BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS																
QUALIFICATION DEVELOPER (S)	Botswana International University of Science and Technology																
TITLE	Master of Science in Chemical Engineering											**NCQF LEVEL**					
STRANDS (where applicable)	N/A																
FIELD	Manufacturing, Engineering and Technology											**CREDIT VALUE**		240			
SUB FIELD	Engineering and Engineering Trades																
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

The Master of Science degree is designed to produce graduates with an extended specialist knowledge in a particular area of Chemical Engineering and is currently the only such qualification in Botswana. The National Human Resources Development Plan 2028 highlighted that one of the challenges in transition towards a knowledge-based economy in Botswana is the lack of graduates with high level critical thinking skills that generally provide for high order thinking, including problem solving. The report also highlighted the need for graduates that are capable of learning and applying knowledge through creative thinking and critical analysis. Such requirements can only be achieved

through producing graduates with higher level skills, capable of not only evaluating but of critical analysis, which is addressed at postgraduate level. Based on a study done in the United States of America, it has been found that graduate qualifications1 contribute to the development of talent-rich ecosystems that drive global competitiveness and economic growth.

PURPOSE:

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

1. Generate and analyse information through experimentation, modelling and simulation.
2. Conduct advanced research and contribute innovative solutions in the fields of energy, water, resources, and process engineering.
3. Implement the technical and transferrable skills attained in solving complex engineering problems in industry and academia.
4. Investigate the application of physical phenomena on Chemical Engineering processes used in industry and academia.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- A Bachelor's Degree, NCQF Level 7 in Chemical Engineering or related discipline
- RPL and CAT may be considered for access in line with ETP policies.

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA*** ***The graduate should be able to:***
1. Plan and execute a scientific investigation in the discipline of Chemical Engineering and/or other closely related disciplines.	1.1 Formulate research questions and hypotheses. 1.2 Compile and evaluate relevant scientific literature in the field of study. 1.3 Develop an appropriate research methodology for a scientific investigation. 1.4 Analyse the results of a scientific investigation. 1.5 Develop substantive scientific conclusions and recommendations based on the analysis of scientific results.

	1.6 Produce a written dissertation that demonstrates mastery of the field of study.
2. Work effectively as an individual or team member in multi-disciplinary environments by performing critical functions and demonstrating management skills.	2.1 Work independently and display critical thinking. 2.2 Produce outputs that clearly demonstrates personal contribution. 2.3 Leverage on the benefits of team work in solving complex scientific and engineering problems. 2.4 Evaluate possible solutions by taking into consideration technical, socio-economic and environmental aspects. 2.5 Produce innovative solutions to complex scientific and engineering problems.
3. Apply engineering methods, skills, tools and information technology in diagnosing and solving scientific and engineering problems.	3.1 Use simulation tools to model and predict the behavior of physical, chemical and biological processes in solving scientific and engineering problems. 3.2 Use statistical tools and packages in analyzing experimental results or simulation data. 3.3 Use information technology tools for presenting and processing scientific and engineering data.
4. Communicate scientific and technical information through scientific research articles and oral presentations to scientific audiences.	4.1 Compile articles in scientific journals and publications. 4.2 Develop and present scientific and technical presentations to other experts in the field of specialty in a manner that demonstrates competency in the field of expertise.
5. Act professionally and ethically, to take responsibility, and to exercise judgement commensurate with knowledge and experience.	5.1 Apply professional and ethical codes of conduct in the execution of scientific and engineering related work. 5.2 Assume full responsibility of tasks executed in the exercise of the profession.
6. Manage scientific research projects within the budgetary and time constraints	6.1 Plan and execute a scientific research project. 6.2 Integrate multidisciplinary skills such as management, economics and environmental factors in the execution of scientific projects.

SECTION C	QUALIFICATION STRUCTURE				
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	**TITLE**	**Credits Per Relevant NCQF Level**			**Total (Per** *Subject/ Course/ Module/ Units)*
		Level [ ]	**Level [9]**	**Level [ ]**	
CORE COMPONENT *Subjects/Courses / Modules/Units*	MSc Chemical Engineering Dissertation		240		240
ELECTIVE/ OPTIONAL COMPONENT *Subjects/Courses / Modules/Units*					

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
9	***240***
TOTAL CREDITS	***240***

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

The qualification is research based and has no course work component. The MSc learner must submit a dissertation, successfully complete all the dissertation reviewers' comments, and submit the approved dissertation. The candidate must publish (or paper accepted for publishing) one (1) journal paper, then must pass a compulsory oral examination (meet the viva voce defence), to attain all 240 credits

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ASSESSMENT ARRANGEMENTS
Assessors must be registered with BQA preferably with a doctoral degree in chemical engineering.
MODERATION ARRANGEMENTS
Moderators must be registered with BQA preferably with a doctoral degree in chemical engineering.
RECOGNITION OF PRIOR LEARNING (if applicable)
RPL and CAT will be considered for the award of this qualification.
PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)
Vertical Pathway Doctor of Philosophy in Chemical Engineering **Horizontal Pathway** • Master of Science in Engineering Management. • Master of Research in Engineering Management. **Employment Pathway** Possible employment articulations: • Chemical Engineering Researcher • Process engineer • Research and development (R&D) Engineer
QUALIFICATION AWARD AND CERTIFICATION
Minimum standards of achievement for the award of the qualification Candidates nee a minimum of 240 credits to graduate with Master of Science in Chemical Engineering ***Certification***

Candidates meeting prescribed requirements and attaining 240 credits will be awarded the certificate in accordance with standards prescribed for the award of the qualification and applicable policies.

REGIONAL AND INTERNATIONAL COMPARABILITY

Title of Qualification, NQF Level & Credit Value or Duration

- The title of the qualification is the same for all the benchmarks, Master of Science in Chemical Engineering.
- The NQF level is consistent across the institutions (Level 9 for University of Cape Town, University of Queensland, and University of Birmingham).
- Credit value for each benchmark is 180 credits in line with the minimums for each NQF, while this qualification has 240 credits in line with the NCQF minimum for level 9 qualifications.

Main Exit Outcomes

- All qualifications emphasize the development of research skills, with a focus on problem-solving, critical analysis, and scientific communication.
- Graduates are expected to apply engineering knowledge to real-world challenges, considering societal, environmental, and economic impacts.
- Leadership skills and lifelong learning are stressed across all programs, preparing graduates for roles in research, management, and industry.

Domains/Modules/Courses/Subjects covered (Fundamental, Core & Electives)

- The focus is on advanced engineering knowledge and research methods, including the ability to conduct independent investigations.
- Programs integrate technical and cognitive skills in research, communication, and practical application of scientific knowledge.

Assessment Strategies and Weightings

- All qualifications rely primarily on the thesis/dissertation as the central form of assessment, with oral presentations and written reports as key elements.
- Research progress is monitored regularly, and academic milestones are set to ensure the completion of the program.

Qualification Rules and Minimum Standards for the Award of the Qualification

- All qualifications have similar requirements for successful completion, focusing on thesis submission, academic progress reviews, and adherence to research ethics.
- A lead supervisor is assigned to guide students through their research.

Education and Employment Pathways

- All qualifications provide pathways to PhD programs in Chemical Engineering, as well as career opportunities in research and development, engineering practice, and academic roles.
- Similarly, graduates are prepared for leadership roles in industries like environmental engineering, product development, and project management.

REVIEW PERIOD

The review period for this qualification is 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**	