed concerns about the level and type of skills availability in the local market to drive effective ICT developments in business. The Human Resources and Development Council, human resource development needs in the field of information technology identified top occupation in the ICT field and listed amongst these Computer Network Professionals, Telecommunications Engineers, System Administrators, ICT Security Managers, IT Service Engineers etc.

The specialized Bachelor of Science in Information and Communication Technology taps into the growing demand for the expertise in these occupations, hence the HRDC indicators on human resource development needs on information technology and entrepreneurship formed a useful anchor in the development of this qualification.

The qualification is designed to ensure that graduates from this qualification have the educational grounding and intellectual development to take full advantage of career opportunities in the field of ICT as a business enabler and is an entry level qualification for professionals who are entering the industry, particularly professionals with keen interest in network administration, computer networking, IT Service Management, Systems Administration, Business Technologies etc.

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.

PURPOSE

The graduates will also be well trained in transferable skills such as research, problem-solving, analytical, numeracy and communication. Graduates of the programme also do qualify to apply for professional membership at IEEE, ACM and British Computer Society.

The purpose of the Bachelor of Science in Information and Communication Technology is to:

- produce graduates who are techno savvy in blending business information, communication, and technology.
- produce graduates who can take full advantage of ubiquitous computing resources to foster business opportunities that create employment and contribute to economic growth.
- produce graduates who can create business solutions from computing technology and manage such solutions for future enhancements.
- produce graduates who are competent in computer networking.

ENTRY REQUIREMENTS (including access and inclusion)

Entry to this qualification is through <u>any one</u> of the following:

(a) Minimum entry level is NCQF Level 4 or equivalent, with passes in Math or Physics or Statistics plus English and any other 4 subjects).

(b) **Recognition of Prior Learning (RPL):**
There will be access through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in accordance with the RPL and CAT National Policies.

QUALIFICATION SPECIFICATION **SECTION B**

GRADUATE PROFILE (LEARNING OUTCOMES)	ASSESSMENT CRITERIA
<u>LO1</u> Demonstrate knowledge and understanding of computer hardware, software, security, networks, databases, methodologies and management in ICT	1.1 Explain the different types of computing devices and their functions. 1.2 Explain how software development methodologies work. 1.3 Discuss corporate governance of information systems and strategies. 1.4 Explain legal aspects of forensics and ID fraud. 1.5 Appreciate security issues associated with information systems. 1.6 Develop and configure a LAN. 1.7 Simulate network using Packet Tracer. 1.8 Appreciate methodologies in software engineering and process managements.

	1.9 Network configuration TCP/IP and usage of basic windows commands for troubleshooting network related issues.
LO2 Critically evaluate ICT solution strategies for business problems, implement and maintain them	2.1 Solve problems using divide and conquer and other problem-solving techniques. 2.2 Model software solutions using objecting modeling techniques such as UML. 2.3 Apply Quantitative skills relevant to decision making. 2.4 Model business processes on a modeling tool such Visual Paradigm. 2.5 Analyze business processes models and extraction of requirements for business process improvement.
LO3 Demonstrate the application of intellectual capability that is universally acceptable and all encompassing.	3.1 Analysis and development of networking solutions for simple business. 3.2 Demonstrate skills on continual service improvement. 3.3 Define statistical principles and methods. 3.4 Demonstrate how IT can be used to improve a firm's competitiveness. 3.5 Model a firm's data management solution using Relational Data Model. 3.6 Extract data requirements from documentation. 3.7 Use statistical formulas for data analysis and solving mathematical problems. 3.8 Simulate and Apply project management skills in ICT.
LO4 Demonstrate the ability to participate in constructive arguments on concepts, heuristics and theories encountered during learning time.	4.1 Be inquisitive on concepts and theories encountered in their own studies. 4.2 Reflect on their own value systems, development and practices and compare these with alternative systems and practices. 4.3 Critically evaluate heuristics encountered in their studies.

