

**1. Module details****Module name****Telecommunication Earthing and Protection****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 - 20 hours.

**Module code**

NUE193

**Discipline code**

Electrotechnology - 0703225.

**2. Module purpose**

This module provides the student with the knowledge and skills to install telecommunication, earthing systems and overvoltage protection systems.

**3. Prerequisites**

NBB02 Occupational Health and Safety  
 NUE190 Telecommunications Standards and Regulations  
 NUE192 Telecommunications Systems Overview

**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.

**5. Content****Telecommunication overvoltage protection system**

Operating principles

Overvoltage and surge/spike suppression protection techniques

Overvoltage protection devices

Installation of overvoltage protection systems

**Earthing protection system**

MEN system

TELEX functional earth system

Telecommunication system earthing

Communication earth system

Protective earth barriers for segregation, cable tray, duct and metal equipment enclosures

**Electrical interference**

Types – RFI, EMI

Sources of interference

Techniques in reducing interference

Earthing cable shields

**Testing of systems**

	<p>Earth testing instruments Earth testing procedures</p> <p><b>Earthing Hazards</b> Safety issues to be considered with earthing and bonding</p>
<b>6. Assessment strategy</b>	
<b>Assessment methods</b>	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.
<b>Conditions of assessment</b>	Learning and assessment will take place in an environment that is conducive to a learner's development.
<b>7. Learning outcome details</b>	
<b>Learning outcome 1</b>	<b>Define the different earthing systems</b>
<b>Assessment criteria</b>	<p>1.1 Describe the Multiple Earth Neutral System of Earthing.</p> <p>1.2 Define the Communication's Earthing System.</p> <p>1.3 Describe the purpose of the Telecommunication Reference Conductor (TRC).</p> <p>1.4 Define the purpose for the earthing cable shield.</p> <p>1.5 Demonstrate the correct procedure to earth a cable shield.</p> <p>1.6 Test the telecommunication earthing system.</p> <p>1.7 Describe the purpose of protective earth barriers for segregation, cable tray, duct and metal equipment enclosures</p>
<b>Learning outcome 2</b>	<b>Describe overvoltage and surge/spike suppression protection devices.</b>
<b>Assessment criteria</b>	<p>2.1 Describe the purpose of overvoltage protection devices</p> <p>2.2 List the types of overvoltage protection devices used.</p>

	2.3	Describe the operation of various types of overvoltage protection devices.
	2.4	Define the installation techniques applicable to overvoltage protection systems
	2.5	Define the earthing requirement for each type of overvoltage protection device mentioned in 2.3.
	2.6	Describe the purpose of surge/spike suppression systems
	2.7	Describe the operation of various types of surge/spike suppression systems
<b>Learning outcome 3</b>		<b>Define Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) with respect to telecommunication services.</b>
<b>Assessment criteria</b>	3.1	Explain the principle of EMI/RFI.
	3.2	Identify EMI/RFI sources.
	3.3	Describe EMI/RFI reduction techniques.
	3.4	State reasons for earthing cable shields.
	3.5	Demonstrate effective earthing of cable shields.
<b>Learning outcome 4</b>		<b>Describe the earth testing instruments and procedures that should be applied</b>
	4.1	Explain the purpose of earth testing instruments and the parameters that are to be met
	4.2	Describe the procedure and requirements for conducting an earthing test
	4.3	Conduct a earth test utilising a range of earth testing instruments
	4.4	Analyse and record results
<b>Learning outcome 5</b>		<b>Describe hazards associated with earths for overvoltage and surge/spike suppression system</b>
	4.1	Identify hazards associated with non complying earths used in overvoltage and surge/spike suppression systems

## 8. Delivery of the module

### Delivery strategy

#### 4.2 List possible solutions

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 learning outcome sequence other than that indicated in the module.

### Resource requirements

Resources should be sufficient for students to carry out learning activities on an individual basis. This will require a range of support equipment and reference material.

*Students will require access to the following reference material or their replacement:*

- TS008
- TS009
- AS/NZS 1668
- AS1199
- AS 1670
- AS1851
- AS 2220
- AS/NZS 3000 series and related sub-standards
- AS3902
- IS11801
- TSB67
- IEEE802 and related sub-standards
- Telecommunications Act 1997 - overview
- The Building Code of Australia Volumes 1-3
- Australian Communications Authority Cabling Provider Rules – Benchmark Cabler Competency Requirements - 2000
- Communication Cabling Manual BCL Package
- Certified Components List (CCL) or replacement
- Labelling

**Occupational health  
and safety requirements**

*Specialised facilities and equipment required by the training provider include:*

- Access to a range of industrial, commercial and domestic sites
- Range of overvoltage and surge/spike suppression equipment
- Earthing equipment
- Certification and related documentation

*In addition learners will require access to:*

- Standard workshops, equipment and tools should be available for practical exercises
- Approved telecommunication tools
- Approved safety equipment
- Approved earth testing equipment

A safe and healthy environment will be provided for students and teachers as well as the particular safety procedures followed as part of the learning / teaching activity and content.