

BQA NCQF QUALIFICATION TEMPLATE

SECTION A: QUALIFICATION DETAILS												
QUALIFICATION DEVELOPER (S)	University of Botswana											
TITLE	Bachelor of Science (Honours) in Occupational Hygiene						NCQF LEVEL	8				
STRANDS (where applicable)	N/A											
FIELD	Services						CREDIT VALUE	595				
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>RATIONALE:</p> <p>The International Labour Organisation estimates that about 2.78 million workers die annually around the world due to work-related accidents or diseases, of which 2.4 million are due to work-related diseases alone. Furthermore, around 340 million occupational accidents occur, and 160 million workers suffer from work-related illnesses annually. In addition to this human and social tragedy, it is estimated that economic losses due to poor working conditions, occupational accidents and diseases contribute to the loss of more than 4% of the Gross Domestic Product worldwide.</p> <p>While work is essential for life, development and personal fulfilment, unfortunately, work-related activities and processes create hazards to the health of workers and those in nearby communities, as well as to the general environment. The generation and release of harmful agents in the work</p>												

environment can be prevented through adequate hazard control interventions, which not only protect workers' health but also limit the damage to the environment often associated with industrialisation. The work environment should be under continuous surveillance so that hazardous agents and factors *can be detected and removed, or controlled, before they cause any ill effects; this is the role of occupational hygiene* (Herrick, 2011).

There is a significant demand for occupational hygiene professionals, with a current shortage of qualified individuals across various industries in Botswana. Occupational hygiene has been identified by the Human Resource Development Council of Botswana (HRDC) as one of the professions which are in short supply in the country. Thus, there is a high need for occupational hygienists to ensure workplace health and safety compliance within the country. The majority of current occupational hygiene professionals had to rely on their employers or institutions to train them outside the country at high costs. Furthermore, in 2024, occupational hygiene was listed among the professionals that will be required for the Jwaneng Underground Project, which is envisaged to extend the life of Jwaneng Mine beyond 2050. With the mining sector, among others, growing, occupational hygiene will continue to be in demand.

Therefore, the rationale for developing this qualification is mainly to meet the country's need for scientists in the field of Occupational Hygiene; professionals in possession of relevant theoretical expertise, practical skills and professional attitudes and behaviours, enabling them to function as occupational hygienists and researchers. This qualification is therefore of great value in the training field of the health sciences. The national and regional needs for an occupational hygiene qualification was considered when developing this qualification. In composing the curriculum, consideration of career possibilities and workforce needs also took place.

PURPOSE: (itemise exit level outcomes)

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

1. Apply a range of scientific methods to anticipate, recognise, evaluate and control health risks that can impact human health and the community at large.
2. Protect the health of workers and the community at large within the framework provided by national and international occupational health and safety legislation.
3. Conduct occupational health incidents investigation and prevention.
4. Conduct research in occupational health areas for evidence-based decisions to protect workers' health, communities and the environment.
5. Communicate occupational hygiene concepts and programs to a variety of audiences, using both written and oral forms of communication.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

The minimum entry requirements for the Bachelor of Science (Honours) in Occupational Hygiene are:

- Certificate IV (NCQF Level 4) or equivalent.
- Entry through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) is accessible to all candidates through institutional policies in line with the national RPL and CAT policies.

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SECTION B QUALIFICATION SPECIFICATION	
GRADUATE PROFILE (LEARNING OUTCOMES)	ASSESSMENT CRITERIA
<p>1. Apply knowledge of mathematics, science and occupational hygiene principles to identify, analyse and solve technical and scientific problems affecting human health, community at large and the environment.</p>	<p>1.1. Analyse workplace conditions using scientific methods to identify potential health hazards.</p> <p>1.2. Evaluate data and measurements to determine exposure levels and compliance with standards.</p> <p>1.3. Design appropriate interventions and recommend solutions to control or eliminate hazards.</p> <p>1.4. Implement evidence-based problem-solving strategies in occupational hygiene contexts.</p>
<p>2. Assess, manage and control workplace hazards to protect human health, promote community well-being and safeguard environment in line with occupational hygiene standards and best practices.</p>	<p>2.1. Conduct occupational health risk assessments in different work environments to eliminate occupational exposures or reduce them to acceptable levels.</p> <p>2.2. Develop and implement control measures according to the hierarchy of controls to mitigate risks.</p> <p>2.3. Monitor and evaluate the effectiveness of control strategies using recognised standards.</p> <p>2.4. Advocate for sustainable practices that balance occupational health, environmental protection, and community welfare.</p>
<p>3. Apply national and international occupational health and safety standards and legislation to protect the health of workers and the community at large.</p>	<p>3.1. Interpret policies, health and safety standards and legislation and develop programs to comply with the health and safety standards and legislation.</p> <p>3.2. Apply relevant policies, health and safety standards and legislation to protect worker health and well-being and safeguarding the community at large.</p> <p>3.3. Contribute to the development of policies, health and safety standards and legislation to contribute to provision of safe and healthy</p>

