QUALIFICATION SPECIFICATION							SECTION A
QUALIFICATION DEVELOPER	AWIL College						
TITLE	Bachelor of Science in Computer Games				**NCQF LEVEL**	7	
FIELD	Information and Communications 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					480		

RATIONALE AND PURPOSE OF THE QUALIFICATION

Rationale

Games or Gaming is concerned with conceptualisation, design and structures that result in a worthy experience for users or players. This is one industry in which learners' skills are stretched from various creative disciplines, such as illustration, animation, and sound design. It is via computer games, gamification concepts and games intelligence, that today's world is increasingly becoming interesting, as it embraces games and computers for entertainment and more serious purposes, such as virtual reality training.

Around November 2016, it was noted that video gaming was fast becoming the world's fastest-growing global industry and hence a booming career option. Games provide for a creation of a vibrant technological and economic activity which contributes significantly to the growth of Botswana's GDP.

To further establish the need for this qualification, issues and policies consulted and noted include Maitlamo Policy, 4th Industrial revolution era, technology news, National Action Plan for Youth (2010), vision 2036, HRDC (2018 report on top occupations in demand) and publication by a technology expert.

The Botswana National ICT Policy of 2007, referred to as Maitlamo, was developed to provide communication that meets high international standards and ensure that the country has the skills to be an ICT leader. This development, therefore, calls for creative minds in the fields and programmes, such as

Games or Gaming. This qualification is also necessitated by the fact that the world has moved into the 4th Industrial revolution, thus calling for experts in Programmes such as Games, to function effectively in this era. Botswana will thus be well placed to compete with the world, owing to the introduction of such qualifications. Furthermore, most people today are bombarded by huge amounts of information and data, via cellphones, Tv and online platforms. Therefore, Games design experts are in great demand, to package and help users with content.

Botswana already has several game designers, however, as freelancers. Most are not Batswana, and those who are Batswana, freelance mainly as, administrators, for data entry and few developers. This further opens the need for Batswana Game designers who will conceptualise and create gaming products. National Action Plan for Youth (2010-2016) is responsive to issues of skills and the labour market, as it affects the youth. Concerning issue number 8, as captured in the framework, provision of appropriate education and training, it asserts that action is to design innovative ways of promoting life-long learning and career development. The same framework on pillar number 2, about Human and Social Development, states that Botswana society will be knowledgeable with the relevant quality education that is outcome-based, with an emphasis on technical and vocational skills, as well as academic competencies. This qualification will therefore afford youth job opportunities and allow for the development of technical and technological skills.

This qualification resonates well with some of the Vison 2036 pillars. The Sustainable Economic Development and Social Development, Sustainable Economic Development pillar 1, supports the creative arts Industries. Games remain one such creative industry with an emphasis on the use of the computer. As per the Human Resource Development Council (HRDC 2018) report on top occupations in demand, the electronics telecommunications installers and servicers will be in high demand, projecting to 2028. However, HRDC further outlines that in the world, future jobs will be, data analysts and scientists, big data specialists, digital transporters specialists, software developers and analysts, information security analysts and application developers and analysts, among others. This is deduced from the World economic forum (2018) report. It is therefore inevitable that there is a dire need for games or gaming.

In 2016, a technology expert called Nola Payne wrote an article on a new degree course in gaming that was to be offered by Vega School of Brand Leadership. In the article, Payne outlined how the huge impact video gaming was to economically contribute to the South African economy. By then, the video gaming industry was estimated at $21 billion. Payne noted that according to a report by PricewaterhouseCoopers

(PwC), the South African video games industry was to grow from R1.6billion in 2010 to an R3.6billion by 2019. The industry overall was therefore lucrative to offer many career opportunities. This degree is highly internationally competitive. This qualification is undoubtedly very important to Botswana, with its potent economic contributor and numerous career benefits.

