QUALIFICATION SPECIFICATION							SECTION A
QUALIFICATION DEVELOPER	Limkokwing University of Creative Technology						
TITLE	Diploma in Information Technology			**NCQF LEVEL**		6	
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					**360**		

RATIONALE AND PURPOSE OF THE QUALIFICATION

Rationale

Botswana is a developing country, with a per capita GDP (PPP) of US$16,100 classifying it as an “upper middle income “economy". With the country striving to move to a “high income country”, the government continues to exert efforts to lure investment and improve infrastructure. Speaking at the 48th St Gallen Symposium in Switzerland (2018) on the future of work, artificial intelligence, challenges and opportunities of job creation in the fourth industrial revolution Honorable Kenewendo, Minister of Investment, Trade and Industry stated, “We recognise that innovation and productivity are keys to unlock high growth and catapult us to even become a high income country.” Such efforts by the country translate to continuing growth in various industries and ICT infrastructure is needed as an integral component of the various businesses processes.

Botswana Investment and Trade Centre (BITC) identifies ICT amongst investment opportunities, with key focus on;

- ICT investment in Botswana presents an opportunity for growth in R&D and global competitiveness in ICT
- An objective of National ICT Policy is to utilise ICT to facilitate economic diversification and foreign direct investment (FDI)
- Infrastructure development: widespread fibre-optic network and e-government services
- Communications and security, e-health, e-education, e-tourism, including mobile access to e-government. https://www.gobotswana.com/sector/ict

The thrust of Vision 2016 was ‘prosperity for all’ through a strategy of employment creation and this theme was carried through to the NDP10 whose Mid-term Review identified six strategic factors to drive economic growth. Amongst these strategies was Information and Communications Technology, whose thrust is to enhance employment creation by increasing the contribution of the private sector to the economy.

- Botswana Education & Training Sector Strategic Plan (ETSSP 2015-2020) pg 14

The National Information and Communication Technology Policy (Maitlamo) 2007, provides Botswana with a clear and compelling road map that will drive the social, economic, cultural and political transformation through the use of ICTs. In an Information Age, with its focus on information as a key business resource, Information Technology emerges as the key enabler of innovation and operational efficiency by ensuring the right infrastructure is available at all times.

The Human Resources Development Council Top Occupations in Demand report of 2017 lists ICT occupations related to this qualification amongst those in demand;

- Computer Network Professionals
- ICT Sales Professionals

- IT Service Managers
- Systems Administrators

- Human Resources Development Council Top Occupations in Demand (2017) pg 5

The National Development Plan 11 (2011-2016) expresses the need for information technology expertise by stating that "… training of ICT personnel will continue to be accorded priority in order to enhance the sector's contribution to economic and export diversification, as well as the creation of high quality jobs"(p.80) and this strategic intuition is further confirmed by HRDC's Top 20 occupation of priority in the sector of ICT by the (HRDC TOP OCCUPATIONS IN HIGH DEMAND report, December 2016) that ICT Security Managers are needed.

The faculty conducted a workshop on the landscape of Information and communication technology in 2017. Findings suggested key soft and hard skills needed in ICT for a developing nation, including;

- Networks installation and support, especially in the wireless sector
- Systems support, including for the ever evolving mobile technology sector
- Database development to manage volumes of data as organisations go digital

This qualification, therefore, will provide the country with the continued needed expertise in the ICT industry by training technical expert to install and maintain infrastructure as well as provide end user support for continued business support in the ever digitizing environment in Botswana.

Purpose

The qualification in Information Technology is designed to produce information and communication technology (ICT) specialists who can play a crucial role in designing, implementation and maintaining systems for industries in a variety of sectors. Information Technology plays a vital role in driving and supporting innovation; fuelling small business start-up and growth and accommodating external environment and marketplace changes. With the advent and adoption of technology by users, both corporate and individuals alike, the need for ICT specialists continues to grow.

The purpose of this qualification is to produce graduates:

(a) who can anaylse an organisation's ICT infrastructure needs then recommend and design plausible solutions.
(b) who are equipped with database design and development skills to analyse, design, develop and operate relational databases.
(c) who can analyse, design, implement and upgrade an organisation's ICT network to facilitate communication.
(d) who can develop computer systems using variety of programming languages to integrate into and facilitate the organisation's operations.

ENTRY REQUIREMENTS (including access and inclusion)
Minimum entry requirement for this qualification is a: • Certificate IV, NCQF Level 4 with a pass in Mathematics and/or Physics or equivalent. • Applicants who do not meet the above criterion but possess relevant industry experience may be considered using RPL and CATS National Policies for access.

