

BQA NCQF QUALIFICATION TEMPLATE

SECTION A: QUALIFICATION DETAILS																		
QUALIFICATION DEVELOPER (S)			Orapa Technical College															
TITLE		Certificate V in Heavy Plant Mechanics								NCQF LEVEL		5						
STRANDS (where applicable)		N/A																
FIELD		Manufacturing, Engineering and Technology								CREDIT VALUE		398						
SUB FIELD		Engineering & 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																		
RATIONALE: Heavy Plant Mechanics is one of the trades identified as one of the priority areas for job creation in specific sectors and industries that are critical to economic growth and job creation, hence the need to prioritise training and education in this area. Orapa technical college as one of the private-sector driven TVET, and education and training provider (ETP) aims to influence programme contents and its delivery at the workplace and ensure they are specific to the local and international industries by adopting work-based learning and employer-led training which adequately prepare learners for the world of work by equipping learners with Heavy Plant Mechanics knowledge, skills, and competencies needed to work in mining, construction, government agencies and agricultural services and sectors. Ministry of Higher Education's 2025 TVET PITSO & EXPO, held under the powerful theme: "Transformative TVET – A Driver for Enhanced Innovation, Social Mobility, Employability and																		

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Entrepreneurship for Sustainable Economic Growth.” The high-level event co-hosted by Botswana’s Human Resource Development Council (HRDC) has identified TVET as the backbone of national development and government’s top priority for industrialization and job creation.

Furthermore, HRDC Priority Skills Report of March 2025, Table 23 list Heavy duty maintenance specialist as one TVET skill in High demand in Botswana. This is one of the skills that are informed by the strategic direction of the socioeconomic development of our country as per the National Development Strategy (2024 to 2030).

The proposed qualification, Certificate V in Heavy Plant Mechanics is meant to provide the need skilled workforce to drive our country’s economic growth and diversification.

PURPOSE: (itemise exit level outcomes)

The purpose of the qualification is to produce graduates with a broad technical knowledge, skills and competence to:

1. Apply occupational health, safety, and environmental practices to ensure safe working conditions in line with national and international standards.
2. Perform maintenance on heavy plant equipment as per original equipment manufacturer standards.
3. Diagnose, analyse and rectify faults in heavy plant equipment to optimise equipment performance.
4. Apply knowledge and techniques of engineering drawing to produce components according to engineering drawing standards.
5. Carry out heavy plant equipment components overhaul and assembly as per original equipment manufacturer standards.
6. Apply business principles to shift focus from producing mere workers to fostering entrepreneurship spirit.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- A minimum of Certificate IV, NCQF Level 4 or equivalent
- OR
- Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) will be used for access in line with ETPs and national policies on RPL and CAT.

Admissions process is open to all students / youth of Botswana and reasonable accommodation will be undertaken to support learners with diverse needs.

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SECTION B

QUALIFICATION SPECIFICATION

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GRADUATE PROFILE (LEARNING OUTCOMES)	ASSESSMENT CRITERIA
1. Execute health and safety measures to ensure compliance in a heavy plant workshop environment.	1.1. Identify potential hazards in the workplace according to the set safety procedures. 1.2. Evaluate risks associated with identified hazards to assess their impact. 1.3. Employ appropriate controls to mitigate hazards.
2. Troubleshoot heavy plant equipment systems to effect repairs.	2.1. Diagnose heavy plant equipment using equipment tools and manuals 2.2. Identify possible causes to the faults and make a conclusion. 2.3. Recommend repair actions on equipment and systems as per the identified faults.
3. Carry out repair and maintenance of heavy equipment and machinery as per set out repair and maintenance procedures.	3.1. Plan for maintenance on systems and components as per original equipment manufacturer's specifications. 3.2. Carry out systems and component disassembly and assembly in accordance with original equipment manufacturer's specifications. 3.3. Use service equipment and tools to perform repairs on heavy plant equipment as per the set procedures. 3.4. Use constructional arrangements, functions, and operations of systems and components to repair and service machine systems according to set standards.
4. Apply engineering mathematics skills to solve heavy equipment machine systems problems.	4.1. Perform problem solving calculations to solve heavy equipment systems problems. 4.2. Employ engineering mathematical concepts and principles in accordance with repair and maintenance procedures.