Purpose

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

- Create outline design specifications for a computer game.
- Implement a game using industry-standard techniques and processes.
- Use ICT to understand critical concepts to design computer games for various purposes.
- Design and specify complex, non-trivial games focusing on many areas, such as real and virtual worlds, artificial intelligence behaviours of non-plyer characters, mechanics of a game, concepts, and techniques of computer game programming, as well as 2D and 3D graphic effects and game objects, such as weapon systems.

ENTRY REQUIREMENTS (including access and inclusion)

The minimum entry requirement for this qualification is a:
Certificate IV, NCQF level 4 (General Education or TVET) or equivalent

Recognition of Prior Learning (RPL):
There will be access through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in accordance with the RPL and CAT National Policies.

QUALIFICATION SPECIFICATION B	SECTION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
LO1 Describe the history and evolution of Video and Computer games, as well as game genres.	1.1 Explain the concept of game design and game development. 1.2 Distinguish between traditional games and computer games. 1.3 Discuss the primary concepts of gaming. 1.4 Outline what defines a game. 1.5 Discuss the evolution of games from the past, present and into the future 1.6 Explain the global user interface. 1.7 Discuss the process of creating games using objects and rooms. 1.8 Manipulate sprites, sounds and backgrounds, using files, editing and adding menus on the computer.
LO2 Develop interactive and action Games on a game design or development product/project.	2.1 Load an image and draw it as a sprite. 2.2 Use action, including move, control, score, and drawing. 2.3 Apply dramatic elements of the game and narrative design. 2.4 Use effective controls to ensure functionality, completeness, and balance, while designing a game. 2.5 Analyse, design, implement and validate game user interface.
LO3 Demonstrate level design in Game Programming.	3.1 Create rooms and instances of rooms. 3.2 Add levels to a game. 3.3 Design and create simple cooperative and competitive games. 3.4 Develop and apply a games software. 3.5 Outline the purpose of Game level design in game programming. 3.6 Discuss principles of good level design in game programming.
LO4 Apply methods of analysing and producing game designs, documentation, project plans and game systems.	4.1 Analyse and correlate connections between mechanics and how games are experienced. 4.2 Apply design principles that focus on form following function, in games development. 4.3 Explain how business models affect game design. 4.4 Identify forms of documentation within game development. 4.5 Discuss game development life cycle.

LO5 Discuss issues and practices in the game development industry.	5.1 Discuss welfare issues of Games Industry employees. 5.2 Identify the role of game designers in the Games Industry. 5.3 Discuss software challenges in the Game development industry. 5.4 Identify and discuss success factors to improve the game development industry.
LO6 Apply technical and theoretical approaches in developing games	6.1 Conceptualise, design, develop and implement own games. 6.2 Design game play, conceiving and designing rules and structures for an experience by players 6.3 Identify and apply game design elements, such as Puzzle design, Level design and Character design, in developing a game. 6.4 Create a game incorporating aspects of game design and production, such as storyboarding, level design, texturing and materials, programming and user interface. 6.5 Apply the software engineering process 6.6 Apply game theory and its types, in developing games.
LO7 Apply gamification in marketing or for promotional purposes	7.1 Develop gamification applications, business applications and mobile apps. 7.2 Integrate gaming concepts with a brand-building slant 7.3 Apply user-friendly interfaces to the game design. 7.4 Outline gamification strategies in marketing. 7.5 Discus advantages of gamification. 7.6 Identify the purpose of gamification in marketing or for promotions.
LO8 Develop an understanding of concepts and techniques of computer game programming.	8.1 Discuss the importance of elements of game playing 8.2 Explain Illustration, writing, and sound design about game programming. 8.3 Outline the System and mechanics of the game 8.4 Explain Game mechanics in game programming. 8.5 Apply C# in game development. 8.6 Apply data structures in game design. 8.7 Deploy web servers and create a RESTful interface in developing a game. 8.8 Connect games to services databases. 8.9 Add programming code to a game, using C++ and GML.

