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SECTION A: QUALIFICATION DETAILS														
QUALIFICATION DEVELOPER (S)		University of Botswana												
TITLE	Bachelor of Science in Computer Information Systems										NCQF LEVEL	7		
FIELD	Information and Communications Technology			SUB-FIELD			Information Systems			CREDIT VALUE	528			
New Qualification							√	Review of Existing 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														
<p><b>RATIONALE:</b></p> <p>Organizations need useful information to achieve business goals. Information Systems play a pivotal role in this regard as they provide relevant information for problem identification, analysis, and decision making, thus supporting management processes. They assist business processes and strategies across many operational areas within an organization. The Bachelor of Information Systems (Computer Information Systems) qualification is therefore a multidisciplinary degree developed with a focus on the application of information systems in businesses to generate this vital information.</p> <p>This 4-year qualification is designed to provide learners with the necessary theoretical and practical knowledge and skills required to apply information technology within a business to solve business problems and support business operations. These skills enable learners to gather, process, store, distribute and use information and its associated</p>														

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technologies to improve the efficiency and effectiveness of business operations. In order to prepare learners for effective integration of technology into organizations, this qualification covers a broad range of relevant courses from information technology and business fields of study. Learners gain knowledge about various computer technology alternatives, how to select the most appropriate solution that addresses the business' information needs, and relevant skills in relation to implementing and managing the selected technology alternative. It also aims to provide students with a solid background in the analysis, design, development, deployment, and maintenance of computer-based information systems by integrating appropriate and latest information technologies with organizational processes. Furthermore, the qualification aims to equip students with the ability for critical thinking and life-long learning that helps them keep up with the rapid development of the technology in information systems.

Graduates of this qualification qualify to work in occupations listed in the 2016 HRDC's top Occupations in Demand report [1], under the Information and Communication Technology sector. Skills acquired by graduates of this qualification will contribute towards VISION 2036 [2] pillar 1 (Sustainable Economic Development) and pillar 2 (Human and Social Development) outcomes as the qualification develops human capital with the necessary specialized ICT skills and knowledge for local, regional, and international industries. In order to keep up with the world development, the department has based its computing curricula trend as documented in the ACM/AIS IS 2010 Model Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. [3]. The departmental national computing skills survey (CS Computing Skills Survey 2017) [4] and HRDC report on Top Occupations in Demand [5] also indicated that there is a need for graduates who can apply knowledge of information systems and computing to different sectors. Some of these are Systems analysts, Project Managers, ICT Consultants and Database Managers.

### **PURPOSE:**


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

- Specify Information Systems requirements.
- Design and manage enterprise architecture.
- Identify and evaluate systems solutions and sourcing alternatives.
- Secure data and infrastructure.
- Manage Information Systems projects.