	work environments for workers and environmental protection.
<p>4. Investigate and analyse work-related accidents and incidents to protect human health and the community.</p>	<p>4.1. Identify root causes of incidents in the work environment to prevent future incidents.</p> <p>4.2. Apply investigative techniques (e.g., interviews, site inspections, data analysis) to gather evidence.</p> <p>4.3. Evaluate contributing factors (e.g., human error, equipment failure, environmental conditions) with logical reasoning.</p> <p>4.4. Interpret incident data (e.g., injury reports, safety audits) to draw meaningful conclusions.</p> <p>4.5. Propose realistic and effective measures to prevent incident recurrence.</p>
<p>5. Conduct scientific occupational health research for evidence-based interventions that will reduce adverse impacts to protect workers' health, communities and the environment.</p>	<p>5.1. Identify occupational hygiene research need/ theme/ problem to investigate.</p> <p>5.2. Select appropriate scientific methods (quantitative, qualitative, or mixed) for occupational health research</p> <p>5.3. Apply research principles to design and conduct occupational hygiene research.</p> <p>5.4. Manage research data in line with prescribed guidelines relevant to occupational hygiene area.</p> <p>5.5. Disseminate research findings to relevant stakeholders and policy makers</p> <p>5.6. Utilize research findings to develop, implement and evaluate intervention measures in the field of occupational hygiene</p>
<p>6. Interpret and communicate complex occupational hygiene issues, health risks, and solutions to various workplace stakeholders and audiences through different mediums.</p>	<p>6.1. Communicate verbally, in writing and electronically according to requirements of all stakeholders.</p> <p>6.2. Translate technical information into messages that suit the knowledge level, concerns, and responsibilities of different stakeholders.</p> <p>6.3. Tailor communication styles and content to different audiences, including technical and non-technical stakeholders</p>

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<p>7. Apply leadership skills in driving occupational hygiene programs</p>	<p>7.1. Develop comprehensive hygiene program aligned with organizational goals and legal standards to protect human health, environment and community.</p> <p>7.2. Lead a multidisciplinary team and engage stakeholders to support hygiene efforts.</p> <p>7.3. Work in a team and collaboratively with other team members to safeguard workers' wellbeing and environmental protection.</p> <p>7.4. Use analytical and critical thinking skills to work with the line organization to evaluate a problem and to make decisions.</p>
<p>8. Use Information and Communication Technology (ICT) to store, retrieve data and manipulate data into information and information into knowledge.</p>	<p>8.1. Identify proper informatics management tools for the organization to manage occupational hygiene data.</p> <p>8.2. Implement solutions that assure confidentiality, security and integrity while maximizing the availability of information for occupational health use.</p> <p>8.3. Evaluate environmental information systems and applications to monitor environmental hazards.</p> <p>8.4. Retrieve information from digital libraries to inform decision making in human health and environmental protection.</p>

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SECTION C	QUALIFICATION STRUCTURE					
COMPONENT	TITLE	Credits Per Relevant NCQF Level				Total Credits
		Level [5]	Level [6]	Level [7]	Level [8]	
FUNDAMENTAL COMPONENT	Principles of Biology	16				16
	General Chemistry I	16				16

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Subjects/ Courses/ Modules/Units	Geometrical Optics and Mechanics	16				16
	Introductory Mathematics I	12				12
	Communications and Academic Literacy Skills for Health Sciences and Pre-Med	12				12
	Computing Skills Fundamentals I	8				8
	Diversity of Plants and Animals	16				16
	General Chemistry II	16				16
	Electricity and Magnetism	16				16
	Introductory Mathematics II	12				12
	Health Communication (Health Sciences and Pre-Med)	12				12
	Computing Skills Fundamental II	8				8
CORE COMPONENT Subjects/Courses/ Modules/Units	<i>Cell Biology</i>		14			14
	<i>Introduction to Analytical Chemistry</i>			10		10
	<i>Analytical Chemistry Laboratory I</i>			10		10
	<i>Epidemiology</i>		12			12
	<i>Human Anatomy and Physiology I</i>			12		12

