BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	***QUALIFICATION DETAILS***				
QUALIFICATION DEVELOPER (S)	Boitekanelo College				
TITLE	Bachelor of Science in Diagnostic Radiography		***NCQF LEVEL***	*8*	
STRANDS (where applicable)	*N/A.*				
FIELD	Health and Social Services	***SUB-FIELD***	Health Science	***CREDIT VALUE***	*600*

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
In Botswana, there is a growing demand for high-quality healthcare services, especially diagnostic imaging, as the population continues to age and grow. Medical diagnosis, treatment planning, and condition monitoring all depend heavily on radiography. Including the creation of radiology departments and the acquisition of cutting-edge imaging technology, Botswana is investing in the growth and upgrading of healthcare facilities. To use and maintain these systems properly, trained radiographers are required. Botswana can guarantee a qualified workforce of radiographers who can deliver precise and efficient diagnostic imaging services by providing a degree program in radiography. This contributes to superior treatment outcomes, earlier illness detection, and better patient care. In a study done the total posts for radiographers in Botswana in 2008 were only 48 and only 40 were filled. The recommended post for 2016 were 104 and the vacancy rate was estimated at 62% (O. Nkomazana,2014). Among the radiographers who are employed in Botswana only 13% os Batswana (O. Nkomazana,2014). According to "HRDC Priority Skills (2023-2024)

recommendations for external training and development of new programs" report outlines the need of Radiographers in different spheres of practice like Therapeutic and Diagnostic Radiography. A degree qualification that trains radiographers locally aid in addressing the industry's inadequacy. It encourages the growth of a self-sufficient healthcare workforce in Botswana and lessens dependency on external healthcare professionals. It promotes the growth of local radiography expertise by allowing local learners to learn from knowledgeable professors and practitioners. Aspiring radiography professionals in Botswana will have career prospects through the proposed qualification. Graduates can ultimately work in both public and commercial healthcare organizations, boosting the nation's overall economic growth.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to equip graduates with specialized knowledge, skills and competencies to:

1. Apply principles of radiation protection when dealing with patients.
2. Operate radiographic equipment and position patients effectively to ensure high-quality diagnostic images while adhering to radiation safety protocols.
3. Interpret and analyze radiographic images and effectively communicate their observations to other healthcare professionals.
4. Evaluate image quality and make informed decisions in complex clinical scenarios.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

1. Certificate IV, NCQF level 4 certificate (GE/TVET) or its equivalent.
2. Applicants who did not meet the minimum entry requirements with NCQF level 4 will be considered for entry through Recognition of Prior Learning (RPL) and CAT (Credit Accumulation and Transfer) and as per institution RPL policy and CAT policy.

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Operate radiographic equipment and perform various imaging modalities accurately and safely.	1.1. Operate various imaging modalities (e.g., X-ray, MRI, CT) according to established protocols and procedures.

	1.2. Apply the image acquisition, processing, and visualization techniques used in medical imaging. 1.3. Analyse and interpret medical images to identify normal and abnormal findings. 1.4. Interpret and analyse radiographic images for diagnostic purposes, including recognizing normal anatomy and identifying common abnormalities or pathologies. 1.5. Adjust imaging equipment parameters, including milliamperage, kilovoltage, and exposure time, to optimize image quality while minimizing patient radiation dose. 1.6. Apply critical thinking and problem-solving skills in radiographic imaging, including troubleshooting technical issues, adapting techniques for special populations, and optimizing image quality. 1.7. Perform and optimize SPECT, PET, and nuclear medicine image acquisition techniques. 1.8. Recognize normal and abnormal anatomical and physiological processes on SPECT, PET, and nuclear medicine images.
2. Apply radiation safety principles and practices, including minimizing radiation exposure to patients, themselves, and others.	2.1. Implement radiation safety protocols and procedures to minimize radiation exposure. 2.2. Utilize knowledge of radiation protection regulations and standards in all imaging modalities. 2.3. Utilize principles of radiographic exposure and image processing to optimize image quality and reduce patient radiation exposure. 2.4. Implement appropriate radiation safety measures and protection strategies for patients, healthcare professionals, and the public. 2.5. Execute appropriate radiation protection measures for patients, operators, and other personnel.

