1. Module details

Module name

Electrical Installation — Testing & Verification

Suggested structured learning time

A learner possessing the prerequisite skills and knowledge should achieve the module purpose in 18 to 20 hours.

Module code

NUE408

Discipline code

0703101

2. Module purpose

This module provides Learners with the knowledge and skills to undertake the necessary safety testing of electrical installations in accordance with regulations.

The module focuses on the responsibilities of the person undertaking the tests, the methods and procedures for conducting the tests on a whole installation and the correct method of reporting the results to the distributing authority. Also, Learners will develop knowledge and skills in applying periodic testing requirements for construction sites and inspection and testing of electrical equipment.

3. Learning pathway

Intended use in the structured learning program

This module intended to supplement extensive workplace exposure to electrical installation work. In particular it applies to testing electrical installations to ensure they comply with requirements and are safe to use. Therefore before undertaking this module an apprentice should have a clear understanding and experience of the electrical distribution systems in buildings and premises and how the fundamental principles for safety apply.

Recommended prerequisites

For the most effective learning this module should be undertaken only after modules in applied electrical theory and electrical installation practices and processes have been completed.

4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills in the ‘Evidence Guide’ of specific units of competency in the National Electrotechnology Training Package and provides similar support, where mapped, to equivalent units in the National Metals and Engineering Competency Standards. For details refer to the module to unit maps, available from NUEITAB.

This module supports the development of essential capabilities required for electrical licensing.

5. Content

Summary of content

1. Legislated regulations
   - regulations
   - responsibilities
   - testing requirements
2. Testing installations
   - insulation
   - earth continuity
   - polarity
   - transposition of earth and neutral
   - identification of circuit conductors
   - operation of installation
   - fault loop impedance
   - operation of RCDs
3. Documentation
   - reporting tests
   - minimum requirements

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

Conditions of assessment

Normally learning and assessment will take place in a formal learning environment.

7. Learning outcome details

Learning outcome 1

Describe the requirements to ensure electrical installations and electrical equipment are safe in accordance with legislation and regulations.

Assessment criteria

1.1 Name the legislation and regulations that require installations and equipment to be tested to ensure they are safe.

	1.2 Identify the person/bodies responsible for the various aspects of ensuring electrical installations are safe.
	1.3 List the required results of tests that show an electrical installation is safe for connection to the supply.
	1.4 List the required results of periodic inspection and tests that show construction site wiring and equipment is safe to use.
	1.5 List the required results of periodic inspection and tests that show electrical equipment is safe to use.
Learning outcome 2	Demonstrate the ability to conduct the tests required to ensure an electrical installation and equipment is safe in accordance with legislative regulations.
Assessment criteria	2.1 Conduct tests to ensure: • insulation resistance is adequate • earth continuity is such that it will ensure the operation of protection devices under earth fault conditions • polarity of active/s and neutral for mains, submains and final subcircuits is correct • there is no transposition of earthing and neutral conductors • fault-loop impedance is sufficiently low • RCD for correct operation and sensitivity.
	2.2 Conduct tests to ensure active/s and neutral for the same circuit are clearly identified with their circuit protection device.
	2.3 Conduct tests that show all circuits and devices operate as intended.
	2.4 Conduct tests to determine the fault level at a particular point in an installation.
Learning outcome 3	Complete documentation reporting results of tests as required by local supply authorities.
Assessment criteria	3.1 Show how the results of tests conducted on an installation comply with requirements and ensure the installation is safe.
	3.2 Document the results of testing an installation as required by the local supply authority.

3.3 Document periodic inspection and testing of construction site wiring and equipment in accordance with requirement.

3.4 Document periodic testing and inspection of electrical equipment including tagging requirements.

8. Delivery of the module

Delivery strategy

Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective method to achieve this is by integration of theory and practice where students learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require a learning outcome sequence other than that indicated in the module.

Resource requirements

Resources should be sufficient for students to carry out exercises on an individual basis.

This including simulated electrical installations including consumers mains/submains, single purpose final subcircuit, separate final subcircuit, accessories and appliances, switchboard and earthing system.

Useful references include:

Pethebridge, K., and Neeson, I., 2001, *Electrical Wiring Practice*, 6th Ed, Vol.1& 2., McGraw Hill, Sydney

Standards Australia, Standards New Zealand:

AS/NZS 3000:2000 *Wiring rules*

AS/NZS 3008.1: 1998 *Electrical installations — Selection of cables*

HB300 *Electrical installations—A guide to using the wiring rules*

AS/NZS 4836 *Safe working practice on low-voltage electrical installations*

AS/NZS 3017 *Electrical Installations – Testing guidelines*

Local electricity distributor and authority regulations

	Where this module is used in an approved Traineeship or Apprenticeship program learners should be advised to obtain, where available, respective EEQSBA[1] ***User Guides*** (*these outline in detail what training and work performance the Learner is required to undertake for the program*).
Occupational health and safety requirements	A safe and healthy environment will be provided for learners and teachers. Safety procedures for the particular learning facilities shall be followed as part of the learning / teaching activity and assessment.

[1] EEQSBA – ElectroComms and EnergyUtilities Qualifications Standards Body of Australia Ltd