

BQA NCQF QUALIFICATION TEMPLATE

SECTION A: QUALIFICATION DETAILS											
QUALIFICATION DEVELOPER (S)	Boitekanelo College										
TITLE	Bachelor of Science in Occupational Hygiene						NCQF LEVEL	8			
STRANDS (where applicable)	1. 2. 3. N/A 4.										
FIELD	Services						CREDIT VALUE	606			
SUB FIELD	Hygiene and Occupational Health Services										
New Qualification	✓	Legacy Qualification				Renewal Qualification		Registration Code			
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											
<p>By 2036, Botswana wants to be a high-income country driven by high productivity. By 2036, Botswana hopes to have achieved high productivity and high-income levels through the support of SMEs and the informal sector, diversification of the mining industry through technology, and commercialisation and technological advancement of the agriculture sector. With this new vision, it is therefore crucial to foresee changes and the hazards that go along with them, such as those related to technological innovation, organisational change, demographic shift and development, and climate change. As per Costantino et al. (2021), the adoption of technological innovation confers benefits to organisations, as it guarantees noteworthy advantages concerning technology, expenses, administration, and so on, and also permits the improvement of worker safety and wellbeing. But technological advancements necessitate updating</p>											

and promotes knowledge on the worker risk analysis and trends management. For example, it is necessary to consider new risks of harm, new potential sources of disease, or new dangers resulting from new practices or activities. Technology innovation, therefore, presents new problems for businesses and necessitates a reworking of old procedures and operations. Therefore, the requirement for Occupational Hygiene (OH) qualifications. According to ILO (2015), implementing the best occupational hygiene qualifications and investing in occupational safety and health (OSH) are essential for boosting productivity.

According to its consolidated list of priority occupations and skills (2023/2024), Botswana, through its Human Resource Development Council of Botswana (HRDC), recognises Occupational Hygiene as a priority skill, particularly in sectors as essential as Manufacturing, Energy and Mining & Minerals. The Priority Skills list's inclusion of Occupational Hygiene demonstrates a dedication to creating a healthier workplace, which eventually serves the interests of both employers and employees. It is a positive move toward securing sustained growth and development in these areas in Botswana.

Globally, the number of deaths directly related to employment increased by 26%, from 2.3 million in 2014 to 2.9 million in 2019, according to Takala et al. (2024). We anticipate an increase in occupational diseases and injuries in Botswana due to the current lack of national OHS policies and acts, the country's goal of becoming a high-income country based on high productivity, and the lack of studies demonstrating the recent prevalence of occupational diseases in Botswana. Consequently, it is critical to invest in experts who understand how to anticipate, recognise, evaluate and manage risks associated with exposures to health stressors in and arising from the workplace that may result in illnesses, impairments or affect the well-being of workers and members of the community.

Additionally, enhancing the country's Occupational Hygiene capabilities would aid in achieving several UN Sustainable Development Goals (SDGs), chief among them being SDG 3: Good Health and Well-Being. This is consistent with SDG 8, which focuses on establishing secure, healthy, and productive work environments to achieve sufficient employment and economic advancement.

PURPOSE: (itemise exit level outcomes)

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

1. Analyse qualitative and quantitative exposure data using risk assessment approaches and professional judgment.
2. Compare appropriate exposure parameters to standards and guidelines where available to assess risks to workers' health.
3. Evaluate engineering, administrative and personnel protective equipment mitigation and control options to ensure compliance with recognised standards, guidelines and practices.
4. Coordinate resources to ensure controls are effectively implemented and verify their effectiveness following implementation.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

To be eligible for admission to this Bachelor of Science in Occupational Hygiene:

1. Certificate IV, NCQF level 4 or equivalent.
2. Applicants who do not meet the minimum entry requirements with NCQF level 4 will be considered for entry through Recognition of Prior Learning, RPL and Credit Accumulation and Transfer, CAT, and as per institutional and national policies on RPL and CAT.

