BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS													
QUALIFICATION DEVELOPER (S)	University of Botswana													
TITLE	Bachelor of Design (Honours) Design and Technology Education									**NCQF LEVEL**	8			
STRANDS (where applicable)	1. 2. N/A 3. 4.													
FIELD	Education & Training		**SUB-FIELD**	Training						**CREDIT VALUE**	650			
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

RATIONALE:

The qualification has been designed to respond to the social and economic needs of Botswana and that of the region, especially in areas that deal with design, technology, creativity, and innovation to provide the society with innovators and designers. This is important in order to support the growth of the manufacturing industry as design is a direct input of manufacturing. The qualification is also aligned to the key strategic sectors of creative industries; research, innovation, science and technology, and manufacturing as identified by Human Resource Development Council of Botswana (2023), which requires a high demand of manpower to transform Botswana into a creative and knowledge-based economy. The qualification's core mandate is to train secondary school leavers to be industrial designers and entrepreneurs to fill the gap of applied design innovation and applied design research in the economy. Industrial Design has been identified as one of the top occupations in demand in Botswana (HRDC, 2019; 2023-2024). Skills which are traditional industrial design skills have also been identified as future skills by the World Economic Forum (2016; 2018) and HRDC (2019). The enabling technical and soft skills required for this core

mandate are as identified and reported by the Human Resources Council of Botswana (2019, p.24 and 2023-2024, p.35). The qualification is in congruence with the Faculty of Engineering and Technology's vision of being the leading centre of excellence in engineering, design and the built environment in the world. The Bachelor of Design (Industrial Design) qualification has been developed in line with outcome-based learning principles. The development of the qualification has been informed by the accreditation requirements of the Institution of Engineering Designers. The qualification contributes towards the strategic role of meeting the country's development needs through advancing human resource development and developing research and innovation capacity (Towards a Knowledge Society. Tertiary Education Policy, 2010; Revised National Policy of Education 1994; National Human Resource Development Plan, 2009-2022, Education and Training Sector Strategic Plan, 2015, National Development Plan 11, 2017 and HRDC, 2019 top occupations priority area - manufacturing). Furthermore, this qualification is commensurate with three of the pillars of Vision 2036 of producing 'sustainable economic development, human and social development and sustainable environment', as well as two key future imperatives of 'innovation and sustainability'.

PURPOSE: (itemise exit level outcomes)

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

- Apply a range of advanced specialist knowledge and skills to teach the secondary education design and technology subject content.
- Exercise autonomy and responsibility to efficiently coordinate/manage a Design and Technology Workshop, including, planning instructional activities, procuring materials, and carrying out minor maintenance works.
- Develop and implement various assessment activities for a variety of instructional tasks of a practical nature including design portfolios.
- Design and manufacture products to solve real-life problems using a variety of advanced manufacturing processes.
- Demonstrate mastery of Design and Technology when applied to entrepreneurial solutions.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- Certificate IV, NCQF Level 4 (BGCSE or equivalent).
- Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) shall be considered according to the policies for access aligned with BQA/National policies.

SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1.1 Exercise autonomy to apply design principles to solve complex design and technology education problems (Design principles).	1.1.1 use the appropriate Mathematical, Science and Engineering principles to a given design task/problem. 1.1.2 apply research methodologies and techniques relevant to design and technology education to solve complex problems. 1.1.3 Demonstrate mastery of design skills in managing the design process during complex problem solving 1.1.4 Demonstrate capacity to individually conduct design research and critically evaluate and synthesise design information towards a solution.
1.2 Critically apply engineering design analysis in solving design and technology problems creatively and innovatively (Design analysis and Creativity and innovation).	1.2.1 conduct research, select, evaluate, manipulate and manage information relevant to the analysis and synthesis of design and technology solutions. 1.2.2 apply analytical skills to designed objects against their context. 1.2.3 Undertake visual analysis 1.2.4 use a systematic approach to problem-solving using appropriate design tools and techniques.
1.3 Apply design practice principles in practising design and technology education through a creative innovation process of critical analysis and independent evaluation of design information involving decision-making gates (Design practice and Creativity and innovation).	1.3.1 create new processes or products through a synthesis of ideas-based material selection principles. 1.3.2 Practice collaborative and independent work to realise a range of practical, creative and theoretical projects. 1.3.3 initiate projects, meet deadlines, liaise with industrial collaborators, and make presentations. 1.3.4 conduct research and synthesize information, produce reports and evaluate designs. 1.3.5 analyse problems of a creative nature and provide appropriate solutions. 1.3.6 apply for intellectual property rights (IPR) including patent search and principles of copyright and design registration. 1.3.7 use engineering design codes of practice and industry standards, with some knowledge of design factors and requirements for safe operation.

