QUALIFICATION SPECIFICATION							SECTION A
QUALIFICATION DEVELOPER	Botswana Open University						
TITLE	Bachelor of Technology in Information Systems			**NCQF LEVEL**	7		
FIELD	Information and Communication Technology			**SUB-FIELD**	Information Systems		
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

The rationale of this qualification is to cover the gap and demand of occupations such as Database Administrators and Designers, ICT Sales Professionals, Application programmers, Network Designers and Administrators, as highlighted under ICT Sector top occupations published by HRDC, 2016. A needs assessment survey was conducted amongst key potential employers and curriculum advisors in order to inform the structure of the qualification. The content and structure of the qualification takes into account feedback from these consultative surveys and HRDC ICT sector committee recommendations on skills development. The recommendations include; infusing entrepreneurship to curriculum, infusing industry certification into tertiary curriculum, and introducing a closely monitored industrial attachment on the qualification.

This qualification will address national and regional skills needs as articulated here. It is in line with national policy documents such as; Vision 2036, pillar 1 which commit to leveraging economic growth on ICT; and the ETSSP Strategic Priority 10, which encourages and promotes integration of ICT in teaching and learning. The philosophy behind the structure of this Bachelor of Technology qualification contributes towards the vision 2036 pillar 2 on human and social development. As a basis for human resource development, a learner who graduates with this qualification will possess relevant practical and academic competencies which are the pinnacles of the modern-day economies. The qualification will build capacity to implement e-Government projects as outlined in the National Development Plan 11 Chapter 5. This will further help the nation to solve

its ICT problems, creation of Knowledge based economy and propel the country to the Fourth Industrial Revolution.

The qualification will help towards achieving sustainable development goals (SDGs) in Southern Africa in line with the provisions of The SADC Industrialization Strategy and Africa Agenda 2063. A strategic objective specific to the contribution of this qualification to the Africa Agenda 2063 is, Industrialization as champion of economic and technological transformation.

The purpose of this qualification is to produce graduates who are able to present creative and innovative solutions to technical and business problems using state-of-the-art IT tools and methodologies. It puts strong emphasis on producing graduates with various competencies across the following ICT areas; database design and administration, computer networks and security, systems engineering and software project management, and Information Systems Management.

The qualification also inculcates life-long learning skills on the learners by preparing them for relevant postgraduate studies in the future.

ENTRY REQUIREMENTS (including access and inclusion)

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

1. NCQF Level IV, BGCSE or other equivalent secondary school qualification
2. Diploma or equivalent qualification (NCQF Level VI) in a related field.
3. Applicants that do not meet the above criteria but possess relevant industry experience will be considered through recognition of prior learning (RPL).

QUALIFICATION SPECIFICATION SECTION B	
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA** Candidates will be able to:
1. Analyse a problem, identify and define the computing requirements appropriate to its solution.	1.1. Apply various modern Software Development Lifecycles (SDLC) to business problems. 1.2. Describe key software engineering concepts and activities. 1.3. Apply knowledge and skills learned in other IT courses into execution of the project. 1.4. Illustrate understanding of software engineering concepts to perform requirements elicitation and analysis. 1.5. Design abstract data types and data sets to solve problems. 1.6. Apply mathematical skills and methods to solve computing problems.
2. Design, implement and evaluate a computer-based system to meet specified design and performance requirements.	2.1. Describe object design concepts. 2.2. Demonstrate the ability to model a business problem into various database and software models. 2.3. Write SQL statements effectively to access RDBMS. 2.4. Model an entity-relationship diagram. 2.5. Design a relational database using normalization process. 2.6. Install and administer a database. 2.7. Explain the concepts of software development modelling concepts, software processes, software process models and software development activities.
3. Apply design and administration principles in the network and security management of an enterprise ICT infrastructure	3.1. Explain concepts of LAN and WAN and create logical design of both. 3.2. Differentiate and discuss types of internet architecture components and standards. 3.3. Explain troubleshooting theory and methodologies. 3.4. Describe network management and apply techniques to solve computer network management problems.
	3.5. Demonstrate ability to provide the protection needed to ensure smooth operation of the system and network of an organisation. 3.6. Apply a range of network security technologies such as firewalls and intrusion detection systems for securing networks. 3.7. Apply appropriate security standards and network security tools to enhance the security of a system. 3.8. Determine the appropriate placement of network devices and install/configure them

