

**1. Module details****Module name****Single Wire Earth Return Systems****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**

NUE212

**Discipline code**

0703130

**2. Module purpose**

This module is designed to supply the knowledge and skills required by electricity supply industry workers to construct and maintain a single wire earth return system.

The experience gained is in the correct procedures and practices involved in preparing for and carrying out the construction of a complete SWER system.

Select and string conductors with associated hardware, install and connect SWER earthing system to Distribution and Isolation transformers. Install, commission and maintain SWER reclosers, sectionalises, transformers and regulators.

All procedures and practices comply in accordance with electricity supply industry standards, Supply Authority regulations, relevant Australian standards and OH&S regulations.

**3. Prerequisites**

NE162 Electrical Principles 3.

NUE215 Overhead Conductor Installation (Distribution).

**4. Relationship to competency standards**

This module partly addresses Unit 3.5 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing and Unit 5.1 of the Electrical Contracting Industry Award Standard (Volume 8).

**5. Content****Basic layout of the SWER system**

advantages

disadvantages

supply authority technical drawings

safety approach testing

**Insulators and conductors**

types

uses

jointing

tapping

**Forces**

vector diagrams

field calculation of a line deviation angle

conductor weight per span  
square rigging principles refresher

**Earthing**

earthing networks  
earth stakes  
installing earth stakes  
drilling rigs  
earthing improvers  
(Low-ohm, Earthrite)  
couplings and cable  
earth test values  
earth testers

**Isolating Transformers**

purpose  
construction requirements  
periodic testing of earthing networks

**Distribution transformers**

purpose  
construction requirements  
periodic testing of earthing networks

**Reclosers, sectionalisers and regulators**

purpose  
construction  
operating procedures

**Stringing theory**

tensioning  
stringing  
repairs under tension

**Insulator changing (practical)**

in line  
line angle  
vertical angle

**6. Assessment strategy**

**Assessment methods**

Short answer questions (written, oral or graphic or computer based).  
Suitable practical exercises which assess the skills required of each learning outcome.

**Conditions of assessment**

Theory room for written tests together with practical field observation.

## 7. Learning outcome details

### Learning outcome 1

**Describe and demonstrate the methods used to construct a SWER system.**

#### Assessment criteria

- 1.1 Identify conductors commonly used in a SWER system.
- 1.2 Identify and install various fittings and line hardware used within a SWER system.
- 1.3 Describe the methods used to string SWER conductor.
- 1.4 Demonstrate stringing methods.
- 1.5 Connect conductors using non tension and full tension joints/splices.

### Learning outcome 2

**Identify and install SWER Earthing Networks and explain their importance.**

#### Assessment criteria

- 2.1 List the SWER earthing networks and describe the principles of operation install and connect earthing systems to Distribution and Isolating Transformers.
- 2.2 Demonstrate the testing procedures for SWER earthing network.
- 2.3 Perform periodic test procedures isolating and distribution transformers earthing systems.
- 2.4 Define 'step potential' and describe the hazard associated with it.

### Learning outcome 3

**Explain the functions of and install SWER reclosers, sectionalisers, transformers and explain the role of regulators.**

#### Assessment criteria

- 3.1 Describe the functions of reclosers and sectionalisers.
- 3.2 Describe the operating procedure for reclosers and sectionalisers under fault conditions.
- 3.3 Explain how this relationship between recloser and sectionaliser aids fault locating.
- 3.4 Explain the functions of a isolating and distribution transformer.
- 3.5 Explain the role of a regulator on the SWER system.

**8. Delivery of the module**

**Delivery strategy**

- 3.6 Install and commission an Isolating Transformer and Distribution Transformer.
- 3.7 Install a recloser and sectionaliser.

Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose. It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning sequence other than indicated in the body of this module descriptor.

**Resource requirements**

Enterprise construction manuals  
Relevant Australian standards  
Enterprise work manuals and standing instructions  
Relevant manufacturers' equipment manuals

**Occupational health and safety requirements**

Students should be made aware of Occupational Health and Safety issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.