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	4.3. Perform technological related mathematical calculations to solve heavy equipment system problems.
5. Apply engineering drawing techniques to solve heavy plant equipment systems, constructional and functional problems.	5.1. Develop, read, and interpret engineering drawings to solve machine systems problems. 5.2. Use engineering drawings to solve heavy equipment system problems. 5.3. Diagnose constructional and functional problems using engineering drawing techniques.
6. Address and control pollution in heavy equipment industry as per regulations.	6.1. store used petroleum products according to the set standards. 6.2. dispose used hydrocarbons products according to the set standards. 6.3. Analyse air pollution to check adherence to heavy equipment industry control measures. 6.4. Implement, monitor policies and procedures for environmentally sustainable work practices.
7. Demonstrate knowledge of Entrepreneurial principles in the workplace.	7.1. Employ effective oral, written and electronic communication strategies in all business operations. 7.2. Apply business principles according to Competency-based Economics through Formation of Enterprises (CEFE) methodology for the Start-up and Management of a small business.

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	7.3. Apply accounting concepts and methods for evaluating the financial position and performance of the business. 7.4. Demonstrate ability to manage business and solve entrepreneurial problems. 7.5. Work with Computer Applications for creating documents, record business transactions and prepare documents for presentation.
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SECTION C		QUALIFICATION STRUCTURE			
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [3]	Level [4]	Level [5]	
FUNDAMENTAL COMPONENT Subjects/ Courses/ Modules/Units	<i>Safety, Health & Environment</i>		5	5	10
	<i>Business communication skills</i>		3	5	8
	<i>Mechanical fasteners</i>			5	5
	<i>Technical drawing 1</i>		5		5

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	<i>Technical Mathematics 1</i>		5		5
	<i>Engineering tools and equipment</i>			5	5
CORE COMPONENT Subjects/Courses/ Modules/Units	<i>Technical mathematics 2</i>			15	15
	<i>Technical drawing 2</i>			15	15
	<i>Engine systems</i>			10	10
	<i>Steering, chassis and suspension systems</i>			10	10
	<i>Braking systems</i>			10	10
	<i>Basic vehicle electrical systems</i>			10	10
	<i>Cooling systems</i>			10	10
	<i>Bearings and lubrication system</i>			10	10
	<i>Fuel systems</i>			10	10
	<i>Transmission systems</i>			15	15
	<i>Hydraulics</i>			10	10
	<i>Undercarriage</i>			10	10
	<i>Pneumatics</i>			5	5
	<i>Heating ventilation and air conditioning</i>			10	10
	<i>Professional business practice</i>			15	15
	<i>Maintenance practices</i>			5	5

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	<i>Industrial Attachment</i>			180	180
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	Credits Per Relevant NCQF Level			Total Credits
		Level []	Level []	Level [5]	
1.					
2.					
Electives (Choose One)	<i>Basic Welding</i>			10	10
	<i>Basic Rigging</i>			10	10

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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL

TOTAL CREDITS PER NCQF LEVEL

NCQF Level	Credit Value
4	18
5	380
TOTAL CREDITS	398

Rules of Combination:

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

This qualification consists of the following:

- Fundamental Components offering both NQF level 4 and 5.
- Core Components at NQF level 5.

To be awarded the Qualification, learners are required to obtain a minimum of 398 credits as detailed below:

Fundamental Components:

The Fundamental components consist of foundational knowledge in key skills modules to the value of 38 credits all of which are compulsory.

Core Components:

The core components consist of modules containing applied knowledge, practical and workplace skills in Heavy Plant Mechanics vocation to the value of 360 credits which are compulsory, inclusive of two mandatory electives.

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ASSESSMENT ARRANGEMENTS

Assessment will include both summative and formative assessments modes.

- Formative will contribute 60% to the overall coursework.
- Summative assessment will constitute 40% of the overall coursework.

Assessment will be carried out in accordance with the BQA requirement and institutional policies.

MODERATION ARRANGEMENTS

The sole purpose of moderation is to make sure that assessment and marking is fair, valid and reliable. It aligns the assessment tools to the outlined learning outcomes, that it is set at an appropriate level of study and that the process of marking is consistently done.

- There will be both internal and external moderation.
- Moderation for assessment shall be carried out by BQA accredited moderators.

RECOGNITION OF PRIOR LEARNING

There will be provision for awarding the qualification through RPL mode in line with national RPL policy.