	2.6. Implement radiation safety measures and protection strategies for patients, healthcare professionals, and the public in complex imaging procedures.
3. Obtain and analyze high-quality diagnostic images by positioning patients correctly, selecting appropriate exposure factors, and evaluating image quality.	3.1. Demonstrate proficiency in patient positioning and immobilization techniques for various radiographic examinations, considering patient comfort, safety, and image quality. 3.2. Recognize and respond appropriately to challenging patient conditions or factors that may impact the imaging procedure, such as trauma, obesity, or limited mobility. 3.3. Recognize and respond appropriately to patient conditions or factors that may impact the imaging procedure, such as mobility limitations, pain, or anxiety. 3.4. Perform radiographic positioning techniques for specialized examinations, including those requiring contrast media. 3.5. Analyse and evaluate image quality factors and techniques for improvement. 3.6. Position patients for complex radiographic examinations, including procedures such as gastrointestinal, genitourinary, and specialized imaging studies. 3.7. Apply specialized positioning techniques for specific body systems, such as the biliary system, urinary system, and reproductive system.
4. Communicate effectively with patients, providing appropriate care, addressing their concerns, and ensuring their comfort during procedures.	4.1. Communicate effectively with patients, providing clear instructions and addressing their concerns or questions regarding the imaging procedures. 4.2. Communicate imaging findings effectively through written and oral means. 4.3. Communicate effectively and compassionately with paediatric and geriatric patients, their families, and caregivers. 4.4. Collaborate with radiologists and other healthcare professionals in the

	evaluation and interpretation of radiographic images.
5. Analyze clinical situations, make sound decisions, and adapt imaging techniques to accommodate patients with special needs or challenging circumstances.	5.1. Analyse and correlate radiographic findings with underlying pathological processes. 5.2. Perform comprehensive patient assessments, including obtaining relevant medical history, assessing patient conditions, and identifying potential risks or contraindications to imaging procedures. 5.3. Adapt imaging techniques, equipment settings, and exposure factors to obtain optimal images of specialised needs population. 5.4. Apply principles of radiation protection and dose optimization when imaging for special needs patients. 5.5. Recognize and respond to the psychological and emotional needs of special needs patients during radiographic procedures. 5.6. Communicate effectively and compassionately with special needs patients, their families, and caregivers. 5.7. Recognize and manage potential complications or challenges that may arise during radiographic procedures on patients with special needs.
6. Adhere to ethical standards, maintain patient confidentiality, and demonstrate professionalism in the interactions with colleagues, patients, and other healthcare professionals.	6.1. Uphold patient rights, privacy, and confidentiality in the radiographic setting. 6.2. Recognize and address ethical dilemmas and conflicts that may arise in radiography practice. 6.3. Apply the legal framework and regulatory bodies governing radiography. 6.4. Identify legal issues and liabilities related to radiographic practice. 6.5. Apply ethical decision-making models to address ethical and legal challenges in radiography. 6.6. Uphold ethical considerations in research, including informed consent,

	privacy, confidentiality, and the responsible conduct of research.
7. Apply principles of quality assurance and quality control in radiography, including identifying and resolving technical issues that may affect image quality.	7.1. Implement quality control measures to ensure accurate and reliable radiographic images. 7.2. Identify and troubleshoot common technical errors and artifacts in radiographic images. 7.3. Evaluate radiographic images for diagnostic quality, including image contrast, density, and spatial resolution. 7.4. Critically analyse and interpret radiographic images, identifying abnormalities, and relating them to the underlying pathology. 7.5. Execute appropriate image evaluation criteria and guidelines in radiographic interpretation and diagnosis. 7.6. Utilize imaging software and tools for image enhancement, manipulation, and post-processing.
8. Engage in Continuous Professional Development (CPD) to stay updated with advancements in radiography.	8.1. Utilize the knowledge on emerging trends, advancements, and research in quality assurance and image evaluation. 8.2. Evaluate and apply evidence-based practice principles to optimize imaging protocols and patient care outcomes. 8.3. Utilize technology and digital tools to enhance research, communication, and learning in the field of radiography.

