

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARD**

**FOR**

**MOTORCYCLE MECHANIC**

**KNQF LEVEL 3**

**PROGRAMME CODE: 0716 254A**

# FOREWORD

The provision of quality education and training is fundamental to the government’s overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya’s development blueprint, Vision 2030 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted in the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training.

This policy document requires that training in TVET institutions be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery to allow for multiple entry and exit in TVET programmes. These reforms demand that industry takes a leading role in occupational standards development to ensure it addresses competence needs.

It is against this background that these Occupational Standards have been developed for a competency-based Automotive Engineering standard. These Occupational Standards will also be the basis for assessment of an individual for competence certification.

It is my conviction that these Occupational Standards will play a key role towards development of competent human resource for the engineering sector’s growth and development.

# PREFACE

Kenya Vision 2030 aims to transform the country into “a newly industrializing, middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace competency-based education and training (CBET).

The Technical and Vocational Education and Training (TVET) Act CAP 210A and Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labor force.

Incumbent Automotive engineering industry experts in conjunction with expert subject trainers and other related stakeholders have developed these Occupational Standards for Motorcycle Technician Level 3. These standards will be the basis for development of competency-based curriculum for Motorcycle mechanic Level 3.

The Occupational Standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.

I am grateful to everyone who participated in the development of these Occupational Standards.

# ACRONYMNS

**KCSE** Kenya Certificate of Secondary Education

**KNQA** Kenya National Qualifications Authority

**TVETA** Technical, Vocational Education and Training Authority

**ISCED**  International Standard Classification of Education

**ICT** Information Communication Technology

**RPL** Recognition of Prior Learning

**PPE** Personal protective Equipment

# KEY TO UNIT CODE



TABLE OF CONTENTS

[FOREWORD ii](#_Toc196922175)

[PREFACE iii](#_Toc196922176)

[ACRONYMNS iv](#_Toc196922177)

[KEY TO UNIT CODE v](#_Toc196922178)

[OVERVIEW vii](#_Toc196922179)

[SUMMARY OF UNITS OF COMPETENCY vii](#_Toc196922180)

[CORE UNITS OF COMPETENCY 1](#_Toc196922181)

[MAINTAIN MOTORCYCLE ENGINE 2](#_Toc196922182)

[MAINTAIN MOTORCYCLE FRAME 8](#_Toc196922183)

# OVERVIEW

The Motor cycle mechanic level 3 qualification consists of competencies that a person must achieve to enable him/her to service and maintain motorcycles. It includes applying workplace essential skills, maintaining motorcycle engine and maintaining motorcycle frame.

The units of competency comprising Motor cycle mechanic certificate Level 3 qualification include the following competencies:

# SUMMARY OF UNITS OF COMPETENCY

|  |  |
| --- | --- |
| **UNIT CODE** | **UNIT TITLE** |
| 0716 251 01A | Maintain Motorcycle Engine |
| 0716 251 02A | Maintain Motorcycle Frame |