4. Interpret and relate the linkage between business strategy and IT Solutions.	4.1. Describe the crucial role played by information strategy and Internet technology in strategic information systems. 4.2. Discuss the role and significance of information technology in modern business organizations 4.3. Explain the relationship between business process re-engineering and ERP. 4.4. Explain the technological architecture of an ERP system and its relationship with other functional information systems.
5. Implement and maintain a safe and healthy work environment with a good understanding of professional and ethical responsibilities.	5.1. Show understanding of professional and ethical responsibilities. 5.2. Show understanding of legal and regulatory standards in IT. 5.3. Ability to recognise health hazards in the IT work environment and use appropriate safety procedures and controls. 5.4. Identify and apply policies and best practices in IT.
6. Use various communication skills and techniques with a range of audiences	6.1. Demonstrate professional communication skills when interacting with customers. 6.2. Show ability to use appropriate templates, structure and principles in writing various types of technical documents including reports and proposals. 6.3. Explain ideas and results through written, statistical, graphical, oral and computer- based forms of communication.
7. Participate in educational activities to expand knowledge of professional practice and enhance own competencies, life-long learning skills and ability to work in a team.	7.1. Discuss a range of approaches to structured decision making and when it is appropriate to use them. 7.2. Identify complex and strategic problems and understand how to apply a range of problem- solving tools to tackle more difficult and ambiguous problems in the workplace. 7.3. Appraise the process of identifying and managing risk. 7.4. Recognise the knowledge about self and the world through an on-going process of decision making and be able to work as a team (team player). 7.5. Demonstrate ability to manage time, to be self-directed and independent when studying.

QUALIFICATION STRUCTURE
SECTION C

	Title	Level	Credits
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	Communication for Academic Purposes	6	15
	Introduction to Computing	6	15
	Decision Making skills	7	15
	Entrepreneurship Development	6	20
	Mathematics for Science & Engineering	6	20
CORE COMPONENT Subjects / Units / Modules /Courses	Operating Systems	7	20
	Software Development Models	7	20
	Programming Fundamentals with Java	7	20
	Database Management Systems	7	20
	Data Structures and Algorithms	7	20
	Visual Programming	7	20
	Database Administration	7	20
	Web Database Application	7	20
	Human Computer Interaction	7	20
	Computer Networks	7	20
	Project Part II	7	30
	Computer Organization	7	20
	Systems Security	7	20
	Project Part I	7	30
	Industrial Training	7	30
	Management Information Systems	8	20
	Software Project Management	8	20
ELECTIVE COMPONENT Subjects / Units / Modules /Courses	Strategic Information Systems	7	25
	Intelligent Systems for Decision support	8	25
	Telecommunication Principles	7	25

Rules of combinations, Credit distribution (where applicable):

This qualification will have 480 credits.

The credit combination for this qualification is from 70 credits of fundamental modules, 345 credits of core modules and the remaining 25 credits from elective module. (Note. Learners will choose any one elective module)

The credit distribution of the qualification is as follows:

NCQF Level	Credits	Compulsory	Elective (Choose one)
6	**70**	**70**	**0**
7	**345**	**345**	**50**
8	**65**	**40**	**25**
TOTAL	**480**	**455**	**25**

ASSESSMENT AND MODERATION ARRANGEMENTS

Assessment

This qualification is made up taught modules, project modules and industrial training. An Outcomes-Based assessment approach is used to assess the exit outcomes for this qualification as follows:

Taught Modules

Learners will be assessed through Formative and Summative assessments.
Assignments and Course Participation constitutes Continuous formative assessment and constitutes **60 %** weighting. Final Exam (summative) constitute **40 %** of the course mark to give a total of 100%.
Pass Requirements: For a learner to pass a module, they need to have passed both components (formative and summative) by at least 50% each component.

Industrial Training: This will be portfolio and performance-based assessed against workplace outcomes. Assessment will be conducted by the workplace supervisor (formative - 40%) and institution (summative - 60%).

Moderation

Internal moderation requirements

All assessment instruments including marking keys will be internally moderated and approved by relevant structures before they are administered. Internal moderation will be done by course specialists during or after marking of final examinations. This will be done by Team Leaders or Chief Examiners and quality assured by in-house Lecturers. The requirements for internal moderators should be relevant qualification in the particular disciplines. At the end, a report should be submitted to the relevant structure for consideration during external moderation.

The sampling of candidates' work for Moderation should be 10% minimum across the performance levels; low, middle and high.

External moderation requirements

The criteria for appointment of External Moderators and Examiners should be consistent with assessment and moderation principles. The moderation should be anchored upon the assessment and moderation principle, placing emphasis on; assessment methods that are appropriate and fair and allow for manageability and integration processes that are systematic, transparent and consistent ascertaining that evidence of competence is valid, authentic, current, sufficient and at an acceptable level
External Moderators and External Examiners are experienced senior academics, normally at least senior lecturer or equivalent, who commands expert authority. Nominees should have expertise and previous external examining experience in assessment at the appropriate level or extensive internal examining expertise and experience or other relevant experience.