SECTION C		***QUALIFICATION STRUCTURE***	
	TITLE	***Credits Per Relevant NCQF Level***	***Total Credits***

COMPONENT		Level [5]	Level [6]	Level [7]	Level [8]	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	Radiation Physics	10				**10**
	Anatomy I &II	10	12			**22**
	Physiology I &II	10	12			**22**
	Communication and Study Skills	10				**10**
	Basic Computer Applications	10				**10**
	Ethics and Legal Issues in Medical Imaging		12			**12**
	Introduction to Medical Imaging Sciences		12			**12**
	Introduction to Psychology	10				**10**
	General Pathology	12				**12**
CORE COMPONENT *Subjects/Courses / Modules/Units*	Radiographic Imaging, I &II	12	*14*			**26**
	Radiographic Positioning and Procedures I &II		12	*16*		**28**
	Radiation Protection and Biology I &II	12	*14*			**26**
	Clinical Practicum I		14			**14**
	Radiographic Anatomy		12			**12**

	Radiographic Equipment & Technology			16		***16***
	Clinical Practicum II		14			***14***
	Radiographic Pathology		14			***14***
	Imaging Modalities I, II &III		12	*14*	*16*	***42***
	Radiographic Procedures in Specialized Areas			16		***16***
	Clinical Practicum III			14		***14***
	Imaging Techniques and Procedures			12		***12***
	Quality Assurance and Image Evaluation			12		***12***
	Research Methodology and Biostatistics			12		***12***
	Clinical Practicum IV				14	***14***
	Entrepreneurship			14		***14***
	Research Proposal				16	***16***
	Educational Techniques			12		***12***
	Leadership and Management in Healthcare			12		***12***

	Clinical Practicum V				16	***16***
	Radiologic Sciences Seminar (Consolidation)				16	***16***
	Research Project				16	***16***
	Professional Development and Career Planning				16	***16***
	Clinical Practicum VI				18	***18***
	Clinical Practicum VII (Clinical Rotations in Specialized Areas)				52	***52***
STRANDS/ SPECIALIZATION	*Subjects/ Courses/ Modules/Units*	***Credits Per Relevant NCQF Level***				***Total Credits***
		Level [ ]	***Level [ ]***	***Level [ ]***		
1.						
2.						
Electives	Infection Control in Diagnostic Radiography		10			***10***

	Occupational Health and safety		10			***10***
	Basic Life support		10			***10***
	Forensics in Diagnostic Radiography		10			***10***

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
Level 5	***96***
Level 6	***174***
Level 7	***150***
Level 8	***180***
TOTAL CREDITS	***600***

Rules of Combination:

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

Fundamentals modules: 120 credits

Core Modules: 460 credits.

Electives (Choose any 2): 20 credits.

Total: 600 Credits

To graduate with BSc Diagnostic Radiography, learners are expected to complete all the 120 credits for fundamental modules, 460 credits for the core modules and 20 credits for the elective modules.

ASSESSMENT ARRANGEMENTS
This will be assessed using formative at 50% and summative at 50%.
MODERATION ARRANGEMENTS
The following shall apply for both internal and external moderation. Internal moderation requirements and external moderation shall be carried out in accordance with ETP moderation policy and BQA requirements. Professional registration and accreditation All assessors and moderators must be registered and accredited with BQA
RECOGNITION OF PRIOR LEARNING
Candidates with relevant work-related experience will be considered for the award of BSc in Diagnostic Radiography using RPL policies.
CREDIT ACCUMULATION AND TRANSFER
Credit accumulated shall be evaluated and transferred for the award of BSc in Diagnostic Radiography as guided by the institutional CAT policy.
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)
Learning Pathways **Horizontal Articulation (related qualifications of similar level that graduates may consider)** • Bachelor of Science in Diagnostic Sonography • Bachelor of Science in Nuclear Medicine