	1.3.8 demonstrates awareness of management and quality assurance issues in product design. 1.3.9 Work effectively as part of a group with respect for the dignity, rights and needs of others. 1.3.10 manage time and projects in professional practice. 1.3.11 use information and communication technology (digital skills) in data collection. 1.3.12 evaluate technical risks and address risk in design methodology. 1.3.13 write design reports and present design ideas.
1.4 demonstrate specialised knowledge and understanding of economic, social and environmental context in the practice of design and technology education (Design principles and Design practice).	1.4.1 manage the design process through a decision-making matrix guided by design tools and methods 1.4.2 demonstrate an awareness of financial, economic, social legislative and environmental factors of relevance to design and technology education. 1.4.3 use sustainable design principles in solving societal problems. 1.4.4 demonstrate awareness knowledge and understanding of the 6 rules of thumb in decision making about resources.
1.5 Demonstrate mastery of professional practice in the design products, services and systems as per the user needs (Design analysis and The designer and society).	1.5.1 evaluate design solutions against relevant constraints and criteria. 1.5.2 address human needs using research, anthropometric data and ergonomic principles. 1.5. 3 provide design solutions according to customer and user requirements. 1.5.4 generate product design specifications. 1.5.5 use product design cost drivers and appreciate the cost implications of different production volumes. 1.5.6 generate a wide range of design ideas, concepts and proposals independently and in teams in response to set or self-generated design briefs. 1.5.7 select and test materials and manufacturing processes in the synthesis of product design solutions. 1.5.8 create logical and innovative design solutions. 1.5.9 select and use the appropriate manual drawing/construction/CAD, communication

	and technological media in the realisation of design ideas. 1.5.10 use visual literacy and drawing ability appropriate to the practice of product design. 1.5.11 develop concepts to provide manufacturing instructions and specifications. 1.5.12 design through computer modelling and visualisation. 1.5.13 integrate form, texture and colour in computer modelling.
1.6 Demonstrate proficiency in professional and technical communication, and the use of digital skills in complex problem-solving (Design practice).	1.6.1 present academic, professional ideas orally, visually and textually to a range of audiences. 1.6.2 offer creative insights, rigorous interpretations and solutions to problems and issues appropriate to the context. 1.6.3 research, analyse, organize data, and retrieve information using ICT /digital skills. 1.6.4 use sound sketching, drawing and computer-aided and computer-aided manufacturing skills in designing products, services and systems. manage and present information in a variety of formats using ICT/digital skills.
1.7 Practise teaching and design professionalism by taking responsibility and accountability for own work output and of others in the design and technology teaching profession (The designer and society).	1.7.1 take full responsibility for their work, decision-making and use of resources, and full accountability for their decisions and actions of others where appropriate. 1.7.2 uphold the teaching profession, and design and technology ethics. 1.7.3 Identify and address ethical issues in design and technology education. Apply ethical considerations when dealing with students of various age groups in design and technology lessons.
1.8 Actively engage in Continuous Professional Development activities to enhance performance and the practice of teaching design and technology (The designer and society).	1.8.1 develop a personal Professional Development Plan (PDP) in the field of Design and Technology Education. 1.8.2 Identify accredited education and training providers to be considered in relation to their own PDP. 1.8.3 initiate arrangements for supporting the implementation of the PDP. 1.8.4 evaluate own actions or performance and make judgements about what to do to improve.

	1.8.5 initiate ideas and seek support to improve performance.
1.9 Demonstrate advanced knowledge and skills in guiding the designing of products or services (Design practice).	1.9.1 Conduct advanced design research to solve a design challenge. 1.9.2 Design a solution to an identified design challenge. 1.9.3 Make a prototype that satisfies the design challenge. 1.9.4 Organise a design exhibition to showcase the solution to stakeholders.
1.10 Demonstrate an advanced application of design research knowledge and skills in teaching and learning the design of products, services, strategy and systems (The designer and society and design analysis)	1.10.1 Conduct advanced design education research to inform design and technology education and create a design driven economy. 1.10.2 Design a solution and/or strategy to an identified need at individual, community, national and international level. 1.10.3 Guide to make a prototype that satisfies the need identified. 1.10.4 Organise a design exhibition to showcase the solution to stakeholders and provide public education. 1.10.5 Document the design education research processes into a design education research report to inform policy directions, practice, and education

SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [6]	Level [7]	Level [8]	
FUNDAMENTAL COMPONENT Subjects/ Courses/ Modules/Units	Geometrical Optics and Mechanics, Vibrations Waves	10			10
	Design Mathematics	10			10
	Computer Skills Fundamentals	10			10
	Introduction to Communication and Academic Literacy Skills	6			6
	Electricity, Magnetism and Elements of Modern Physics	10			10
	Academic and Professional Communication	9			9
CORE COMPONENT Subjects/Courses/ Modules/Units	Design Fundamentals	10			10
	Elements and Principles of Design	10			10
	Design Materials and Processes	16			16
	Graphical Communication	16			16