SECTION B QUALIFICATION SPECIFICATION	
GRADUATE PROFILE (LEARNING OUTCOMES)	ASSESSMENT CRITERIA
<p>1. Apply comprehensive knowledge, practical skills, and critical comprehension of the relevant theories, techniques, and concepts specific to the discipline of occupational hygiene to safeguard and advance the health and safety of all stakeholders.</p>	<p>1.1. Identify exposure, recognise and prioritise hazards for evaluation.</p> <p>1.2. Survey the locations, operations, materials/products, and tasks.</p> <p>1.3. Communicate with affected parties the impact of exposure and relevant controls.</p> <p>1.4. Reconstruct exposures and conduct forensic investigations.</p>

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	<p>1.5. Compile and interpret Occupational Hygiene Reports in line with set standards and legal requirements.</p>
<p>2. Analyse hazardous workplace agents, factors, and stressors associated with defined sources and/or processes to determine the impact on health and the environment.</p>	<p>2.1. Identify potential risks of exposure associated with various equipment, operations and materials/products using different levels of risk assessments.</p> <p>2.2. Evaluate potential risks to human health.</p> <p>2.3. Evaluate potential risks to environmental health.</p>
<p>3. Measure and analyse the qualitative, quantitative, and statistical aspects of occupational risks and exposures to ensure compliance with standards.</p>	<p>3.1 Monitor and assess exposure using approved methodologies.</p> <p>3.2 Select and utilise suitable sampling techniques</p> <p>3.3 Operate and calibrate instruments for accuracy and reliability of measurements.</p> <p>3.4. Analyse exposure data and health-related data, such as the prevalence of diseases.</p> <p>3.5 Devise appropriate action plans and approaches to mitigate risks of exposure.</p>
<p>4. Implement effective hazard controls based on international and national standards to create a safe working environment.</p>	<p>4.1. Conduct a gap analysis of the controls in a workplace.</p> <p>4.2. Assess the effectiveness of existing controls.</p> <p>4.3. Evaluate the environment in which the control is to be used.</p> <p>4.4. Execute hazard control measures based on the hierarchy of controls and the principle of what is reasonably practicable.</p>

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<p>5. Function as an accountable and efficient member of a health and safety management team.</p>	<p>5.1. Develop and communicate strategies and qualifications to the members of the health and safety team.</p> <p>5.2. Audit Occupational Hygiene qualifications to ensure the effectiveness of the management system.</p> <p>5.3. Integrate Occupational Hygiene requirements into the ISO management systems.</p>
<p>6. Uphold ethical and professional standards while collaborating with other members of a multidisciplinary team to promote a culture of health and safety in the workplace.</p>	<p>6.1. Apply ethical principles in decision-making.</p> <p>6.2. Comply with legal requirements to avoid legal implications during service provision.</p> <p>6.3. Uphold professional standards while providing health and safety management services.</p>

SECTION C	QUALIFICATION STRUCTURE					
COMPONENT	TITLE	Credits Per Relevant NCQF Level				Total Credits
		Level [5]	Level 6]	Level [7]	Level [8]	
FUNDAMENTAL COMPONENT						
	Chemistry	10				10

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Subjects/ Courses/ Modules/Units	Analytical Chemistry		12			12
	Physics	10				10
	Human Anatomy & Physiology	12				12
	Biostatistics		12			12
	Communication & Study Skills	8				8
	Occupational Epidemiology		12			12
	Basic Computer Applications	8				8
	Risk Assessment methodologies		14			14
CORE COMPONENT Subjects'/Courses/ Modules/Units	Occupational Hygiene Fundamentals	10				10
	Introduction to Environmental Health		14			14
	Occupational Health and Safety Legislation	8				8
	Occupational Exposure Monitoring			22		22
	Health Risk Analysis and Hazard Communication			14		14
	Air sampling & Instrumentation		12			12

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	Noise Risk Assessment & Monitoring			16		16
	Radiation Safety			18		18
	Asbestos and other Fibres	10				10
	Thermal Stress Management		16			16
	Data Analysis for Exposure Assessment	12				12
	Occupational Ergonomics			18		18
	Industrial Ventilation		16			16
	Work Environments & Industrial Processes			14		14
	Occupational Toxicology			18		18
	Measurement and Effects of Hazardous Substances		14			14
	Occupational Health and Safety Leadership			20		20
	Occupational Health Surveillance and Monitoring			22		22
	Work Integrated Learning		20	22		42