- Bachelor of Science in Radiation Therapy and Oncology
- Bachelor of Science in Public Health

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

- Master of Science in Diagnostic Radiography

Employment

The graduates of the Bachelor of Science in Diagnostic Radiography Qualification are prepared in such a way that, they can work as:

- Diagnostic Radiographers
- Diagnostic Clinical Sonographer
- Radiology Managers
- Mammographers
- Clinical Researchers
- Radiation Protection Officers

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification:

Qualification award

The candidate to be awarded Bachelor of Science in Diagnostic Radiography qualification must achieve a minimum of 600 credits.

There will be issuance of a certificate and an official transcript at the award.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

Similarities

Durban University of Technology (SA) offers Bachelor of Health Science in Diagnostic Radiography which is like the developed qualification offering at the same NQF level of 8 like the proposed qualification. There are 22 modules like the developed qualifications like Anatomy I &II, Physiology, Diagnostic Imaging Sciences I, II and III, Professional Practice I, II, III and IV, Health Science Research I, II and III and Management for Health Professionals. The Assessment Strategies for DUT are also like the proposed qualification such as Portfolios, Simulations, Workplace assessments and practical workbooks/logbooks, Written assignments, Written tests, Case studies and case presentations, Problem based assessments, Peer group projects and assignments, Oral presentations, and Competency assessment of clinical skills.

University of West of England, Bristol (UK) offers Bachelor of Science (Hons) In Diagnostic Radiography consists of the similar Learning Outcomes for the proposed qualification like Obtaining and examining images of the patient's body to start the diagnosis process, Perform effective

diagnosis, using specialist imaging equipment to help diagnose surgical, medical, or vascular conditions, cancer, and complex injuries, provide vital practice care and supporting the patient through their diagnostic pathway , and perform Magnetic Resonance Imaging (MRI), Ultrasound, and Computed Tomography (CT) and produce reports for the same . UWE for UK also has similar modules like Fundamentals of Human Anatomy and Physiology (Diagnostic Imaging Practice), foundation of Imaging Science and Technology, fundamentals of Radiographic Imaging Technique, Patient Care, and Fundamentals of Diagnostic Imaging in the Clinical Context and Informing Practice through Research and Inquiry (Diagnostic Imaging Practice

Differences

Durban University of Technology offers BSc in Diagnostic Radiography for 512 credits which is different from the developed qualification which has 600 credits. This qualification consists of 33 modules of which 16 are fundamental modules, 15 are core modules and 2 electives at NQF Levels 5, 6, 7 and 8, totalling 512 Credits. The developed qualification has 11 Fundamentals modules and 25 core modules and 2 electives at NQF levels of 5,6,7 and 8 totally of 600 credits of a professional degree. The difference between the total credits (512 and 600) is accounted by more practical hours in the developed qualification which is aligned to the recommended practical hours of radiography worldwide.

University of West of England, Bristol (UK) offers BSc (Hons) in Diagnostic Radiography at FHEQ Framework level of 6 with 360 credits for 3 years which is different from the developed qualification of NCQF level of 8 and Credit value of 600 credits for 4 years. The difference in total credits is accounted by the difference in numbers of years of study.

Generally, the qualification compares well with other institutions in terms of Learning outcomes and modules offered which facilitates easy articulation for the learners horizontally like Bachelor of Health Sciences in Diagnostic Sonography, Bachelor of Health Sciences in Nuclear Medicine and Bachelor of Health Sciences in Radiation therapy and Oncology. Vertically the learners can articulate for Master of Sciences in Diagnostic Radiography. The learners can also pursue different employment pathways like the proposed qualification like Diagnostic Radiographers, Sonographers and Radiation Therapist like the universities which were compared (Louise Coleman 2013, Education and Career Framework for the Radiography Workforce).

REVIEW PERIOD

5 years

(Note: Please use Arial 11 font for completing the template)

For Official Use Only:

BQA NCQF QUALIFICATION TEMPLATE

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