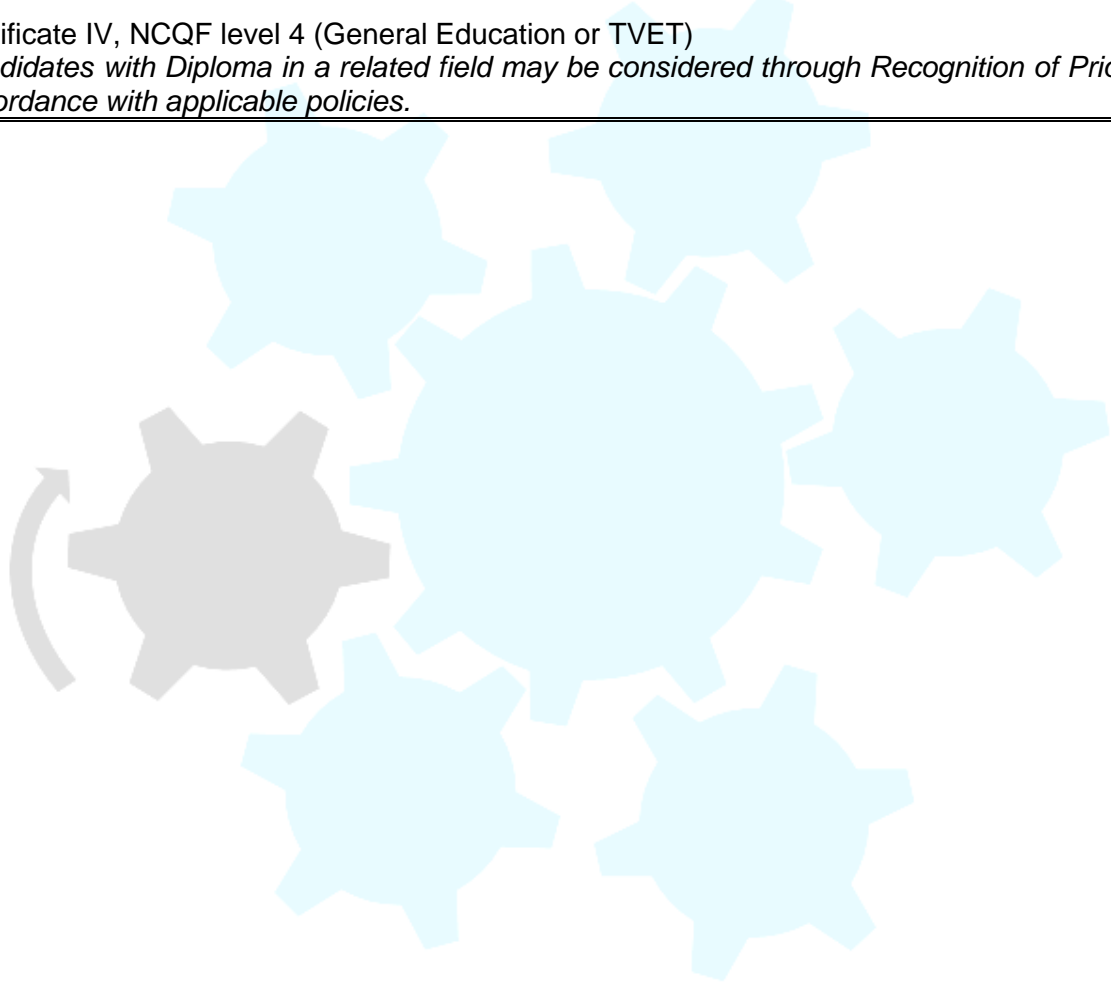
In addition, the qualification will produce candidates with competences in business and people skills and in balancing technology with the human side of Information Systems.

### **ENTRY REQUIREMENTS (including access and inclusion)**

For entry to the BIS (Computer Information Systems), the following entry requirements shall apply.

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| <p>i)</p> <p><b>ii)</b></p> | <p>Certificate IV, NCQF level 4 (General Education or TVET)</p> <p><i>Candidates with Diploma in a related field may be considered through Recognition of Prior Learning in accordance with applicable policies.</i></p> |
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<b>SECTION B QUALIFICATION SPECIFICATION</b>	
<b>GRADUATE PROFILE (LEARNING OUTCOMES)</b>	<b>ASSESSMENT CRITERIA</b>
1. Design information technology solutions that enhance organizational performance.	1.1. Specify the information system needs of a business. 1.2. Design various components of an information system solution. 1.3. Model the designed IS solution processes and data using appropriate design tools. 1.4. Develop the necessary documentation for the designed IS solution.
2. Implement information technology solutions that enhance organizational performance.	2.1. Implement technical and process solutions. 2.2. Apply appropriate techniques to acquire, process, transmit and store data and information. 2.3. Develop databases. 2.4. Perform basic system deployment tasks including installation, creating user accounts, setting appropriate access rights, and backup.
3. Apply analytical and critical thinking skills in solving IS problems in organizations.	3.1. Critically identify the required information needs of a business. 3.2. Apply systems concepts (both traditional and contemporary) for understanding and framing information system's problems. 3.3. Identify potential business processes where information systems can be applied to improve organizational efficiency and effectiveness. 3.4. Demonstrate an understanding of constituents of a system, which are people, procedures, hardware, software, and data. 3.5. Demonstrate understanding of the relationships among the various aspects of an information system. 3.6. Demonstrate problem-solving skills. 3.7. Identify alternative information system solutions. 3.8. Explore alternative information system solutions and recommend a more appropriate and sustainable solution given business requirements, resources, and the available skill set.

