

BQA NCQF QUALIFICATION TEMPLATE

SECTION A: QUALIFICATION DETAILS												
QUALIFICATION DEVELOPER (S)			Gaborone Institute of Professional Studies									
TITLE		Bachelor of Science in Computer Science					NCQF LEVEL			7		
STRANDS (where applicable)		1. 2. 3. 4.										
FIELD		Information and Communication Technology			SUB-FIELD		Information technology			CREDIT VALUE		480
<i>New Qualification</i>						<i>Review of Existing Qualification</i>					✓	
SUB-FRAMEWORK		<i>General Education</i>			<i>TVET</i>			<i>Higher Education</i>			✓	
QUALIFICATION TYPE		<i>Certificate</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>Diploma</i>		<i>Bachelor</i>	✓	
<i>Bachelor Honours</i>				<i>Post Graduate Certificate</i>				<i>Post Graduate Diploma</i>				
<i>Masters</i>						<i>Doctorate/ PhD</i>						
RATIONALE AND PURPOSE OF THE QUALIFICATION												
<p>RATIONALE:</p> <p>As stated in Vision 2036, “The ICT sector contributes significantly to the economy and it also a crucial enabler of efficient product and service delivery across all economic sectors”, hence a strong need to produce computer scientists with a broad range of skills. This qualification is geared towards closing the skills gap in the Information Technology sector, specifically in regard to graduates who are able to apply computer technologies in the business environment. Students are trained not only in the technical areas of specialization but also in personal development, communication skills and entrepreneurship. Furthermore, the government of Botswana introduced the ICT policy, called Maitlamo which provides a roadmap about economic transformation through the use of ICT. The</p>												

policy is geared towards making Botswana to become a sub-Saharan ICT hub, creating an enabling environment for the growth of an ICT industry in the country with the help of computer scientists. Given the universality of computer technology in society today, there are many different job possibilities for the graduates upon completion of this qualification such as, software developers, computer hardware technicians, database administrators, computer systems analysts, web developers and IT project managers. This qualification will play a major role in the economic transformation as it provides learners with the necessary skills and knowledge to develop automated business systems as well as computer applications that can be used by individuals and the business sector, thus creating jobs that will benefit the society as well as boosting the economy through either direct employment or entrepreneurship.

PURPOSE:

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

1. Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion.
2. Use science and technology effectively and critically, showing responsibility towards others.
3. Analyse a problem, identify and define computing requirements appropriate to its solution.
4. Model, simulate, and solve computational problems using appropriate theoretical and mental methods, to produce reliable and experiment secure network systems.
5. Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- i) Certificate IV, NCQF level 4 (General Education or TVET)
- ii) Candidates who do not meet the minimum requirements may be considered through Recognition of Prior Learning, RPL and Credit Accumulation and transfer, CAT in accordance with applicable policies.

SECTION B		QUALIFICATION SPECIFICATION	
GRADUATE PROFILE (LEARNING OUTCOMES)		ASSESSMENT CRITERIA	
<p>1. Apply communication and research skills to communicate effectively with a range of audiences.</p>	<p>1.1 Create reports to communicate to various business audiences.</p> <p>1.2 Use electronic mail to communicate to various stakeholders.</p> <p>1.3 Employ basic research skills to gather interpret, manipulate and compile data to produce reports.</p>		
<p>2. Apply software design principles to create scalable and maintainable software applications.</p>	<p>2.1 Build appropriate interfaces between databases and applications.</p> <p>2.2 Design a database using database models such as: Hierarchical, Relational, Network and Object-oriented database models.</p> <p>2.3 Create web-based applications using ASP.Net.</p> <p>2.4 Write basic programs accepting input and providing output in C, C# and Java.</p>		
<p>3. Apply algorithms to break down complex problems into manageable parts.</p>	<p>3.1 Analyse graph algorithms and implement them in C language.</p> <p>3.2 Implement algorithms for various problems to provide appropriate solutions.</p> <p>3.3 Model solutions with multiple levels of detail and abstraction of a computer system.</p>		