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	<i>Fundamental of Occupational Hygiene</i>		12			12
	<i>Basic Toxicology</i>			12		12
	<i>Health Informatics</i>			12		12
	<i>Human Anatomy and Physiology II</i>			12		12
	<i>Biological and Psychosocial</i>		12			12
	<i>Chemical Stressors I</i>		14			14
	<i>Physical Stressors I</i>		14			14
	<i>Ergonomics</i>			12		12
	<i>Chemical Stressors II</i>			14		14
	<i>Physical Stressors II</i>			14		14
	<i>Occupational Safety</i>			12		12
	<i>Industrial Psychology</i>		12			12
	<i>Principles and Practices of Health Education</i>		14			14
	<i>Introduction to Biostatistics</i>			15		15
	<i>Occupational Diseases</i>			12		12
	<i>Chemical Stressors III</i>			14		14
	<i>Physical Stressors III</i>			14		14
	<i>Internship</i>				40	40

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	<i>Operational Management for Health Practice</i>				12	12
	<i>Occupational Health Risk Management</i>				12	12
	<i>Research Proposal</i>				15	15
	<i>Occupational Hygiene Legislation</i>				12	12
	<i>Ventilation</i>				12	12
	<i>Emergency and Disaster Management</i>				12	12
	<i>Research Project</i>				17	17
	<i>Seminar on Occupational Hygiene</i>				12	12
	<i>Incident Investigation and Management</i>				12	12
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level				Total Credits
		Level []	Level []	Level []		
1.						
2.						
Electives						

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL

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TOTAL CREDITS PER NCQF LEVEL

NCQF Level	Credit Value
<i>Level 5</i>	160
<i>Level 6</i>	104
<i>Level 7</i>	175
<i>Level 8</i>	156
TOTAL CREDITS	595

Rules of Combination:

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

Fundamental courses: 160 credits

Core courses: 435 credits

Total credits: 595

All fundamental and core courses must be achieved for the qualification to be awarded.

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ASSESSMENT ARRANGEMENTS

All assessments will be done using formative and summative assessment.

- **Formative assessment:** weighting of 50%
- **Summative assessment:** weighting of 50%

Assessment will be carried out by BQA or other relevant bodies registerable and accreditable assessors.

MODERATION ARRANGEMENTS

Internal and external moderation

- There shall be both internal and external moderation in accordance with institutional policies aligned with national policies.
- Moderators shall all be registerable and accreditable with BQA or other relevant bodies.

RECOGNITION OF PRIOR LEARNING

There is a provision for award of this qualification through RPL in line with institutional and national policies.

CREDIT ACCUMULATION AND TRANSFER

There is a provision for award of this qualification through credit accumulation in line with institutional and national Credit Accumulation Transfer (CAT) policies.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Vertical Progression: Graduates will be eligible to pursue any of the following postgraduate qualifications:

- Master's in Occupational Hygiene
- Master's in Public Health
- Master's in Occupational Health and Safety
- Master's of Nursing Science Occupational Hygiene
- Master's in Ergonomics

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

This qualification articulates horizontally with any relevant Bachelor's Degree (Honours) in the area of Environmental and Occupational Health, for example:

- Bachelor of Science (Honours) Occupational Health and Safety
- Bachelor of Science (Honours) Occupational Health, Safety and Environment

- Bachelor of Science (Honours) Environmental Health
- Bachelor of Science (Public Health)

Possible jobs or employment which the holder of this qualification may take up include the following:

- Occupational Hygienists
- Occupational Health and Safety Officers
- Researcher in Academic Institutions
- Policy advisor –
- Occupational Hygiene Consultancy

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

Candidates must acquire a minimum of 595 credits, of which 435 are core course credits and 160 fundamental course credits, to be awarded with a Bachelor of Science (Honours) in Occupational Hygiene.