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<p>4. Apply strong ethical principles and good interpersonal communication and team skills needed in managing IS in organizations.</p>	<p>4.1 Apply knowledge of professional codes of conduct.</p> <p>4.2 Apply ethical considerations and exercise judgment and take responsibility for one's actions.</p> <p>4.3 Manage inter/intra-personal conflicts.</p> <p>4.4 Demonstrate effective communication and collaboration skills including persistence, curiosity, creativity, risk-taking, and a tolerance of these abilities in others.</p> <p>4.5 Exhibit team-spirit.</p>
<p>5. Manage IS projects effectively using appropriate management tools.</p>	<p>5.1 Understand the process of managing an IS project.</p> <p>5.2 Create and deliver presentations effectively.</p> <p>5.3 Use project management tools effectively to document and manage IS development progress.</p> <p>5.4 Use spreadsheet production tool for documenting and managing IS project's finances.</p> <p>5.5 Write project reports.</p> <p>5.6 Apply other communication modes such as email and telephone effectively.</p> <p>5.7 Organize and participate in team meetings.</p>
<p>6. Serve as an effective bridge between the technical and management communities within an organization.</p>	<p>6.1 Identify main communications gaps between technical and management units.</p> <p>6.2 Understand the human, business, and technology dimensions specific to an organization.</p> <p>6.3 Demonstrate advanced analytical skills and knowledge needed for technical and managerial endeavours in the field of IS.</p>
<p>7. Demonstrate advanced knowledge in the information systems discipline.</p>	<p>7.1 Demonstrate proficiency in basic research, advanced analytical skills, and knowledge.</p> <p>7.2 Demonstrate proficiency in applying IS theories to understand specific IS problems.</p>
<p>8. Develop proficiency in adapting to new IS environments.</p>	<p>8.1 Interact appropriately with various information system stakeholders from diverse communities.</p> <p>8.2 Explore new IS technologies and environments independently.</p>

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	8.3 Exhibit knowledge of occupational health and safety procedures to create conducive IS environments.
9 Exhibit self-directed, lifelong learning skills.	9.1 Show evidence of setting clear goals in an IS environment. 9.2 Demonstrate ability to evaluate activities in an IS environment. 9.3 Show evidence of the ability to independently find and use technical information. 9.4 Demonstrate competency to engage in lifelong and independent learning through different mechanisms.

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<b>SECTION C</b>		<b>QUALIFICATION STRUCTURE</b>			
<b>COMPONENT</b>	<b>TITLE</b>	<b>Credits Per Relevant NCQF Level</b>			<b>Total (Per Subject/ Course/ Module/ Units)</b>
		<b>Level [ 6]</b>	<b>Level [7]</b>	<b>Level [8]</b>	
<b>FUNDAMENTAL COMPONENT</b>  Subjects/ Courses/ Modules/Units	Mathematics for Social Sciences	√			28
	Information Systems Foundations		√		24
	Introduction to Computing		√		12
	Communication and Study Skills	√			24
	Basic Microeconomics		√		12
	Introduction to Programming		√		12
	Introduction to Accounting		√		12
	Data and Information Management I		√		12
	Data and Information Management II		√		12
	Intermediate Programming		√		12
	Data Structures		√		12