	8.10 Apply appropriate software and technology to network a game to other systems.
LO9 Apply collaborative skills in designing or developing a game.	9.1 Apply artificial intelligence behaviours for non-player characters in game development. 9.2 Apply collaboration attributes such as role clarity, mutual respect, shared vision, communication, and complimentary strength, in designing a game as a team. 9.3 Discuss challenges of collaboration in game development. 9.4 Outline a design approach in collaboration with the work of game development. 9.5 Identify game development collaboration tools. 9.6 Identify the game developer community.
LO10 Apply 2D and 3D graphic effects in game development.	10.1Apply animation in game development. 10.2 Apply 2D and 3D rendering in Games design and development. 10.3 Connect effective user interface tools. 10.4 Create 3D characters. 10.5 Apply event systems and delegates in developing a game. 10.6 Reflect and apply choices, agency, and aesthetics in a game.
LO11 Create a game as a project, to solve a community or business problem.	11.1 Create multiple games as a project and for the portfolio. 11.3 Assemble a portfolio of programming projects. 11.4 Conduct interactive presentation of programming project to peers and the facilitator. 11.5 Create an outline design specification for a computer game and implement a game using industry-standard techniques.

QUALIFICATION STRUCTURE **SECTION C**

	Title	Level	Credits
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	Programming logic and Design	6	30
	Principles of Game Design	5	30
	2D and 3D Animation	6	30
	Mathematics for Developers	6	30
CORE COMPONENT Subjects / Units / Modules /Courses	Database Introduction	5	40
	Narrative for Gaming	7	40
	Project	7	55
	Open-source coding	7	35
	Attachment	7	50
	Game development I	**7**	45
	Game Development II	**7**	45
ELECTIVE COMPONENT Subjects / Units / Modules /Courses	***Choose any TWO electives from this set below***		
	Digital Laws and Ethics	7	25
	Critical Thinking	7	25
	Computer Graphics	7	25
	Branding and Marketing	7	25

Rules of combinations, Credit distribution (where applicable):

For this qualification, a learner will have 70 credits at Level 5, 90 credits at Level 6 and 320 credits at Level 7. This cumulatively sums up to **480 credits**.

The credits combinations are obtained from 120 credits for the fundamental component, 310 credits for the core component and 50 credits for electives, where a candidate is expected to carry **TWO** electives from a basket of electives.

ASSESSMENT AND MODERATION ARRANGEMENTS

FORMATIVE ASSESSMENT (70%)

Formative or continuous assessment contributing towards credits award should be based on module (unit) outcomes.

The contribution of formative assessment to the final grade shall be 70%.

SUMMATIVE ASSESSMENT (30%)

Candidates may undergo assessments, including written and practical examinations or projects. The final assessment for each module (unit) contributes 30% of the final mark for that module.

The assessment shall be carried out by BQA registered and accredited Assessors.

MODERATION ARRANGEMENTS

Internal and external moderators to be engaged will be BQA accredited subject specialists in relevant fields with relevant industry experience and academic qualifications.

Both internal and external moderation shall be done in accordance with applicable policies and regulations.

RECOGNITION OF PRIOR LEARNING (if applicable)

There will be a provision for awarding of the qualification through RPL and CAT mode, which will be in line with the national RPL Policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

There are various avenues that learners or graduates of this qualification may go into, be it via learning or employment.

Learning

With respect to learning,

Vertical:

- Bachelor of Science (Hons.) in Software Engineering
- Bachelor of Science (Hons) in Information Systems

Horizontal:

- Bachelor of Science (mobile computing)
- Bachelor of Science (computer science)

Diagonal:

- Bachelor of science (computer networking)

Progression (Employment)

The employment routes, for graduates, include, although not limited to, the following:

- Java/ ActionScript Developer for PlayTech
- Software Developer
- Developer for gamification applications
- Developer for business applications
- Developer for mobile apps
- Game Developer
- Simulation Designer

- Digital Animator
- Game Designer (various platforms)
- User Experience Designer

QUALIFICATION AWARD AND CERTIFICATION

Minimum Standards of Achievement for the Award of the qualification

A candidate is required to achieve the stipulated 480 total credits inclusive of the fundamental, core and two elective components, to be awarded the Bachelor of Science in Computer Games

Certification

Candidates meeting prescribed requirements will be awarded the Bachelor of Science in Computer Games in accordance with the standards prescribed for the award and applicable policies.

