Relevant Occupation/trade title: Electrician	**SAQA ID:** 91761	
Learning Area 3: Use and care for basic portable measuring and testing equipment	**Total Hours:**	**56**
Learning Project 1: Select, operate and maintain electrical test instruments	**Total Hours:**	**40**
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):	• LA 1 (LP 2,3, 5, 7, 9, 10)	
Learning project description: Test the required three-phase low voltage AC circuit to locate a fault by using portable electrical measuring and testing equipment		

Activity phase	Practical Skills Modules Content	Underpinning Knowledge Module Content	Work Experience Module Content	Didactical-methodological advice	Learning materials/Tools and Equipment
Reference to QCTO Curriculum	PM-01-PS03	KM02- KT02	WM-None		
Planning/ Preparation	**Provide access to (Given):** Electrical testing- and measuring instruments and electrical equipment required to apply testing on as per last column **Apprentices must be able to do/perform the following (hard and soft) skills:** **Prepare to operate measuring and testing equipment** • Identify and confirm scope of work requirements • Perform risk assessment on the work assignment, identify occupational health and safety requirements and take appropriate	**Knowledge of:** • Different types of testing- and measuring instruments and their uses • Safety precautions regarding correct use of electrical testing and measuring instruments • PPE in the use of testing and measuring equipment • Statutory requirements in relation to testing instruments • Testing Techniques • Standard operating procedures for measuring instruments • Calibration and related legal requirements • OHSA, Mining Act,	**Under supervision:** • Prepare testing and measuring equipment to obtain specific readings • Perform risk assessment on testing and measuring equipment • Operate commonly used measuring and testing equipment required in the work environment • Interpret readings and report findings • Verify the functionality of various testing and measuring equipment • Store test and measuring equipment record and report any defects • Engage in regular	• Research /Desk study • Case studies /scenarios • Technical discussions • Group work • Lecture/ instructions • Presentations • Textbook work	**Print materials, electronic files, software applications incl.:** • OHS Act • Text books • Manufacturer catalogues and manuals • Training manuals for trainers and apprentices incl. multimedia software • Set of presentation aids (videos, slides) for overhead or LED/LCD projectors **Range of Electrical**

	precautions • Source and use procedures and instructions, including workshop manuals and specifications to determine work requirements • Select measuring methods appropriate to the circumstances • Source and obtain correct measuring instruments needed for testing/ measurement • Test functionality of measuring instruments and report malfunctions to appropriate personnel • instruments and devices • Select and correctly fit personal protective equipment (PPE)	Municipal By-laws • Safe operation of common measuring and testing equipment • Reading and interpretation of measuring results **<u>Type of tests to be conducted include:</u>** • Continuity • Insulation Resistance • Resistance / Inductance • Voltage AC / DC • Polarity • Capacitance • Current (AC / DC) • Wave identification • Reporting requirements and work documents related to the operation of measuring instruments • Housekeeping procedures	housekeeping activities, tool and equipment maintenance		**<u>testing and measuring instruments to be covered (minimum):</u>** • Insulation Resistance Tester • Line Tester • Multi meter • Clamp on ammeter (Tong tester) • Phase Rotation tester • Oscilloscope • Capacitance Tester **<u>Testing of a variety of components / circuits & equipment</u>** • Windings • Inductors • Resistors • Circuits • Capacitors • Diodes • Power Supplies • Switching Devices
Implementation/ Execution	**Test three phase low voltage Operate measuring equipment and analyse results** • Correctly use appropriate personal protective equipment (PPE) • Ensure that the circuit /installation is isolated and locked out • Conduct measurements/ testing (under power on – with supervision/power off conditions) according to given instructions and				

	without damage to the instruments, circuits, the surrounding environment or services • Obtain readings and compare measurement results with specifications to indicate compliance or non-compliance • Document measurements and make recommendations in line with given instructions • Process and report test findings to appropriate personnel				
Evaluation/ Documentation	**Complete testing, store, maintain and care of test/ measuring devices** • Conduct housekeeping activities • Access and interpret information required for testing/ measuring instrument maintenance from manufacturer specifications • Check testing/ measuring instruments against manufacturer recommendations and confirm selection of appropriate maintenance methods • Complete testing/ measuring instrument tests without causing damage to component or system				

	• Tag and remove faulty testing/measuring instruments from service • Record and report any defects and malfunctions of test instruments • Maintain, store and secure testing/ measuring instruments • Finalise workplace documentation				
Total	Hours: 40				
Specialisation additions	Equipment that requires authorisation				

Assessment guidance

- **Self-assessment**
- **Group assessment**
- **Theory test**

Criteria for assessment:

- Observing workplace procedures relating to the use and maintenance of testing/measuring instruments
- Identifying and selecting of test/measuring instruments is as per work assignment
- Selecting approved measurement methods and techniques
- Caring and storing of testing/measuring instruments
- Testing/measuring a variety of common variables using a range of relevant testing/measuring instruments
- Accurate interpreting and recording of findings
- Checking the validity of the calibration of the testing/measuring instruments
- Validate accuracy of testing/measurement against calibrated instrument
- Using appropriate PPE