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<b>CORE COMPONENT</b>  <i>Subjects/Courses/ Modules/Units</i>	Business finance		√		12
	Small Business Management		√		12
	Advanced Programming		√		12
	IT Tools and Productivity		√		12
	Computer Architecture		√		12
	Business Statistics		√		12
	Network Management		√		12
	Information Systems Analysis		√		12
	Operating Systems		√		12
	Information Systems Design and Implementation		√		12
	System Administration		√		12
	Information Systems Security		√		12
	Web Technology and Applications		√		12
	Industrial Attachment		√		28
	Enterprise Architecture		√		12
	IS Project Management		√		12
	IS Research			√	12



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	Decision Support Systems		√		12
	IS Project			√	16
	IS and Society		√		12
	Strategic IS Management		√		12
	Web Computing		√		12
	Entrepreneurship and new Business Formation		√		12
	Human Computer Interaction		√		12
<b>ELECTIVE/ OPTIONAL COMPONENT</b>  <i>Subjects/Courses/ Modules/Units</i>	Information Systems Auditing		√		12
	Knowledge Management		√		12
	Accounting Information Systems		√		12
	Principles of Management		√		12
	Foundations of Business law		√		12
	Business Process Re-engineering		√		12

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<b>SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL</b>	
<b>TOTAL CREDITS PER NCQF LEVEL</b>	
<b>NCQF Level</b>	<b>Credit Value</b>
<b>6</b>	<b>52</b>
<b>7</b>	<b>448</b>
<b>8</b>	<b>28</b>
<b>TOTAL CREDITS</b>	<b>528</b>
<b>Rules of Combination:</b> <b>(Please Indicate combinations for the different constituent components of the qualification)</b>	
<p>The qualification requires <b>184</b> credits of fundamental courses, <b>296</b> credits of core courses and <b>48</b> credits of elective courses. The total credit a learner must achieve is <b>528</b>.</p>	

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## ASSESSMENT ARRANGEMENTS

Assessment will consist of both formative and summative assessments and should be aligned with learning outcomes and sub-outcomes. Assessment will be carried out by registered and accredited assessors.

### 1. Formative assessment

Formative assessment or continuous assessment component of each course may include one or more of the following: written assignments, written tests, practical projects, research exercises, and independent study. Continuous assessment shall contribute 60% to the final grade of each course.

### 2. Summative assessment

Summative assessments are conducted in the form of examinations and practical assessment. The practical assessment is mainly on the final year project which comprises of project demonstration and research reports. Summative assessment shall contribute 40% to the final grade of each course.

## MODERATION ARRANGEMENTS

In accordance with the university policies and regulations, internal and external moderations are conducted at the end of each semester by registered and accredited moderators.

### 1. Internal moderation requirements

Internal moderation is carried out by BQA accredited staff members in the department whose area of expertise is in line with the courses to be moderated and by the staff members of the course clusters.

### 2. External moderation requirements

External moderation is carried out by BQA accredited moderators from other institutions recruited for this purpose.

## RECOGNITION OF PRIOR LEARNING

Candidates may submit evidence of prior learning and current competence and/or undergo appropriate forms of RPL assessment for the award of credits towards the qualification in accordance with applicable university RPL policies and relevant national-level policy and legislative framework. Implementation of RPL shall also be

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consistent with requirements, if any, prescribed for the field or sub-field of study by relevant national, regional or international professional bodies.

### **CREDIT ACCUMULATION AND TRANSFER**

Credit accumulation and transfer will be done according to the institution's policy on credit accumulation and transfer.