# CORE UNITS OF COMPETENCY

# MAINTAIN MOTORCYCLE ENGINE

**UNIT CODE: 0716 251 01A**

**UNIT DESCRIPTION**

This unit specifies competencies required to service and repair Motorcycle engine. It involves Carrying out motorcycle engine overhaul, servicing motorcycle transmission system and servicing motorcycle fuel system.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| 1. Perform motorcycle engine overhaul | 1. Work area is organised and safety measures undertaken before use as per workplace procedure. 2. Engine diagnosis is carried out as per Manufacturer’s specification 3. ***Engine overhaul Tools, equipment and materials*** are assembled as per work requirements. 4. ***Engine components*** are dismantled according to manufacturer’s manual 5. Engine parts are serviced/Replaced according to manufacturer’s specification 6. Motorcycle engine parts are reassembled according to manufacturer’s manual |
| 1. Service motorcycle fuel system | 2.1 Work area is organized and safety measures  undertaken before use as per workplace procedure.   * 1. Motorcycle Fuel system is diagnosed as per Manufacturer’s specification.   2. Tools, equipment and materials are assembled as per work requirements   3. ***Engine fuel system components*** are inspected according to manufacturer’s manual   2.5 Engine fuel system Components are serviced/replaced according to manufacturer’s specifications. |
| 1. Service motorcycle transmission system | * 1. Work area is organised and safety measures undertaken before use as per workplace procedure   2. Tools, equipment and materials are assembled as per work requirements   3. ***Motorcycle transmission system*** is assessed according to manufacturer’s specifications.   4. Motorcycle transmission system is overhauled according to manufacturer’s specifications.   5. Motorcycle transmission system is service/replaced according to manufacturer’s specifications. |
| 1. Perform Motorcycle Engine Periodic Maintenance | * 1. Work area is organised and safety measures undertaken before use as per workplace procedure.   2. General ***workshop tools*** are assembled as per work procedure   3. ***Periodic maintenance*** is carried out as per manufacture’s specifications.   4. Waste materials are disposed as per the work environment standards. |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Periodic maintenance | * Oil change * Changing air, oil and fuel filters * Components cleaning * Greasing & lubrication * Visual inspection of components * Wear & tear parts |
| 1. Engine overhaul Tools, equipment and materials | * Spanners * Torque wrench * Valve compressor * Pliers * Filler gauge * Compression tester * Ring squeezer * Timing light * Oil * Funnels and draining pans * Cleaning materials * Plasti gauge |
| 1. Motorcycle transmission system | * Gearbox unit * Clutch unit * Chain and sprocket |
| 1. Engine components | * + Oil seals and oil filters   + Piston and piston rings   + Top covers   + Valves, push rods and valve lifters   + Camshaft   + Gasket   + Crankshaft   + Oil sump and oil pump   + Timing gears   + Timing chain   + Cylinder head   + Cylinder block   + Air cleaners   + Manifolds   + Throttle valves   + Cooling fins |
| 1. Engine tune up | * Engine ignition timing * Camshaft timing * Tappet clearance |
| 1. Re-installation checks | * Oil level * Exhaust system checks * Fuel tap and lines * Oil Leaks * Gasket * Seals * Running the engine |
| 1. Engine lubrication components | * Oil sump * Oil filters * Lubrication sensors * Oil galleries |
| 1. Engine fuel system components | * Carburettor * Throttle Cables |

**REQUIRED KNOWLEDGE AND SKILLS**

***The individual needs to demonstrate knowledge of:***

* Kenyan legislation and workplace procedures relevant to:
* Health and safety
* Environment
* Personal protective equipment
* Waste management
* Legal requirements relating to the motorcycle warranty
* Workplace procedures for motorcycle engine overhaul.
* Documenting assessment and rectification information
* Working to agreed time frame and keeping others informed of progress
* The relationship between time, costs and profitability
* Interpretation and use of technical information for engine service activities
* The purpose of and how to use identification codes

**Required Skills**

*The individual needs to demonstrate the following skills*:

* Communication (verbal and written)
* ICT
* Time management
* Problem solving
* Decision making
* Planning
* First aid
* Report writing
* Interpreting technical information

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | 1. Organised Work area and undertook safety measures before use as per workplace procedure. 2. Carried out ***Periodic maintenance*** as per manufacture’s specifications. 3. Serviced/Replaced Engine parts according to manufacturer’s specification 4. Tuned up Engine according to manufacturer’s specification 5. Service/replaced ***Motorcycle transmission system*** according to manufacturer’s specifications. 6. Serviced/replaced fuel system Components according to manufacturer’s specifications. 7. Disposed waste materials as per the work environment standards. |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Resources relevant to the proposed assessment activity or tasks. |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   * 1. Practical   2. Project   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of Assessment | Competency may be assessed in a workplace or in a simulated workplace |
| 5. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended |