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	Professional Development & Ethics		12			12
	Occupational Health Policy and Advocacy				14	14
	Occupational Hygiene Qualification Management				16	16
	Entrepreneurship	8				8
	Research Methods		12			12
	Research Proposal			16		16
	Research Project				30	30
	Practicum/ Internship				60	60
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level			Total Credits	
		Level []	Level []	Level []		
1.						
2.						
Electives	Health promotion and education		12			12

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	Fire and safety			12		12
	Introduction to Occupational Therapy			12		12
	Disaster Management		12			12



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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL

TOTAL CREDITS PER NCQF LEVEL

NCQF Level	Credit Value
Level 5	96
Level 6	178
Level 7	212
Level 8	120
TOTAL CREDITS	606

Rules of Combination:

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

Fundamentals module: 98 credits
 Core modules: 484 Credits
 Electives (Choose any 2): 24 Credits
Total Credits: 606 Credits



ASSESSMENT ARRANGEMENTS

The qualification will be assessed through formative assessment with a weight of 50%, and summative, weighing 50%.

All assessors for the qualification shall be registered with the Botswana Qualifications Authority, BQA or any equivalent and recognised body.

MODERATION ARRANGEMENTS

The following shall apply for both internal and external moderation.

Both internal and external moderation shall be carried out in accordance with both ETP and national moderation policies' requirements.

All moderators must be registered with BQA.

RECOGNITION OF PRIOR LEARNING

There shall be a provision for the award of credits towards the qualification through Recognition of Prior Learning, RPL, in accordance with ETP and national policies on RPL.

CREDIT ACCUMULATION AND TRANSFER

There shall be a provision for Credit Accumulation and Transfer (CAT) in accordance with ETP 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 (at this level) such as.

1. Bachelor of Science in Design Ergonomics
2. Bachelor of Science in Safety Management
3. Bachelor of Science in Environmental Health and Safety
4. Bachelor of Science in Environmental Health

•**Vertical Articulation** (qualifications to which the holder may progress to) Graduates may progress to higher level qualifications such as:

1. Master of Science in Occupational Hygiene
2. Master of Public Health (Occupational and Environmental Health)
3. Master of Occupational Health and Safety
4. Master of Environmental Health Science
5. Master of Industrial Hygiene
6. Master of Risk Management
7. Master of Health Administration (MHA) with a focus on Occupational Health and Safety
8. Master of Ergonomics
9. Post Graduate Diploma in Occupational Health and Safety

Employment Pathways

Graduates will have requisite competencies and attributes to work as:

1. Occupational Health and Safety Practitioners
2. Occupational Hygienist
3. Health and Safety Officer
4. Industrial Hygienist
5. Environmental Health Specialist
6. Risk Assessor
7. Occupational Health Consultant and Coordinator
8. Risk Specialists
9. Loss Control officers
10. Safety Manager

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification:

For a candidate to be awarded a Bachelor of Science in Occupational Hygiene, they must have acquired a minimum of 606 credits. The candidate should pass all the core and fundamental modules in the learning.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

The Bachelor of Science in Occupational Hygiene qualification has been compared with the Bachelor of Health Science in Occupational Hygiene offered by Northwest University, South Africa. Internationally, it is compared well with the Bachelor of Science in Environmental and Occupational Health/Industrial Hygiene Option offered by California State University, Northridge, United States.

Similarities

Bachelor of Health Sciences in Occupational Hygiene, North-West University, South Africa

The qualification compares well with the developed qualification in terms of:

Title: The titles for qualification offered by Northwest University is Bachelor of Health Sciences in Occupational hygiene which is similar to the developed qualification of Bachelor of Science in Occupational Hygiene.

NQF Level: Both qualifications are also on the same NQF level, which is level 8.

Duration: The duration of both qualifications is four years.

Modules Offered: The modules like industrial hygiene, ergonomics, hazardous materials, and noise are covered in both qualifications. Emphasis on practical training is provided by both the qualifications through lab work, field placements, and internships. Both qualifications provide chances and projects for research that are integrated into the course structures.