<p>4. Analyze and design business systems using system analysis and design tools.</p>	<p>4.1 Use data flow diagrams, flow charts, context diagrams to analyse business systems.</p> <p>4.2 Design system user interfaces using the interface design principles.</p> <p>4.3 Evaluate and maintain designed systems for quality assurance and implementation.</p> <p>4.4 Design distributed systems that fulfil business requirements.</p>
<p>5. Apply database management skills to design and implement information management systems.</p>	<p>5.1 Implement management information systems in the corporate environment.</p> <p>5.2 Set up, configure and manage E-business infrastructure.</p> <p>5.3 Adhere to legal and ethical standards, protocols, and practices in computing as well as health & safety issues at work.</p>
<p>6. Use Artificial Intelligence, AI software tools to develop and implement AI algorithms to solve real world problems.</p>	<p>6.1 Formulate problem-solving skills to detect current and future attacks on an organization's computer systems and networks.</p> <p>6.2 Design solutions to enhance Enterprise Information security.</p> <p>6.3 Create simulated versions of machine software and hardware components in a cloud & virtual environment.</p>

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SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [5]	Level [6]	Level [7]	
FUNDAMENTAL COMPONENT <i>Subjects/ Courses/ Modules/Units</i>	Business Communication	10			10
	Introduction to Computing and information Processing			10	10
	Calculus		10		10
	Research Methodology			10	10
	Project Management			10	10
	Entrepreneurship		10		10
CORE COMPONENT <i>Subjects/Courses/ Modules/Units</i>	Hardware and PC maintenance			10	10
	Computational mathematics and digital logic		10		10

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	Introduction to programming			10	10
	Introduction to Web development			10	10
	Software Engineering 1			10	10
	Database principles			20	20
	Introduction to Java			20	20
	Operating Systems			10	10
	Visual Basic.Net framework		20		20
	Professional issues in Computing			10	10
	Algorithms and Data Structures			10	10
	Data communications and networks			20	20
	Computer Architecture			10	10
	Object oriented design and programming			20	20

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	Systems Analysis and Design			10	10
	Distributed Systems			10	10
	Management Information Systems			10	10
	Computer Management And Information Security			10	10
	Database Design and Development			20	20
	Software Engineering 2			10	10
	Human Computer interaction			10	10
	Virtualization and cloud computing			10	10
	File Structures			10	10
	Advanced Web Development in ASP.NET			20	20
	Artificial Intelligence			10	10
	Technical Project			20	20
	Internship			40	40
					Total Credits

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STRANDS/ SPECIALIZATION	<i>Subjects/ Courses/ Modules/Units</i>	Credits Per Relevant NCQF Level			
		Level [5]	Level [6]	Level [7]	
Electives <i>(choose two electives)</i>	C Sharp.Net Framework			20	20
	Advanced Java			20	20
	Windows Network Administration			20	20
	Advanced Networking			20	20
	Cisco Routing and Switching			20	20

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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL

TOTAL CREDITS PER NCQF LEVEL

<i>NCQF Level</i>	<i>Credit Value</i>
5	10
6	50
7	420
TOTAL CREDITS	480

Rules of Combination:

(Please Indicate combinations for the different constituent components of the qualification)

Level and Credits	Fundamental	Core	Elective
Level 5...credits....	10 Credits		
Level 6...credits....	20 Credits	30 Credits	
Level 7...credits....	30 Credits	350 Credits	40 Credits
Total Credits	60 Credits	380 Credits	40 Credits

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ASSESSMENT ARRANGEMENTS

Formative assessment

The weighting of the formative assessments is 50% of the final assessment mark.

Summative assessment

The weighting of the summative assessment is 50% of the final assessment mark.