# MAINTAIN MOTORCYCLE FRAME

**UNIT CODE: 0716 251 02A**

**UNIT DESCRIPTION**

This unit specifies competencies required to Service motorcycle braking system, service motorcycle wheels and tyres, service motorcycle suspension components and service motorcycle steering System.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| 1. Service motorcycle braking system | * 1. Work area is organised and safety measures are undertaken per workplace procedure   2. ***Motorcycle braking system components are*** inspected according to manufacturer’s manual   3. Motorcycle braking system components are serviced/replaced according tomanufacturer’s specifications***.***   4. Motorcycle brakingsystem is tested according tomanufacturer’s specifications   5. Brake system waste disposal is disposed according to the environmental standards. |
| 1. Service motorcycle wheels and tyres | * 1. Work area is organised and safety measures undertaken as per workplace procedure   2. ***Wheels and tyres tools, equipment and materials*** are assembled as per work requirements   3. ***Wheels and tyres*** are inspected as per service manual   4. motorcycle tyres are serviced according to service manual   5. wheels are Balanced according to service manual   6. Wheels are aligned according to service manual   7. Worn out tyres are disposed according to the environmental standards. |
| 1. Service motorcycle suspension system components | * 1. Work area is organized as per workshop procedures.   2. Tools, equipment and material are selected as per task requirements.   3. Motorcycle suspension system is inspected as per service manual   4. Motorcycle suspension system is diagnosed as per the service manual   5. Motorcycle suspension system is tested as per service manual |
| 1. Service motorcycle steering System | 1. Work area is organized as per workshop procedures. 2. Motorcycle steering system is inspected as per task requirements. 3. Motorcycle steering system is diagnosed as per service manual. 4. Motorcycle steering system is serviced as per service manual. 5. Motorcycle steering system is tested as per task requirements. |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Wheels and tyres | * + Tubeless   + Tubed tires   + Wire spoke wheels |
| 1. Wheels and tyres tools, equipment and materials | * + Wheels   + Tires   + Air compressor   + Tire pressure gauge   + Tire levers   + Patches   + Vulcanizing glue   + Tubeless tire repair kit   + Soapy water |
| 1. Motorcycle braking system component*s* | * + Brake pads   + Brake drum   + Brake shoe   + Brake lining   + Brake discs   + Brake calipers   + Brake fluid lines   + Fluid reservoirs   + Brake switch   + Brake cable   + Brake lever   + Brake pedal |

**REQUIRED KNOWLEDGE AND SKILLS**

This section describes the knowledge and skills required for this unit of competency.

**Required knowledge**

* Legislative and organizational requirements and procedures
* Kenyan legislation and workplace procedures relevant to
* Health, safety, environment and quality
* The environment (including waste oil and replaced materials disposal
* Personal and motorcycle protective equipment.
* Workplace procedures for:
* recording fault location and correction activities;
* reporting the results of tests;
* the referral of problems;
* The importance of working to recognized assessment and rectification procedures and obtaining the correct information for rectification.
* The importance of documenting assessment and rectification information.
* The importance of working to agreed timescales and keeping others informed of progress.
* The relationship between time, costs and profitability.

**Motorcycle body works principles**

* The functions of motorcycle body components
* Maintain motorcycle body
* Use motorcycle body workshop tools
* Legal requirements concerned with the disposal of wastes

**Required skills**

The individual needs to demonstrate the following skills:

* Communications
* Planning;
* Decision making;
* First aid;
* Diagnosis
* Analytical
* Report writing
* Motorcycle suspension components service
* Motorcycle steering system service
* Motorcycle wheels and tyres service

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency. | ***Assessment requires evidence that the candidate:***   1. Organised Work area and undertook safety measures before use as per workplace procedure. 2. Serviced motorcycle tyres according to service manual 3. Disposed Worn out tyres as per the environmental safety procedures 4. Serviced/replaced motorcycle braking system components according tomanufacturer’s specifications***.*** 5. Tested motorcycle brakingsystem according tomanufacturer’s specifications |
| 1. Resource Implications | The following resources should be provided:  2.1 Workplace: Real or simulated work area  2.2 Appropriate Tools & equipment  2.3 Materials relevant to the activity |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   * 1. Practical   2. Project   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of Assessment | Competency may be assessed in a workplace or in a simulated workplace |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended |

# 