QUALIFICATION SPECIFICATION	SECTION B
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1.0 Demonstrate knowledge of software development methodologies used in analyzing organizational needs, designing and developing information systems to meet the needs	**1.1** Describe the major alternative methodologies used in developing information systems and the considerations involved in choosing which methodology to use. **1.2** Produce the requisite systems documentation at each point in the analysis and design of an information system, and to do so with clarity and completeness. **1.3** Prepare and use various information gathering techniques for eliciting user information requirements and system expectations. **1.4** Construct and interpret a variety of system description documents, including physical and logical data flow diagrams, entity-relationship diagrams, Structured English, structure charts, and decision tables, as well as screen, form, and report layouts. **1.5** Communicate effectively, in both written and oral forms, systems specifications, and to be persuasive in these presentations.

2.0 Model objects using the Object Oriented Approach	**2.1** Select appropriate and situational tools and techniques for analysis i.e. functional, static and dynamic models **2.2** Design and implement appropriate techniques for using OOA to design i.e. static classes, packaging, data models **2.3** Produce the requisite systems documentation at each point in the analysis and design of an information system, and to do so with clarity and completeness using OOA. **2.4** Construct and interpret a variety of system description documents that include physical and logical models. **2.5** Implement and demonstrate small to medium systems using OOA techniques.
3.0 Design and implement real life databases as well as access data through the use of Sa query language	**3.1** Describe how modern databases evolved from files and file systems **3.2** Differentiate various types of data models **3.3** Examine different kinds of relationships and how such relationships might be handled in the relational database environment **3.4** Explain how ERD components affect database design and implementation **3.5** Explain normalization and the role it plays in the database design process **3.6** Use the basics of the SQL to manipulate database and table structures **3.7** Evaluate and revise within a framework known as Database Life Cycle (DBLC) **3.8** Discuss the various concepts of database transaction management & concurrency controls.

	3.9 Discuss the Distributed & Object Oriented database design techniques. **3.10** Define and manipulate data using Advanced SQL
4.0 Apply data communication concepts to the analysis of user data communication needs, design and develop relevant network systems.	**4.1** Apply fundamental Communication Concepts to all types of data communication systems – application layer, physical layer, data link layer, transport and network layer. **4.2** Explain data communications hardware like analog and digital modems, multiplexers, data switches, network adapter cards, Ethernet and Token Ring components, etc. **4.3** Identify how the Web and e-mail works. **4.4** Discuss industry Protocols & Standards like OSI, TCP,IP,UDP etc. **4.5** Recognize network topologies either LAN or WAN that comprised of servers, clients, hubs, switches, routers, etc. **4.6** Analyze and describe the current/recent data communication development. **4.7** Plan and install a network for data communication **4.8** Install and configure a network operating system **4.9** Create Users and define user rights to define data access rights **4.10** Set up a network for seamless communication and resources sharing

5.0 Identify, install, configure, and upgrade desktop computer modules and peripherals, following established basic procedures for system assembly and disassembly of field replaceable modules.	**5.1** Analyse computing needs and determine the best hardware and software to utilize for the computer system. **5.2** Assemble and test a computer system with full responsibility for the client's equipment. **5.3** Add various items of hardware to the client's assembled systems. **5.4** Maintain installed hardware in accordance with manufacturers' instructions. **5.5** Troubleshoot within the working environment and implement installations of the Operating System in industrial environments.
6.0 Analyse a system's target audience to develop methods of interaction that will facilitate ease of use and encourage system use	6.1 Analyse history and paradigms of human-computer integration. **6.2** Explain information processing and the role of knowledge of human information processing for interactive system design. **6.3** Perform task analysis for user interface design. **6.4** Conduct several kinds of usability analysis including heuristic analysis Conduct several kinds of usability analysis including heuristic analysis. **6.5** Undertake professional interactive system design process as a part of design group.

QUALIFICATION STRUCTURE SECTION C			
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	1. Report Writing Skills for IT	6	10
	2. Human Computer Interaction	6	10
	3. Fundamentals of Internet Technologies	6	10
	4. System Analysis & Design	6	10
	5. Introduction to Data Communication	6	10
	6. Introduction to Databases	6	10
	7. Object Oriented Techniques	6	10
	8. Computer Networks	6	15
	9. Introduction to Object Oriented Programming	6	15
	10. Creative and Innovation Studies	5	10

	11. Business Communication	5	10
	12. Introduction to Business Management	5	10
	13. Practical Project	7	30
	14. Data Models & Algorithms	6	15
	15. Information Systems Security	6	15
	16. Introduction to Computer Hardware	6	10
CORE COMPONENT Subjects / Units / Modules /Courses	1. Computerized Mathematics	5	10
	2. Principles of Programming Logic & Design	5	10
	3. Principles of Web Design	6	10
	4. Operating Systems	6	15
	5. Principles of Software Engineering	6	10
	6. Introduction to Information Systems	6	10
	7. Introduction to Computer Skills	5	10
	8. Database Systems	6	15
	9. Data Communications & Networking	6	15
	10. Principles of Structured Programming	6	15
	11. Entrepreneurship	7	10
	12. Computer System Support	6	15
ELECTIVE COMPONENT Subjects / Units / Modules /Courses/Electives	1. Advanced Object-Oriented Programming	7	15
	2. Web Programming Techniques	7	15
			360

RULES OF COMBINATIONS, CREDIT DISTRIBUTION (WHERE APPLICABLE):

Learners are to choose **one module from the electives** component.
The composition of the qualification has 3 levels ranging from;

- level 5 with 60 credits
- level 6 with 245 credits
- level 7 with 55 credits

Students must take and pass all pre-requisite modules to be allowed to take successive modules.