All assessments shall be conducted by assessors who are registered with Botswana Qualifications Authority or any relevant and recognised body.

MODERATION ARRANGEMENTS

Both internal and external moderation will be done in-line with the Moderation policy of the Institution. In addition, all moderators must be registered with Botswana Qualification Authority (BQA).

RECOGNITION OF PRIOR LEARNING

Learners 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 as per applicable institute RPL policies and relevant national-level policy and legislative framework.

CREDIT ACCUMULATION AND TRANSFER

There shall be a provision for Credit Accumulation and Transfer, CAT, in accordance with institutional and national policies on CAT.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation(related qualifications of similar level that graduates may consider)

Graduates of this qualification may consider pursuing related qualifications such as:

- Bachelor of Science in Computer Networking
- Bachelor of Science in Networking Security and Computer Forensics
- Bachelor of Engineering in Computer Engineering
- Bachelor of Science in Computer Games

Vertical Articulation (Qualifications to which the holder may progress to)

Graduates may progress to higher level qualifications such as:

- Master of Science (Computer Science)
- Master of Science (Computer Information Systems)
- Master of Science (Computer Vision)
- Master of Science (Software Engineering)
- Master of Science (Machine Learning)

Career opportunities

Computer science graduates can work as:

- System developer
- Information Technology consultant
- Software Developer
- Cloud Solution analyst
- Mobile App developer
- Database Administrator
- AI Research Scientist
- Data Scientist

QUALIFICATION AWARD AND CERTIFICATION

QUALIFICATION AWARD

A learner meeting the prescribed requirements will be awarded *Bachelor of Science in Computer Science qualification in accordance with the qualification composition rules and policies.*

CERTIFICATION

After successful completion of the program, the learner will be awarded Bachelor of Science in Computer Science with a minimum credit value of 460. The learner will be issued a certificate and an official transcript.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

A comparison was made for the proposed qualification both regionally and internationally

Regional

The proposed qualification was compared with the qualification from WITS University (South Africa).

Similarities

- They all are NQF Level 7
- Similar core modules (e.g. Data structures, Algorithms & Programming).
- Similar educational and employment pathways
- Similar exit-level outcomes

Differences

- The duration of study ranges from 3 to 4 years
- Credit value ranges from 360 to 480
- There is industrial attachment in the 2 qualifications
- The proposed qualification have business modules while Wits University do not have

International

The proposed qualification was compared with the qualification from Kingston University (London)

Similarities

- The mode of delivery in the 2 qualifications is full time
- Similar career pathways
- The load per semester ranging between 5-6 subjects

Differences

- The duration of study ranges from 3 to 4 years
- Credit value ranges from 380 to 480
- The proposed qualification have business modules while Kingston University do not have

REVIEW PERIOD

This Qualification will be reviewed after every 5 years. However, the qualification can be reviewed when the need arises within the 5-year period

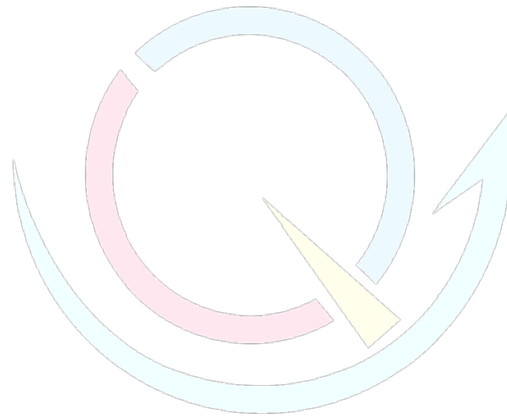
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CODE (ID)			
REGISTRATION STATUS	BQA DECISION NO.	REGISTRATION START DATE	REGISTRATION END DATE
LAST DATE FOR ENROLMENT		LAST DATE FOR ACHIEVEMENT	



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REVISION DATE:		NAME OF PROFESSIONAL BODIES/REGULATORY	
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