	4.4 Reflect that learning is a cumulative process.
LO5 Demonstrate ability to use UML in creating business models, testing, conversion and support strategies for software development.	5.1 Apply appropriate techniques/development methodologies. 5.2 Communicate effectively by written, visual and oral means. 5.3 Know how to use UML and other modelling tools to design different diagrams. 5.4 Engage in creative problem solving that addresses student's individual needs and practice. 5.5 Demonstrate judgment in identifying and improving work-related issues. 5.6 Interpret and implement UML diagrams.
LO6 Demonstrate high personality traits, team play, be conscious with meeting deadlines and be consultative.	6.1 Work as a member of a team and demonstrate /show inter-personal skills. 6.2 Manage own time and work to deadlines. 6.3 Be numerate to an appropriate professional level. 6.4 Identify personal needs, strengths and opportunities for improvement. 6.5 Be able to use current IT equipment in an effective and productive manner. 6.6 Work as a member of a team and develop a range of complex interpersonal skills.
LO7 Professionalism Demonstrate personal and professional qualities necessary for effective adaptation to industry.	7.1 Demonstrate a passionate interest in providing computer techno-based solutions to business problems. 7.2 Ability to model good professional practice and lead by example (e.g. understand code of conduct).

	7.3 Higher expectation for achievements and ability to set stretching targets for oneself. 7.4 Commitment to enabling team dynamics.

QUALIFICATION STRUCTURE			SECTION C
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	Computer related Mathematics and Statistics	5	20
	Computer Technology	5	20
	Systems Development	5	20
	Introduction to C# Programming	5	15
	Computer System Installation and Maintenance	5	20
	Business Process Analysis	6	20
	Database Design and Development	6	20
	Object Oriented Analysis and Design with C#	6	20
	Ethics and Professional Conduct	6	20
	Computer Networks	6	20
	Quantitative Analysis for Business	6	20
	Computer Systems Administration	6	20
	Information System Strategy	6	20
	Innovation Project	6	20
	Industry Attachment	6	60
	Research (Dissertation)	7	25
	IT Systems Audit and Forensics	7	20
	Product Development	7	20
	Business Intelligence & Strategy	7	20
	IT Service Management	7	20
	Professional Issues in Cyber Security and Digital Forensics	7	20
	Business Modelling for Decision Making	7	20
	Grand Total Credits		**480**
ELECTIVE COMPONENT	Not Applicable		

Subjects / Units / Modules /Courses			

Rules of combinations, Credit distribution (where applicable):

The total number of credits at level 5 equals 95 credits; level 6 equals 240 credits and level 7 equals 145 credits. For this qualification, students will do all the modules. A total of 480 credits must be completed to obtain the Qualification.

ASSESSMENT And MODERATION ARRANGEMENTS

ASSESSMENTS ARRANGEMENTS

FORMATIVE ASSESSMENT (40%)

The contribution of formative assessment to the final grade shall be 40%.

SUMMATIVE ASSESSMENT (60%)

The contribution of summative assessment to the final grade shall be 60%.

Assessment shall be carried out by BQA registered and accredited Assessors.

MODERATION ARRANGEMENTS

Moderation is done on all assessments that earn a student grade towards attainment of the qualification. It is two-fold covering internal and external moderation.

Internal moderation arrangements

Internal moderation is done locally to uphold quality issues. It is done on all assessments that lead to the attainment of the qualification. It is done following an internal moderation instrument. Evidence of moderation will be in the form of moderation reports. Observations from the moderators are actioned by examiners to keep up with quality. After internal moderation is complete, external moderation takes place.

External Moderation arrangements

External moderation takes place after the internal moderation process has been completed. The External moderator moderates the assessment before and after it is attempted. It is done following an external moderation instrument. In the latter case, the moderator is presented with a sample set of marks and a sample set of assessments. Due diligence, confidentiality and anonymity is practiced.

RECOGNITION OF PRIOR LEARNING (if applicable)

RPL and CAT will be considered towards the awarding of the qualification. RPL allows for the recognition of knowledge, skills and attributes acquired through formal and non-formal learning experiences. The Learning experience is evaluated to determine its validity and reliability when measured against the learning outcomes of a specific qualification, learning qualification for the purpose of recognition, and awarding the qualification.