ASSESSMENT AND MODERATION ARRANGEMENTS

Assessment Arrangements

The qualification will encompass both formative and summative assessment, which will be designed by assessors who are BQA registered and accredited.

The weightings for the assessments will be as follows;

Assessment Method	Weight (%)
Formative Assessments	60
Summative Assessments	40

Moderation Arrangements

There will be internal and external moderation undertaken by moderators registered and accredited by BQA. All processes and procedures will be in line with NCQF requirements. This will be conducted in reference to the institution's moderation policy and procedures.

RECOGNITION OF PRIOR LEARNING (if applicable)

There shall be provision for award of the qualification through Recognition of Prior Learning (RPL) in accordance with institutional Policies in line with the National RPL Policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

This qualification is designed to facilitate vertical, horizontal and diagonal progression both locally and internationally.

Horizontal Progression

Learners may progress horizontally between qualifications if they meet the minimum requirements for admission to the target qualification. Other comparable qualification to this diploma include,

- Diploma in Information Technology in Network Design and Administration
- Diploma in Information Technology in Network Management
- Diploma in Information Technology in Programming
- Diploma in Information Technology Management
- Diploma: Information Technology: Engineering

Vertical progression

Learners graduated from this qualification may progress to the following;

- Bachelors of Science in Information Technology
- Bachelors of Information Technology
- Bachelor of Engineering Science: Information Technology
- Bachelor of Science: Applied Information Technology

Employment Pathways

Other than progressing academically Graduates of the course may find employment in a range of public and private organisations for the following posts:

- Computer Systems Technician
- IT Consultants
- Desktop Support Engineer
- Web Developer
- Network Technician
- IT Call Centre Agent

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification, a candidate must:

- Attain a minimum of **360 credits** overall.
- Have official verification that (s)he has covered and passed all the modules in the qualification Diploma in Information Technology

Certification

Upon successful completion of this qualification, graduates will be awarded a Diploma in Information Technology.

REGIONAL AND INTERNATIONAL COMPARABILITY

A comparison of this qualification with other qualifications of other regional and international institutions offering similar and closely associated Diploma qualifications reflects as indicated in the Table below. The qualification was benchmarked against institutions offering similar qualifications as indicated below;

- Diploma: Information Technology - Oval International Computer Education
- Diploma: Information Technology - University of South Africa
- Diploma: Information Technology - Advanced Technology Training Institute (ATTI)

Regional and International Comparability

Table 1: Benchmark Summary

Criteria	Oval International Computer Education	University of South Africa	Advanced Technology Training Institute
Duration	3 years	3 years	3 years
Total number of modules	24	28	34
Entry Requirements	• A Senior Certificate with pass in Mathematics • Recognition of prior learning	• A Senior Certificate with pass in Mathematics • National Higher Certificate: Information Technology	• A Senior Certificate with pass in Mathematics • National Senior Certificate rating of 22 points
Mode of Study	• full time or part time	• full time	• full time

Common Modules	• Data communications and networking • Development software • Web page design • Computer mathematics	• Software analysis and design • Computer hardware • User interface design • Local area Networks	• End -User Computing • Programming Logic and Techniques • System Analysis and Design • Database Design • Networking • Software Engineering • Graphical User Interface Programming

Similarities

The following are noted similarities:

(a) The duration of training is almost the same, 3 years
(b) the key core modules taught in the programmes are 80% similar.
(c) The number of modules offered for the programme are 90% the same.
(d) The diploma graduates can progress to degree level and the modules covered are exempted.
(e) All programmes enrol from high school students, mature entry students, progression students and relevant certificate.
(f) All programmes offer core and specialization modules

Differences

Key differences are noted in the following areas:

(a) There is significant difference in number of modules offered, with Oval International Computer Education offering the minimum at 24 whilst Advanced Technology Training Institute offers the maximum at 34

Contextualised Approach

(a) The qualification generally fits in the framework of what other institutions are offering i.e. the specialization modules as indicted in the table 1 above.
(b) The qualification is also offered in a time frame of 3 years like all other institutions.
(c) The qualification has also factored other programmes which create the relevant skills and knowledge that cater for the skills noted in the industry survey , that support the National Development Plans and the National Art Policy and economical needs of the country.

REVIEW PERIOD
The qualification will be reviewed after 5 years.