Certification

In addition, certifying all the rules of combinations and the modules as stipulated and will be issued a certificate.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

i. Regional comparability

a. North West University

Offers Bachelor of Health Science in Occupational Hygiene and it is the only University that offers this qualification in the world. The qualification is offered at NQF Level 8 with 548 credits. The credits of the proposed Bachelor of Science (Honours) in Occupational Hygiene are 595 which exceeds the credit load of the Northwest University. The qualification has fundamental and core courses covering a wide range of topics in Occupational Hygiene such as Fundamentals of Occupational Hygiene, Risk Assessment, Ergonomics for Occupational Hygiene, Toxicology, Ventilation, Chemical and Physical Stressors. Admission requires National Senior Certificate and applicants who obtained equivalent or recognized qualifications are also considered on merit.

ii. International comparability

a. Utah State University, USA*

Offers Bachelor of Science in Public Health – Occupational Hygiene Emphasis. The qualification is offered over four years and has 120 credits.

A wide range of topics in Occupational Hygiene are offered. These include Industrial Hygiene Seminar, Industrial Hygiene Recognition of Hazards, Industrial Hygiene Chemical Hazard Evaluation, Industrial Hygiene Physical Hazards, Industrial Hygiene Internship, Industrial Hygiene Chemical Hazard Control, Fundamentals of Epidemiology, Environmental Toxicology, Public Health Management and Industrial Safety

Graduates are employed in different sectors such as the government, industry, insurance companies, consultants, and regulatory agencies like Occupational Safety and Health Administration (OSHA). They also work in related fields, such as safety or environmental compliance.

b. California State University Northridge, USA*

Offers Bachelor of Science in Environmental and Occupational Health with Industrial Hygiene Major for four years. The qualification has 120 credits.

Occupational Hygiene course such as Occupational Safety, Evaluating the Occupational Environment and Lab and Controlling Occupational Environment.

Graduates are employed in different sectors as Industrial Hygienists, Safety Supervisors or Health and Safety Inspectors. Graduates also are employed as administrators and technical specialists in governmental agencies, private industry and consulting firms. Opportunities for teaching, research and advanced professional programs are numerous.

c. Ohio University, USA*

The Institution offers Bachelor of Science Occupational Health and Safety Major and has 122 credits. The qualification covers a wide range of Occupational Health courses such as Occupational Safety and Health, Occupational Hygiene and Professions Sampling and Analysis, Toxicology for Health Science, Industrial Ventilation, Physical Hazards Evaluation and Control.

Entry requirements include English, Mathematics, Social Sciences and Natural Sciences.

Graduates of the program work in industry, defense, insurance, and government. Some find employment in health care settings, including hospitals, laboratories, or universities.

Similarities:

The proposed qualification's admission requirements, main exit outcomes, modules, assessments strategies, minimum requirements and education and employment pathways are similar to all the four universities compared to. All the universities admit learners from high school and recognise prior learning. Regarding the main exit outcomes, these are similar with the institutions aiming to produce graduates who will be able to anticipate, recognise, evaluate and control hazards in the workplace to provide a safe work environment.

The modules are similar across the universities such as foundational courses including Biology, Chemistry, Physics and Mathematics. The core core courses include Introduction to Occupational Hygiene, Human Anatomy and Physiology, Chemical and Physical Hazards/Stressors, Ergonomics, Safety and Ventilation. Assessment strategies of the qualifications are similar including formative assessments such as tests, written and oral presentations and summative in the form of final

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examinations. Across all the institutions, graduates may be employed by the government, industry as occupational hygienists, health and safety managers.

The proposed qualification just as the Bachelor of Health Sciences in Occupational Hygiene from North West University, South Africa are both honours degrees at NQF Level 8. The three other institutions do not have NQF levels because United States does not have a National Qualification Framework.

Differences:

The differences noted between the proposed qualifications and those from other institutions are:

- The proposed qualification credits are many (595) when compared to North West University (548 credits), Utah State University (120 credits), California State University Northridge (120 credits) and Ohio University (122 credits). The North West University qualification which is closely similar to the proposed qualification does not have Internship (work-based learning) whereas the proposed qualification has Internship for two and half months (10 weeks).

As compared to the proposed qualification, the three qualifications from Utah State University, California State University Northridge and Ohio University have industrial/occupational hygiene as a major. This shows that the development of occupational hygiene discipline is still at infancy stage but developing to meet the market needs. Currently, there is one qualification and undergraduate level in Occupational Hygiene, offered by North West University in South Africa.

REVIEW PERIOD

This qualification shall be reviewed every five (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	