SECTION A:	QUALIFICATION DETAILS																	
QUALIFICATION DEVELOPER (S)	Botswana Accountancy College																	
TITLE	Bachelor of Science in Computer Systems Engineering													NCQF LEVEL				7
STRANDS (where applicable)	1. 2. N/A 3. 4.																	
FIELD	Information and Communications Technology			SUB-FIELD			Information Technology							CREDIT VALUE				480
New Qualification						✓	Legacy 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																		

RATIONALE:

In recent surveys [4] Botswana Accountancy College: Needs assessment report 2019 of the local business sector, there has been a growing focus on ICT as part of the business value additions. Consequently, the ICT field is being given more attention at the strategy and planning level [1] Human Resources and Development Council, Top Occupations in demand, December 2016 [2] Shafika Isaacs April 2007 Survey Of ICT And Education In Africa: Botswana Country Report Botswana – 1 www.infodev.org. [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.

There have been concerns about the level and type of skills available in the local market to drive effective applications of Systems and Software engineering techniques. The Human Resource

Development Council needs analysis has identified a need for professional expertise in areas of software development, systems analysis, applications programmers and web, multimedia developers and database designers and administrators [1] Human Resources and Development Council, Top Occupations in Demand, December 2016.

The relevance and demand for a Bachelor of Science in Computer Systems Engineering is high. In a recent survey [4] Botswana Accountancy College: Needs assessment report 2019, about 79.2 %. of the respondents indicate that the Bachelor of Science in Computer Systems Engineering qualification is relevant to the human resources needs in Botswana, whereas the demand for the qualification is at 60.4%.

This qualification develops a blend of academic rigour and practical skills as it brings the student to the level of a degree.

The qualification takes full advantage of professional-level developer software and advanced hardware platforms and provides a good grounding for graduates to certify on specialist courses that are offered by major technology players such as Microsoft, Cisco, Oracle, SAP etc.

The specialized Bachelor of Science in Computer Systems Engineering taps into the growing demand for local business engineers and strategists with a flair for both business and computing. The HRDC indicators on human resource development need for information technology and entrepreneurship formed a useful anchor in the development of this qualification.

PURPOSE: (itemise exit level outcomes)

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

a. Evaluate computer systems solution strategies for business problems and implement and maintain them.
b. Assess software development solution strategies for business problems.
c. Establish engineering methods for complex engineering problem-solving.
d. Apply systematic engineering synthesis and design processes.
e. conduct research within the engineering discipline.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

To enrol in the qualification, candidates should have the following minimum requirements:

- Certificate IV (NCQF Level 4), BGCSE or equivalent.
- There is provision for Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer in line with Institutional RPL and CAT Policies.

SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
LO1 Demonstrate knowledge and understanding of the theory of computing that manifests itself in computer architecture, networking, security, development, and management.	1.1 Demonstrate understanding of computer architecture, form and trends in computer building. 1.2 Demonstrate understanding of theoretical concepts of software development processes and methodologies. 1.3 Demonstrate theoretical and practical knowledge in computer network engineering and development
LO2 Critically evaluate computer systems solution strategies for business problems, and implement and maintain them.	2.1 Demonstrate Presentation and argument skills when. putting across concepts 2.2 Show Collaboration and interpersonal skills in self-expression 2.3 Display professional Ethics and code of conduct all round. 2.4 Demonstrate an ability to apply new knowledge and understanding. 2.5 Apply basic methods to solve a range of relatively simple problems. 2.5 Evaluate and discuss the application of a range of algorithms to solve more complex problems. 2.6 Reflect that learning is a cumulative process and must not learn to forget. 2.7 Reflect on their own value systems, development and practices and compare these with alternative systems and practices. 2.8 Critically evaluate heuristics encountered in their studies
LO3 Critically evaluate software development solution strategies for business problems.	3.1 Develop large scale applications in the field of programming language such as Java. 3.2 Develop practical skills of designing, and deploying. Wi- Fi, PANs, LANs and WANs. 3.3 Demonstrate practical skills in configuration

	and administration of Windows Server, Linux. 3.4 Develop web-based applications using high end JAVA. Technologies. 3.5 Develop large-scale database solutions for use in any. industry.
LO4 Demonstrate high personality traits, team play, be conscious of meeting deadlines and be consultative.	4.1 Demonstrate judgment in identifying and improving work-related issues. 4.2 Display decisiveness and work independently in Systems Analytics. 4.3 Work as a member of a team and demonstrate /show interpersonal skills. 4.4 Use current IT equipment in an effective and productive manner.
LO5 Demonstrate professional qualities necessary for effective adaptation to the industry.	5.1 Demonstrate ability to provide computer techno based. solutions to business problems. 5.2 Demonstrate competence in critical thinking, analysis and, numeracy required in the industry. 5.3 Conduct oneself in a professional manner and embrace the code of ethics.