The sampling of candidates' work for Moderation should be 10% minimum across the performance levels; low, middle and high.

Assessors and Moderators should be registered by BQA. They should have relevant qualifications in the particular disciplines being assessed and at a level higher than what they are assessing or moderating.

RECOGNITION OF PRIOR LEARNING (if applicable)

Prospective students can apply for recognition of prior learning (RPL), the knowledge may have been acquired through formal learning, at workplace or any other informal or non-formal ways. However, the applicant will be expected to provide evidence of such. The evidence should be relevant, valid, sufficient, verifiable as well as authentic.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

The qualification provides for future developments and growth to the learner through horizontal and vertical articulation.

- Horizontal articulation is possible through undergraduate qualifications in related fields such as Bachelor of Science in Information Technology (NCQF7), Bachelor of Information Systems in Computing (NCQF7) and Bachelor of Science in Computer Systems Engineering (NCQF7).
- Vertical articulation is possible through postgraduate qualifications in related fields such as Master of Science in Information Systems (NCQF9), Master of Science in Computer Science and Management postgraduate qualifications (NCQF9). Post graduate diplomas/certificates (NCQF8) such as Post Graduate Certificate in Education, Post Graduate Certificate in Cybersecurity, Post Graduate Certificate in Big Data Analytics and so on.

The qualification will offer the following career opportunities in both public and private sector;

- Database Management Specialist
- Systems developer
- Application Developer
- Web Developer
- Software Engineer & Analyst
- Software Business Entrepreneurs
- Research & Development (R&D) Engineer & Manager
- IT Sales & Marketing professional

QUALIFICATION AWARD AND CERTIFICATION

The learner will be awarded Bachelor of Technology in Information Systems after attaining 480 credits as specified in the rules of combination and credit distribution. This qualification does not have exit awards. Therefore, if the candidate does not meet the prescribed minimum standards of the qualification the learner will exit with a transcript.

REGIONAL AND INTERNATIONAL COMPARABILITY

Related Degrees are offered by various universities regionally and internationally. The general perception is that the Degree should cover a wide range of topics, such databases, software development, networking and business and communication-oriented modules.

The five reputable universities which were considered for benchmarking are Open University UK, University of South Australia, University of Johannesburg, University of the Free State, Kenya Methodist University and Open University of Tanzania. The Bachelor of Technology degrees are more focused on developing practical skills (hands-on) which shares the same emphasis with our proposed degree. The proposed degree qualification provides similar modules and outcomes to related qualifications offered regionally and internationally. The degree shares more than 70% similar modules on average which subsequently led to a similar graduate profile. The duration varies from 3 to 5 years depending on study mode. Check the attached Comparability Document for more information.

Therefore, our qualification compares favorably with the other qualifications regionally and internationally in terms of purpose and content covered. Please find below matrix showing a summary of comparable qualifications.

Note. The credits, units and NQF levels used differ per country.

Name of University (and Country)	Title of Qualification, NQF Level & Credit Value	Main Exit Outcome(s)
University of the Free State (South Africa)	Bachelor of Computer Information Systems (408 Credits)	- Apply the general theory of Information Technology (IT) in business world -Solve software production problems from the knowledge of selected sub-fields of computer science. -Manage, organise, and retrieve information based on concepts and theories of information systems. -Apply the competencies required to start own enterprise in the field of Information

		Technology (IT).
University of Johannesburg (South Africa)	Bachelor of Commerce Degree: Information Systems (396 Credits)	-Identify and design opportunities for IT -Design and compare solution considering risks and feasibility. -Demonstrate the knowledge and skills to design and implement information systems solutions.
		-Perform professional collaborative roles and assume leadership positions at various levels. - Able to perform systematic analysis of complex systems.
Open University UK (United Kingdom)	BSc (Honours) Computing and IT (320 Credits)	Be a confident user and manager of information technologies; -Ability to administer and manage network or database systems; -Ability to develop new software solutions to meet specific market or organisational needs.
University of South Australia (Australia)	Bachelor of Information Technology (108 Units)	Not provided
Open University of Tanzania (Tanzania)	B.SC Information and Communication Technology	Acquired adequate skills to plan, design, implement and manage information systems.
Kenya Methodist University (Kenya)	Bachelor of Science in Computer Information Systems (150 Credits)	Be able to -Analyse a wide range of problems and provide solutions through algorithms, structures, -Design and develop diverse computer systems. -Identify the current changes in computing technologies. -Evaluate and use professional techniques in developing processing information systems.

REVIEW PERIOD

The qualification will be reviewed on a five-year cycle.

Other information – please add any supplementary information to help the application for this qualification for NCQF Registration.