CREDIT ACCUMULATION AND TRANSFER

There will be provision for award of the qualification through Credit Accumulation and Transfer (CAT) in accordance with ETP and national policies on CAT.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

This qualification is designed to facilitate horizontal, vertical and diagonal progression both locally and internationally.

Horizontal Articulation

- Certificate V in Motor Vehicle Engineering
- Certificate V in Auto Electrics Engineering

Vertical Articulation

- Diploma in Heavy Plant Engineering
- Diploma in Automotive Engineering
- Diploma in Mechanical Engineering

Diagonal Articulation

- Diploma in Vocational Education and Training

Employment Pathways

- Heavy Plant Mechanics Artisan
- Construction Equipment Mechanic
- Diesel Mechanic

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QUALIFICATION AWARD AND CERTIFICATION

Upon successful completion of 398 credits for this qualification the learner will be awarded the Certificate V in Heavy Plant Mechanics with issuance of certificate and transcript.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

International comparison for Certificate V in Heavy Plant Mechanic NQF Level 5 was conducted against regional and international countries known to have good reputation for the provision of heavy plant mechanic in South Africa and India respectively.

Heavy equipment's are used all over the world in construction, mining, forestry and agriculture; and are supplied by large multinational corporations such as Caterpillar, Komatsu and Volvo, all providing maintenance and repair specifications which are standards for maintenance and repair activities. These standards represent best practice and dictate the level and depth of training required to equip trained heavy plant mechanics to meet them.

Regionally: Development Quality Partner - MERSETA (South Africa) - Occupational Certificate: Heavy Equipment Mechanic NQF Level 4

And:

Internationally: Apprenticeship Training Scheme (ATS), India - Mechanic Repair & Maintenance of Heavy Vehicles NSQF Level 5

Similarities and Differences

The Certificate V in Heavy Plant Mechanics developed by Orapa Technical College has been compared against both regional and international qualifications to ensure its relevance, rigour, and alignment with occupational and educational standards. Regionally, the qualification was benchmarked against SAQA QUAL ID: 97582 Occupational Certificate: Heavy Equipment Mechanic (NQF Level 4) from South Africa, while internationally, it was compared to NSQF Level 5 Mechanic Repair & Maintenance of Heavy Vehicles offered under India's Apprenticeship Training Scheme.

The comparison revealed strong similarities in the qualification structures, which include compulsory Knowledge Modules, Practical Modules, and Work Experience Modules. All qualifications share a common focus on developing competencies related to the maintenance, diagnosis, and repair of heavy equipment systems. Furthermore, they are all situated within the broader Manufacturing, Engineering, and Technology field, specifically under the subfield of Engineering and Engineering Trades.

However, a few differences were also observed. The Botswana qualification is pitched at Level 5, whereas the South African equivalent is at NQF Level 4, and the Indian qualification is positioned at NSQF Level 5. The entry requirement for the Botswana qualification is higher (Level 4), compared to

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the South African qualification, which starts at Level 1 with foundational Maths and Science. In terms of progression, the South African qualification leans more towards machining-related specialisations, while the Botswana qualification focuses more extensively on heavy plant and mechanical systems.

Despite these differences, the developed qualification in Botswana is found to be at par with both regional and international standards. The educational pathways offered are consistent with those in South Africa and India, allowing for vertical articulation into qualifications such as National Certificate: N4 Engineering Studies and Diploma in Diesel Mechanics (NQF Level 5). Similarly, horizontal articulation is possible with related occupational certificates such as Diesel Mechanic, Automotive Motor Mechanic, and Motorcycle Mechanic, ensuring that graduates are not limited in their educational progression.

In terms of career pathways, the qualification enables graduates to pursue employment as Heavy Plant Mechanics, General Mechanics, or Diesel Technicians, roles which are similarly defined in the comparator qualifications from South Africa and India.

In conclusion, the Certificate V in Heavy Plant Mechanics is comparable in depth, structure, and outcomes to the referenced qualifications. It offers a robust foundation for both employment and further education, and therefore does not disadvantage its graduates in terms of mobility or professional development, either regionally or internationally.

REVIEW PERIOD

This qualification shall be reviewed after five (5) years from the date of registration. Should there be a need for a review of the qualification before the elapse of the stated period, the review process shall be carried out, and all the concerned stakeholders will be involved in the process.

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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	