Provisions are in place to accommodate appeal of the decisions; in the event the candidate chooses.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

On completion of this qualification the candidates can progress in 3 ways:

a) **Vertical pathways**

Upon completion of the qualification graduates can progress into Honors degree such as,
Bachelor of Science (Hons) ICT,
Master of Science in Computer Science,
Master of Science in Information Technology,
Master of Science in Computer Engineering.

b) Horizontal pathways

Learners can progress horizontally across qualifications such as,
Bachelor of Science in Applied Business Computing,
Bachelor of Science in Information Technology

c) Diagonal pathways

Upon completion of the qualification graduates can progress into masters of other disciplines such as,
Master of Business Administration,
Master of Science Project Management

d) **Employment Pathway**

On completion candidates attain jobs in various computing disciplines beginning at entry level point for the positions. They could venture into industry as
Entrepreneurs,
Business analysts,
Software developers,
Technical support,
Help desk,
Network support specialist,
Data base analyst.
Developers, and network specialists.

They could further establish themselves with professional bodies like SAP, CISCO, ISACA, Microsoft certifications and CBA.

Not all graduates will proceed with a professional career in ICT areas. The attributes of ICT graduates also make them attractive to many non-computing employers: manufacturing, finance, consultancy, public services, creative industries and the arts.

QUALIFICATION AWARD AND CERTIFICATION

The minimum number of credits accumulated for the award of a **Bachelor of Science in Information and Communication Technology** is 480 credits. There will be certification upon awarding of the qualification.

The qualification shall be awarded with a **Bachelor of Science in Information and Communication Technology.**

REGIONAL AND INTERNATIONAL COMPARABILITY

International Benchmarking

The qualification was developed with a focus to equip graduates with top level skills in Information Communication Technology. The qualification was informed by the BSc ICT qualification from University of Sunderland in general. Internationally the qualification is considerably informed by University of Sunderland. The qualification was developed following the requirements of QA associations such as BQA and QAA to ensure that the skills graduates 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 QAA, 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 such.

The ACM, in conjunction with the Institute of Electrical and Electronics Engineers (IEEE) and other professional societies, maintain (and regularly update) curricula in several areas: computer science, computer engineering, information systems, information technology and software engineering

At the international level the qualification was benchmarked against the University of Wales, UK. The two qualifications have some considerable similarities in modules and all levels. Year 1 modules have 80% similarity. Year 2 modules and Year 3 modules are wholly similar with the exception that the University of Wales have more modules than the qualification being developed. Year 4 modules are 66% similarity. It is worth noticing that differences in modules at different levels are met with similar modules in other levels, which make the two qualifications similar (see second table below).

Regional Benchmarking

The qualification being developed was compared to the BSc Hons IT from the University of Johannesburg (UJ), SA. UJ's qualification takes 3 years to complete with the first-year equivalent of the qualification being developed matching the Metric level at UJ. Other years have considerable similarities as shown on the table below.

A similar qualification within the region is the BSc / BSc Hons in Information Technology offered at the University of Johannesburg, South Africa. The modules for BSc (Hons) Information Technology are offered at 3 levels. Modules for Level 1 are replaced by Metric level. At level two we can see minor similarities between the programme modules but still the two qualifications are still in the same discipline of ICT. The BSc Hons IT has a large pool for students to pick their own choices and their careers as per their wish. Although the University of Johannesburg qualification has more modules, both qualifications are carrying almost similar exit level learning outcomes, module themes and content of modules is very similar. Although the above University of Johannesburg qualification above has more modules, both qualifications are carrying almost similar exit level learning outcomes, module themes and content of modules is very similar.

An international qualification which is similar is also found at the University of Wales, UK. The two qualifications have quite a sizable number of modules that are related or similar to each emphasizing the similarity in programme structure. This qualification being a UK qualification it is developed under the QAA guidelines defines similar career prospects as follows. As the use of ICT in business is ever-growing, there are excellent opportunities for students with appropriate qualifications in ICT. Graduates from this ICT degree will have the skills to start careers in network or service management, as well as a range of technical support roles. The roles are similar to that of BSc ICT from Botswana Accountancy College. It should be noted that it is difficult to access the further details of the qualification due to confidentiality of the documents in the various universities.

REVIEW PERIOD

The qualification will be reviewed in 5 years upon registration or whenever there is need.