Bachelor of Science in Environmental and Occupational Health/Industrial Hygiene Option, California State University, Northridge, USA

Learning Outcomes: The qualification offered by California State University compares well with similar learning outcomes as for the developed qualification like demonstrate a comprehensive knowledge of the recognition, evaluation and control of biological, chemical and physical factors that can impact human health and safety which compares well with exhibit comprehensive knowledge,

practical skills, and critical comprehension of the relevant theories, techniques, and concepts that are specific to the discipline of occupational hygiene to safeguard and advance the health and safety of all stakeholders. Others like demonstrate knowledge of how to work in interdisciplinary teams to promote public and private action to protect public health and the environment also compares well with function as an accountable and efficient member of a health and safety management team.

Modules Offered: Both the qualifications also cover the essential modules like industrial hygiene principles, toxicology, safety management, and health risk assessment. They aim to provide learners with a strong foundation in recognizing and controlling workplace hazards. Both qualifications also emphasize practical training, including internships, fieldwork, and laboratory work, to give learners hands-on experience in real-world settings. Both qualifications also incorporate elements from various disciplines such as biology, chemistry, and physics, to provide a holistic understanding of environmental and occupational health issues.

Differences:

Bachelor of Health Sciences in Occupational Hygiene, North-West University, South Africa

Credit Value: The qualification offered by NWU has 548 credits which is different from the developed qualification having 606 credits which is a professional bachelor's degree but at the same NQF level of 8.

Rules of Combination: The rules of combination for the qualification in NWU also differs from the developed qualification where the learners need to achieve the module mark for all coursework modules based on a combination of a module participation mark and an examination mark in the ratio determined in the applicable qualification specific requirements whilst the rules of combination for the developed qualification the learners has to successfully finish the fundamental, core and electives modules .The NWU qualification is tailored to comply with South African occupational health and safety legislation while the developed qualification will be aligned with Botswana legislations so the difference is in the context not the content.

Electives offered: The selection of elective modules differs based on country industrial needs.

Bachelor of Science in Environmental and Occupational Health/Industrial Hygiene Option, California State University, Northridge, USA

Title: The titles for the qualification offered by California State University qualification is different from the developed qualification as it is Bachelor of Science in Environmental and Occupational

Health/Industrial Hygiene Option whilst the developed qualification is specified as Bachelor of Science in Occupational Hygiene.

Credit Value: The credits for the qualification offered by CU are measured in units as the framework which is aligned US qualification Framework whilst the developed qualification has 606 credits aligned to the National qualification Framework (Botswana).

Modules Offered: The modules offered by the California State University is limited in its courses on Occupational hygiene because it is focused on Environmental and Occupational Health (EOH) due to the industry needs for United States of America unlike the developed qualification as all its core modules focussing the Occupational Hygiene.

Rules of Combination: The rules of combination to get the qualification from CU is also different from the developed qualification where the learners to be awarded the qualification they should satisfy total Units in the Major/Option: 80-88, General Education Units: 30, Additional Units: 2-10 and Total Units Required for the B.S. Degree: 120 whilst the rule of combination for the developed qualification is Fundamentals module: 98 credits , Core modules: 484 Credits, Electives (Choose any 2): 24 Credits with Total Credits: 606 Credits.

The developed qualification overall compares well with other qualifications which it was benchmarked against. The developed qualification with the qualifications benchmarked provides a strong foundation in the occupational hygiene principles, emphasising practical skills and theoretical knowledge in the field. In terms of delivery and exit outcomes, the developed Occupational Hygiene qualification compares favourably well to the qualification both regionally and globally. While some differences have been noted regarding the qualification's duration, structure, and some of its modules, overall, there are many similarities because it is in good alignment with the content, opportunities for practical training, and accreditation standards that are observed. The similarity of the courses consequently translates to the graduate profile of the qualifications from the above-mentioned institutions being comparable to the developed qualification. Generally, the qualification compares well with the benchmarked institutions in terms of Learning outcomes, modules offered and employment opportunities which facilitates easy articulation for the learners into the same qualifications identified both horizontally vertically.

REVIEW PERIOD

The qualification will be reviewed every 5 years.

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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	



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