	Design for Sustainability	10			10
	History of Art and Design	9			9
	Product Design Studio: Electronics	10			10
	Foundations of Development Psychology	9			9
	Graphical Communication and Multimedia	10			10
	Product Styling	10			10
	Physical Ergonomics	10			10
	Design Studio: Structures and Mechanisms	10			10
	Historical, Philosophical and Sociological Foundations of Education	9			9
	Industrial Design Attachment	8			8
	Computer-Aided Design Fundamentals		10		10
	Design Research		10		10
	Product Design and Analysis		11		11
	Occupational Health and Safety in Design		10		10

	Teaching Design and Technology		10		10
	Introduction to Educational Psychology		12		12
	Computer-Aided Design and Manufacture		12		12
	Design Control Technology		12		12
	Design Studio: Cognitive Ergonomics		15		15
	Service Design for Sustainability		12		12
	Curriculum Studies		14		14
	Design Studio: Teamwork Projects		16		16
	Classroom Assessment		15		15
	Educational Technology Basics		15		15
	Design Studio: Design for All		18		18
	Introduction to Educational Research		14		14
	Contemporary Issues in Design and Technology		14		14
	Major Design Research Project I: Research & Conceptualisation			30	30

	Research Essay in D&T Education			28	28
	Major Design Research Project II: Prototyping			30	30
	School Management			18	18
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [6]	**Level [7]**	**Level [8]**	
1.					
2.					
Electives	Design for Print Media		12		12
	Design Control Technology II		12		12
	Advanced Computer-Aided Design		12		12
	Branding & Packaging Design		12		12
	System Design for Sustainability		12		12
	Interactive Design			16	16
	D&T Curriculum Innovations			16	16

	Motion Design			16	16
	Guidance and Counselling			16	16
	Philosophical Analysis of Educational Concepts and Policies			16	16
	Measurement & Evaluation			16	16

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	**Credit Value**
NCQF Level 6	**202**
NCQF Level 7	**268**
NCQF Level 8	**180**
TOTAL CREDITS	**650**

Rules of Combination:

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

A candidate will obtain the qualification by completing:

i. Level 6 modules: 202 credits
ii. Level 7 modules: 268 credits
iii. Level 8 modules: 180 credits
iv. Electives/Options Level 7: 112 credits (Learners opt for 4 elective components at Level 7 and another 4 at Level 8 to satisfy the qualification requirements).

Total credits: 650 credits

ASSESSMENT ARRANGEMENTS

All assessments, formative and summative, leading/contributing to the award of credits or qualification should be based on learning outcomes and/or sub-outcomes. All assessors shall be registered with Botswana Qualifications Authority to ensure that assessors meet the regulatory requirement that practitioners performing this function have the capacity to do so.

Formative assessment

Formative assessment will contribute 60% towards the award of the final mark.

Summative assessment

Summative assessment will contribute 40% to the final mark.

MODERATION ARRANGEMENTS

The qualification shall have internal and external moderation following applicable policies and regulations for quality assurance to ensure fairness, validity, reliability and consistency of assessments. The moderators shall be registered and accredited by the Botswana Qualifications Authority. Moderators accredited by other authorities equivalent in mandate to BQA shall subject the qualification to external quality assurance standards as required for external examination and professional accreditation by bodies resident outside Botswana. For example, The Institution of Engineering Designers in the United Kingdom is so far the only reputable professional body which this qualification is aligned to its professional ethos.

RECOGNITION OF PRIOR LEARNING

Learners may submit evidence of prior learning and current competence and/or undergo appropriate forms of RPL assessment for the award of credits towards the qualification in accordance with applicable RPL policy, credit accumulation and transfer system and relevant national-level policy and legislative framework.

CREDIT ACCUMULATION AND TRANSFER

The Credit Accumulation and Transfer is for award of the qualification as per the regulations and policies of the provider and the awarding body in line with national policies.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Articulation related qualifications of a similar level (**NCQF Level 8**) that graduates may progress to:

Bachelor of Science (Hons) Design and Technology; Bachelor of Science (Hons) Secondary Design and Technology; Bachelor of Education (Hons) Technology and Design with Education; Bachelor of Education (Hons) (Secondary) with Technology and Design; Bachelor of Education (Hons) Design and Technology Education; Bachelor of Science Technology Education

Vertical Articulation (NCQF Level 9)

Master of Science Design and Technology;
Master of Science (Secondary) Design and Technology;
Master of Education Technology and Design with Education;
Master of Education (Secondary) with Technology and Design;
Master of Education (Design and Technology Education);
Master of Science Technology Education.