### **PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)**

#### **Horizontal Articulation**

Learners in this qualification will have the following options for horizontal articulation:

- Bachelor of Information Systems in Business Information Systems
- Bachelor of Information Systems in Information Management
- Bachelor of Science in Information Technology

#### **Vertical Articulation**

Graduates of this qualification will have the following options for postgraduate education:

- MSc in Computer Information Systems
- MSc in Information Technology

### **EMPLOYMENT PATHWAYS**

Graduates of this qualification will be able to take up the following jobs:

- Systems Analysts
- Business Analysts
- IS Managers
- IS Project Managers
- IS Security Managers
- Business Intelligence Manager
- IT Entrepreneur

### **QUALIFICATION AWARD AND CERTIFICATION**

1. *Minimum standards of achievement for the award of the qualification*

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To be awarded a BIS (Computer Information Systems) qualification, a candidate must satisfy appropriate provisions of the university. A candidate is expected to complete a minimum of 528 credits with duration of 8 semesters where at least two thirds of the total credits must come from core and fundamental courses prescribed for the qualification, and the total number of credits from elective courses shall not exceed one third of the total credits. A candidate should attain a minimum cumulative GPA of 2.00 to be considered for the award of the qualification.

## 2. Certification

Candidates meeting prescribed requirements will be awarded the qualification **Bachelor of Information Systems (Computer Information Systems)** in accordance with standards prescribed for the award of the qualification and applicable policies of the university.

## REGIONAL AND INTERNATIONAL COMPARABILITY

This qualification was compared against the following:

### Regionally:

The qualification was compared with similar qualifications from the Universities of the Free State [6] and Cape Town, South Africa [7,8].

### Internationally:

The qualification was compared with similar qualifications from California University of Pennsylvania, United States of America [9] and University of London, United Kingdom [10].

### Comparison

The Bachelor of Computer Information Systems offered by the University of the Free State in South Africa provides learners with the necessary information technology knowledge and skills required to apply information systems in organizations. Accredited by South African Qualifications Authority (SAQA), this qualification is comparable to the proposed qualification in terms of objectives and areas of study. The qualification covers a broad range of course areas including information systems, networks, programming, databases, systems analysis and management. The credit value is much lower compared to the proposed qualification.

The University of Cape Town offers the Bachelor of Commerce: Information Systems which has similar objectives to the proposed qualification but offers an option of choosing a stream from business systems analyst, business IT specialist and business application developer. Courses offered include those from the

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lower and upper levels similar to our qualification. The credit value is slightly lower but similar to the proposed qualification.

California University of Pennsylvania in the USA offers a Bachelor of Science, Computer Information Systems. Accredited by Computing Accreditation Commission of the Accreditation Board for Engineering Technology (ABET), this qualification is comparable to our qualification in terms of objectives, duration, possible employment pathways and courses taught. This 4-year qualification equips learners with technical knowledge and skills that help them apply computing technical solutions in business processes to meet organizational information needs. Additionally, graduates learn about IS requirements determination and analysis, as well as IS design and implementation. In terms of courses offered, the qualification offers learners a broad range of course areas including information systems, programming, databases, systems analysis, project management and web development. Although this qualification has an internship program, it is offered as an elective unlike in our qualification where it is core. The qualification also includes some professional courses and has a strong mathematical component. The credit level seems lower than the other 3 qualifications, but this seems to be due to a different credit system.

University of London, United Kingdom offers the BSc Computing and Information Systems. The qualification is like the proposed qualification in terms of exit outcomes, and assessment strategies, though it has additional modules like data security and cryptography. Also, courses done are taken from 2 lower levels as opposed to the lower and upper levels. The credit value is the same as that of the Bachelor of Computer Information Systems qualification offered by the University of the Free State.

#### **Conclusion:**

The above qualifications compare favourably with the proposed qualification. These qualifications seek to provide learners with knowledge and skills required for integration of information systems in businesses for effective and efficient operations. Future reviews might investigate including more advanced areas or options covering applications or issues in information systems such as data security, cryptography and ERP systems.

#### **REVIEW PERIOD**

5 years

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[9] California University of Pennsylvania, *Computer Information Systems*, available at <https://www.calu.edu/academics/undergraduate/bachelors/computer-information-systems/index.aspx#:~:text=Choose%20the%20Bachelor%20of%20Science,of%20today%27s%20dynamic%20business%20environment>. Last accessed 19/6/2020

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