SECTION C	***QUALIFICATION STRUCTURE***

COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [5]	***Level [6]***	***Level [7]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*					
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Computer Technology	20			20
	Systems Development	20			20
	Computer Related Mathematics and Statistics	20			20
	Computer Systems Installation and Maintenance	20			20
	Introduction to JAVA	25			25
	Database design and Development		***20***		***20***
	Object oriented Analysis and Design with JAVA		***20***		***20***
	Computer Networks		***20***		***20***

	Discrete Mathematics		***20***		***20***
	Intelligent Systems		***20***		***20***
	Computer Systems Administration		***20***		***20***
	Innovation Project		***20***		***20***
	Industry Attachment			60	***60***
	Research			25	***25***
	Advanced Web Development with JAVA			20	***20***
	Artificial Intelligence			***20***	***20***
	Advanced Cyber Security			***20***	***20***
	Product Development			***20***	***20***
	Android Mobile Development			***20***	***20***
	Advanced-Data Technologies			***20***	***20***
STRANDS/ SPECIALIZATION	*Subjects/ Courses/ Modules/Units*	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [ ]	***Level [ ]***	***Level [ ]***	
1.					

2.					
Electives	***Mobile Application Development***		***20***		***20***
	Web and Multimedia Development		***20***		***20***
	Advanced Web Development with C#		***20***		***20***

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	*Credit Value*
Level 5	*95*
Level 6	*180*
Level 7	*205*
TOTAL CREDITS	
Rules of Combination: ***(Please Indicate combinations for the different constituent components of the qualification)***	
The total number of credits at level 5 is 95; level 6 is 140 and 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 ARRANGEMENTS

Assessment
All assessments leading to the awarding of this qualification will be based on learning outcomes associated with the following assessment criteria:

1. **Formative assessment**

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

2. **Summative Assessment**

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

Assessment arrangements will be done by BQA-registered and accredited assessors.

MODERATION ARRANGEMENTS

There shall be provision for internal and external moderation done by BQA registered and accredited Moderators.

RECOGNITION OF PRIOR LEARNING

There will be provision of Recognition of Prior Learning (RPL) for award of the qualification using Institutional RPL Policy in line with the National RPL Policy

CREDIT ACCUMULATION AND TRANSFER

There shall be access and award of credits of the qualification using Institutional Credit Accumulation and Transfer (CAT) Policy in line with the National CAT Policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

a) Vertical Pathway

- Honours degree in Computer Systems Engineering (NCQF level 8).
- Post graduate certificate/diploma in Computer Systems Engineering (NCQF level 8).

b) Horizontal pathways

Learners can progress horizontal into:

- BSc Information and Communication Technology (NCQF level 7)
- BSc Applied Business Computing (NCQF level 7)

Employment Pathway

- business analysts,
- developers,
- Software engineers,

- programmers,
- web developers,
- systems administration,
- network specialists.

QUALIFICATION AWARD AND CERTIFICATION

Qualification award:

The minimum number of credits for the award of the Bachelor of Science in Computer Systems Engineering is 480 credits and should fulfil the prescriptions in the rules of combination.

Certification*:*

Graduates will be awarded a Bachelor of Science in Computer Systems Engineering. Upon completion, graduates will be issued with an official transcript and certificate.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

International Benchmarking

The qualification was developed following the requirements of Quality Assurance associations such as BQA 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 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.

Internationally the qualification was benchmarked against one university, namely the University of Edinburg. The qualification was compared against three factors: title, duration, and module. From the comparisons, the qualifications are generally similar in the factors considered and they reflect amicably. The number of modules per semester differs slightly in that the University of Edinburg offers between 4 and 6 modules in a semester against a constant 6 modules per semester for Computer Systems Engineering.

Regional Benchmarking

On the regional front, the qualification was benchmarked against one university, namely WITS University of South Africa. The qualification was compared against three factors: title, duration, and module. The qualifications compare well with module descriptors and learning outcomes.

In the Wits University Computer Science (Hons) Degree, there was similarity in the majority of modules. Wits University Computer Science (Hons) Degree is strong in Mathematics while Computer Systems Engineering is strong in development.

Proposed Qualification: Computer Systems Engineering	**WITS University, South Africa – Computer Science (hons) Degree**			
Comparison factor	**Comparison factor**	**Comparison**	**Comparison**	

(Year)	Module	**factor** (Year)	**factor** Module	
1	Computer Technology	1	Basic Computer Organisation 1	
Systems Development	Discrete Computational Structures1			
Computer Related Mathematics and Statistics	Introduction to Algorithm and Programming			
Web and Multimedia Development	Introduction to Data Structures and Algorithms			

REVIEW PERIOD
Every five (5) years.

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**	