Employment:

Teacher of Design & Technology;
Technological Researcher;
Product designer;
systems and services entrepreneur;
Technology education trainers;
development practitioners;
curriculum specialists;
Educational researcher.

QUALIFICATION AWARD AND CERTIFICATION

Minimum standards of achievement for the award of the qualification

To be awarded a Bachelor of Design (Honours) Design and Technology Education, a learner should have satisfied all exit learning outcomes, met the minimum credit requirements (650 credits) which is made up of fundamental/core/elective components as indicated in the qualification structure.

Certification

For a leaner to be awarded a Bachelor of Design (Honours) Design and Technology Education qualification, he/she should have achieved a minimum of 650 credits. After satisfying all the requirements, a learner will be awarded a certificate of a Bachelor of Design (Honours) Design and Technology Education.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

The qualification was compared against the regional qualifications at the Durban University of Technology (https://www.dut.ac.za/) and Central University of Technology (https://www.cut.ac.za/) (South Africa) and internationally at the University of Newcastle, Australia (https://www.newcastle.edu.au/) and the University of Sunderland (https://www.sunderland.ac.uk/), UK. The qualification was compared with qualifications from the universities as mentioned above and the following is a summary of comparison.

The main similarities observed include:

- All qualifications are at NCQF Level 8 or comparable, and the award is an Honours Degree. The titles of the qualifications follow a similar format of qualification prefix (e.g., BSc), then Honours followed by the specialisation.

- The modules and domains are similar in focus. The focus is on teaching design and technology or technology in the education context.
- Prepare candidates for the following: teaching at the secondary school level, professional industry practice, working in community projects and conducting educational research and design and technology education research.
- The assessment criteria cover a similar spread inclusive of tests, practical projects, examinations, teaching practice/workplace assessments and research report/dissertation

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Differences

- There are no significant differences between the proposed University of Botswana qualification with those of the United Kingdom and Australian universities. However, the following are noted.
- The durations are different depending on the credit loading and the structure of the qualifications.
- The Durban University of Technology and the Central University of Technology offer 1 Year NQF Level 8 programmes with 120 credits. Even though this is a shorter duration when compared to the proposed qualification, the qualifications still compare with it in terms of exit level outcomes, purpose, and focus on teaching design and technology or technology education. The structure is not the same as the that of the University of Newcastle, the University of Sunderland and the qualification being developed.
- The University of Newcastle, Australia and the University of Sunderland offer 4-year long straight Bachelor's Honours Degrees. The exit qualification is an Honours after accumulating enough credits at the end of the fourth year. In the AQF, Australia an Honours of this type is 330 credits. In the FHEQ, UK it is 360 credits. In the NCQF, Botswana it is 600 credits.

The proposed qualification compares more favourably with the qualification at The University of Newcastle and to a greater extent with the one at Sunderland University. The Australian AQF Level 8 is similar to Botswana's NQCF Level 8 and FHEQ Level 6 in the UK. However, both the AQF and FHEQ have far less credits when compared to the credits for a similar qualification structure in Botswana's NCQF. This qualification offers learners the opportunities to learn industrial design practice while at the same time reading towards a teaching qualification by providing core education courses integrated into the programme across the years. In the final year, the Honours thesis is offered in both semesters, together with professional placement. Learning in the Honours year is meant to develop individual students' organisational and negotiation skills. They consult staff and other stakeholders about generating ideas and critical thinking during their design research project. The research focus of this qualification gradually builds up to the Honours year.

The proposed qualification is tailored to prepare learners to be teachers of Design and Technology at the secondary school level, but with added skillsets to allow them to practice and work as researchers in the technology education environment. International best practice is to have a straight Bachelor Honours qualification as is the case with the qualifications at the University of Newcastle, Australia and the University of Sunderland, UK. This makes mobility of graduates for vertical articulation at international universities possible with no need for a bridging course. Both qualifications are registered with the respective Teaching Councils in Australia and in the UK. The Botswana Teaching Council has not started registering qualifications. The qualification will be registered accordingly. The assessment criteria are similar to the other qualifications. The proposed qualification has an added advantage: it equips graduates with skills to venture into entrepreneurship. Students can go to internships to design industry and teaching practice during the learners' study period. Therefore, the qualification builds holistic and versatile graduates. The research focus of the qualification also intensifies as learners go into the Honours year with two

research projects on Design and Technology Education and Design research, conceptualise and prototype project. This is a unique qualification with double research projects of an applied focus (design practice) and informative focus (design education). In the former, the outcome is a tangible prototype of a product, service or system, while the latter is a research dissertation.
REVIEW PERIOD
The qualification will be reviewed every five years

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**	