

**1. Module details****Module name****Overhead Conductor Installation (Distribution)****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 - 40 hours.

**Module code**

NUE215

**Discipline code**

0703130

**2. Module purpose**

This module is designed to supply the knowledge and skills required by electrical supply industry workers to install and maintain overhead conductors and cables in a distribution systems. The experience gained is in the correct procedures and practices involved in preparing for and carrying out installation and maintenance work on all types of overhead conductors and cables including the appropriate hardware and accessories with reference to system plans, drawings and specifications. String, tension and terminate low voltage and high voltage conductors and cables, and pilot, control and communication cables using correct tools and equipment. All procedures and practices comply in accordance with electricity supply industry standards, enterprise regulations, relevant Australian Standards and OH&S regulations.

**3. Prerequisites**

NE160 Electrical Principles 1.  
 NUE207 Powerline Safety Practices.  
 NUE236 Rigging (Basic).  
 NE175 Workshop Practice.

**4. Relationship to competency standards**

This module addresses Unit 2.11, 3.5 and 3.6 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****Safety issues**

installing earth & short circuits  
 access permits & procedures for HV clearances

**Types of conductors**

copper  
 aluminum  
 steel  
 aluminum conductor steel reinforced (ACSR)  
 aerial bundled cables (LV/HVABC)  
 insulated unscreened cable (IUC)  
 service cable  
 pilot and control cables

communication cables

**Conductor connection**

Connectors and clamps

Compression connectors

Twisted sleeve

galvanic action

heat shrink materials (pin ties, line guards, mechanical (conductor) vibration, armour rods, twisted and preformed connections, sag)

sag charts, tables

sag versus temperature

**Stringing conductors**

positive restraints

pulling out method

paying out method

tension stringing method

stringing under live mains

**Tensioning conductors**

procedures

supports at different levels

practical aspects of tensioning

tensioning equipment

**Low voltage aerial bundled conductors**

cable types and sizes

phase identification

neutral identification

line hardware and fittings (strain clamps, suspension clamps, yoke brackets, bi-metal compression lugs and sleeves, termination brackets, hook brackets, insulation piercing connectors

installation tools and equipment (comealong, pulling stockings, stringing rollers, separation wedges, roller brackets, stripping tools)

Erection of ABC (attaching stockings, pulling in, intermediate supports, midspan joints, bonding)

**Suspended services**

**High voltage aerial bundled conductors**

cable sizes

cable identification

**Tools**

comealongs

stockings

separating levers

	stringing rollers swivels
	<b>Erection of HVABC</b>
	<b>Termination and jointing</b>
	<b>Earthing and bonding</b>
	<b>Clearances</b> from structures between LV and HV temporary anchors
<b>6. Assessment strategy</b>	
<b>Assessment methods</b>	Short answer questions (written, oral or graphic or computer based). Suitable practical exercises which assess the skills required of each learning outcome.
<b>Conditions of assessment</b>	Theory room for written tests together with practical field observation.
<b>7. Learning outcome details</b>	
<b>Learning outcome 1</b>	<b>Identify the content and interpret information within line construction manuals/drawings in preparation for the stringing and maintenance of overhead conductors.</b>
<b>Assessment criteria</b>	1.1 Identify the content, page layout and information contained within associated overhead line construction manuals. 1.2 Identify construction types and structures used in distribution and sub-transmission lines. 1.3 Identify the types, sizes and characteristics of overhead conductors.
<b>Learning outcome 2</b>	<b>Obtain and analyse system diagram/plans to prepare for the stringing and maintenance of overhead conductors.</b>
<b>Assessment criteria</b>	2.1 Describe the basic layout and locate specific information from a system diagram/plan. 2.2 Compile a materials list for a nominated task from a system diagram/plan, including conductor size, type and route length.

**Learning outcome 3**

**Identify the resources required to string and maintain overhead conductors.**

**Assessment criteria**

- 3.1 Identify the types of electrical connection used to connect low and high voltage overhead conductors and describe the causes and affects of poor electrical connections.
- 3.2 State the reason for, and the methods used to maintain standard phase sequence when connecting low and high voltage overhead conductors on various structures, such as tee-off, strain and anchor poles.
- 3.3 State the minimum clearances required between overhead conductors and low and high voltage structures.

**Learning outcome 4**

**Identify the safe working practices and procedures required to string and maintain overhead conductors.**

**Assessment criteria**

- 4.1 Identify the limits of approach for personnel, vehicles, mobile plant and elevating work platforms (EWP).
- 4.2 State the requirements of persons prior to making bare hand contact with dead low voltage mains and apparatus.
- 4.3 Specify the requirements of relevant electrical access permits required to allow work to be performed on low and high voltage apparatus.
- 4.4 Describe the safe working practices required to enable safe working on conductive poles.
- 4.5 State the related safe working practices and the procedure to attach an “on-site” earthing device to de-energised low and high voltage overhead circuit.
- 4.6 Attach an “on-site” earthing device to de-energised low and high voltage overhead circuit.

**Learning outcome 5**

**String, tension and terminate low voltage overhead conductors.**

**Assessment criteria**

- 5.1 Identify the tools, equipment and hardware required to string, tension and terminate low voltage overhead conductors.
- 5.2 Identify methods used to string, tension and terminate low voltage overhead conductors.
- 5.3 String, tension and terminate low voltage overhead conductors to the prescribed sag.

**Learning outcome 6**

**String, tension and terminate high voltage overhead conductors.**

**Assessment criteria**

- 6.1 Identify the tools, equipment and hardware required to string, tension and terminate high voltage overhead conductors.
- 6.2 Identify methods used to string, tension and terminate high voltage overhead conductors.
- 6.3 String, tension and terminate high voltage overhead conductors.

**Learning outcome 7**

**Secure conductor to insulators or supports, and fit anti-vibration and conductor separation devices.**

**Assessment criteria**

- 7.1 Select the appropriate size and type of securing device used to secure specified conductors and cables to insulators or supports.
- 7.2 State the requirements for armour taping of conductors.
- 7.3 Secure conductors to insulators or supports.
- 7.4 Identify appropriate anti-vibration devices and describe the method of fitting to specified conductors.
- 7.5 Fit anti-vibration devices to specified conductors.
- 7.6 Identify appropriate conductor separating devices and describe the method of fitting.
- 7.7 Fit conductor separating devices to specified conductors.

<b>Learning outcome 8</b>	<b>Make electrical connections.</b>
<b>Assessment criteria</b>	<p>8.1 Select the appropriate electrical connections to connect various low and high voltage conductors.</p> <p>8.2 Make connections to low and high voltage overhead conductors on various types of structures.</p>
<b>Learning outcome 9</b>	<b>Maintain overhead conductors.</b>
<b>Assessment criteria</b>	<p>9.1 Identify methods used to remove, repair and replace damaged conductors.</p> <p>9.2 Remove, repair and replace damaged conductors.</p>
<b>8. Delivery of the module</b>	
<b>Delivery strategy</b>	<p>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.</p>
<b>Resource requirements</b>	<p>Enterprise construction manuals                      Relevant Australian standards                      Enterprise work manuals and standing instructions                      Relevant manufacturers' Equipment/component manuals                      Range of materials/components                      Appropriate site layout                      Test equipment                      Range of tools                      Safety equipment</p>
<b>Occupational health and safety requirements</b>	<p>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.</p>