REGIONAL AND INTERNATIONAL COMPARABILITY

This qualification has been compared against some of the best institutions that offer Computer Games/Gaming qualifications in Africa and internationally. Below are some of the institutions whose qualifications have been consulted:

1. **Vega School of Brand Leadership (Republic of South Africa)**

The qualification offered is a Bachelor of Computer and Information Sciences: Game Design and Development Degree. It indicates that graduates will work in business, as a developer for gamification applications, business applications and mobile apps. Further, a unique feature of the qualifications is that graduates will have an industry-ready portfolio in game design and development exhibited at the annual student showcase and, thereafter, an internship. This degree takes 3 years.
From the 1st year to the 3rd year, some modules include game development, programming logic and design, 3D animation, the narrative for Gaming, Digital law and Ethics, database introduction and open-source coding. In the final 3rd year, learners are introduced to research and undergo work-based learning. In the same final year, learners build portfolios in game design or game development.
To be enrolled on the programme, entrants need mathematics, and a diploma related to gaming and English. Careers identified through this qualification, among others, include game developer, digital animator, sound artist, simulation designer, commercial software developer and narrative developer.

2. **Breda University of Applied Sciences (Netherlands)**

The University offers a BSc in Creative Media and Game Technologies. This is a 3-year qualification. Some areas of expertise for the qualification include 3D visual arts, high-end video game development, animation, audio, gameplay, and programming. Distinctively, this programme is structured around Role Based learning and is based on Project Based learning. It is noted that this project approach offers an advantage of developing learners to analyse a problem and use all the resources around them to find solutions.

This qualification outlines only projects to be taken in each year of study. This is mainly a project-based approach. In the 1st year, focuses on basic skills through defined projects. The 2nd year builds on the basic skills of the 1st year as learners work in multidisciplinary teams building game projects. In the 3rd year, learners specialise in yearlong projects either in teams or individually. In the final 4th year (also called the graduation year), learners do two projects. The two projects may focus on: a portfolio individually or in groups, working in a company with a project deliverable, developing business plan and starting up own

entrepreneurship business and taking part in a one-semester exchange programme at some partner university.

To be admitted to the university, prospective learners are to be creative, problem solvers and have a passion for making games. They need to understand the roles they will play, are engaged in the games industry and have the determination to learn independently**.**

3. University of Essex (United Kingdom)

The qualification programme is called BSc Computer Games. It is a 3-year degree.
Learners are horned in the mechanics of a game, techniques of computer game programming, real and virtual worlds, artificial intelligence behaviours for non-player characters and 2D and 3D graphic effects and game objects. As competencies, therefore graduates will be able to create an outline design specification for a computer game of their designed to implement a game using industry-standard techniques.

In the 1st year, learners are introduced to programming using Python. The first two years are meant to assist learners to develop communication skills with customers. The 3rd year learners go for placement outside Essex for a year. They are attached to places that are more technology-focused such as Microsoft, Intel, British aerospace, as well as SME software and hardware companies.
The university collaborates with companies that also absorb their graduates, such as robots for the media industry and vehicle diagnostics. Some career opportunities availed to graduates, therefore, include software developers and developers for Playtech.

4. College for Creative Arts (United States of America)

This institution offers Game Design qualifications under the umbrella domain of Entertainment Arts. It is 3 years long. Graduates can conceptualise and build 2D and 3D game designs. Learners use platforms such as mobile, augmented reality (AR), virtual reality (VR) and realistic evasion and assets for the film. Career opportunities for graduates include character artists, environment and vehicle designers, technical artists, creative directors, and AR/VR developers.

This qualification designed for the Botswana environment is the first and compares very well with regional and international qualifications that have been examined.

REVIEW PERIOD

This qualification will be reviewed every 5 years from the period of registration.