

1. Module details**Module name****Transmission Systems: Installation and Maintenance - B****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 54 – 60 hours.

Module code

NUE240

Discipline code

0703130

2. Module purpose

This module is designed to supply further knowledge and skills required by electricity industry supply workers to install and maintain transmission systems.

The experience gained is in the correct procedures and practices involved in preparing for and carrying out installation and maintenance on string, tensioning and terminating overhead transmission lines.

Installing ACSR lines, earthing conductors, stringing tensioning, terminating and securing overhead lines in accordance with enterprise plans, drawings and specifications. Installing conductor separation devices and anti vibration equipment.

All procedures and practices comply in accordance with Electricity Supply Industry Standards, Supply Authority regulations, relevant Australian Standards and OH&S regulations.

3. Prerequisites

NE160 Electrical Principles 1.

NUE207 Powerline Safety Practices.

NE175 Workshop Practice.

NUE236 Rigging (Basic).

4. Relationship to competency standards

This module addresses Units 2.11 and 3.5 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing.

5. Content**Types and applications of conductors**

aluminium conductor steel reinforced (ACSR)
earthing conductors

Stringing conductors

preparation
liaison and communication issues
stringing blocks
winches
hoists
cables

slings
conductor straining devices
cable carriers

Running out conductor

Tensioning

sag charts, sight boards and wave sagging
tension charts and dynameters

Terminating

compression termination
bolted termination

Tension joints

enterprise technical drawings
procedure
repairs under tension
equipment

Construction clearances

Conductor connections

connectors and clamps
compression connectors
galvanic action

Mechanical (conductor) vibration

line guards
armour rods
dampers

System access

6. Assessment strategy

Assessment methods

Short answer questions (written, oral or graphic or computer based), multiple choice questions, oral questions, observations, assignments, other recognised methods.
Suitable practical exercises which assess the skills required of the module purpose.

Conditions of assessment

Theory room for written tests together with practical field observation.

7. Learning outcome details

Learning outcome 1

Identify the content and interpret information within line construction manuals/drawings in preparation for the stringing and maintenance of transmission conductors.

Assessment criteria

- 1.1 Identify the content, page layout and information contained within associated construction manuals.
- 1.2 Identify construction types and structures used in transmission lines.
- 1.3 Identify the types, sizes and characteristics of transmission conductors.
- 1.4 Identify the types of electrical connections used to connect transmission conductors and describe the causes and affects of poor electrical connections.
- 1.5 State the minimum construction clearances required for transmission lines.

Learning outcome 2

String, tension and terminate overhead transmission conductors.

Assessment criteria

- 2.1 Identify the tools, equipment and hardware requires to string, tension and terminate transmission conductors.
- 2.2 Identify methods used to string, tension and terminate transmission conductors.
- 2.3 Identify resource requirements necessary to string, tension and terminate transmission conductors including personnel, plant, tools, equipment and transport.
- 2.4 Install stringing equipment in preparation for the stringing of transmission conductors.
- 2.5 String and tension conductors on transmission structures to the prescribed sag/tension.
- 2.6 Terminate conductors and make the appropriate electrical connections.

Learning outcome 3	Secure conductor to insulators or supports, and fit anti-vibration and conductor separation devices.
Assessment criteria	<p>3.1 Select the appropriate size and type of securing device used to secure specified conductors to insulators.</p> <p>3.2 Secure conductors to insulators or supports.</p> <p>3.3 Identify appropriate anti-vibration devices and describe the method of fitting to specified conductors.</p> <p>3.4 Fit anti-vibration devices to specified conductors.</p> <p>3.5 Identify appropriate conductor separating devices and describe the method of fitting.</p> <p>3.6 Fit conductor separating devices to specified conductors.</p>
Learning outcome 4	Maintain overhead conductors.
Assessment criteria	<p>4.1 Identify methods used to repair and replace damaged conductors.</p> <p>4.2 Repair and replace damaged conductors.</p>
8. Delivery of the module	
Delivery strategy	<p>Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose.</p> <p>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.</p>
Resource requirements	<p>Relevant Australian standards</p> <p>Enterprise work manuals and standing instructions, diagrams and layouts</p> <p>Relevant manufacturers' meter, equipment/component/instrument manuals.</p> <p>All relevant pulling and stringing equipment</p> <p>Suitable site location - poles/towers</p> <p>Samples of hardware and fittings</p> <p>Range of hardware for repair/replacement</p> <p>Range of tools and transmission equipment</p> <p>Safety equipment</p> <p>Appropriate mechanical plant</p>
Occupational health and safety requirements	<p>Students should be made aware of OH&S issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.</p>