

**1. Module details****Module name****Electrotech Engineering Practices****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**

NUE072

**Discipline code**

0703110

**2. Module purpose**

This module will provide the student with the skills and knowledge necessary to undertake work in the Electrotechnology industry. The module covers the areas of working with building materials, soldering and crimping and fabricating a range of material used in the Electrotechnology industry.

**3. Prerequisites**

NBB02 – Occupational Health and Safety  
NE175 – Workshop Practices  
NUE079 - Cables, wiring and accessories introduction

**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 EEQSBA.

**5. Content****1. Building materials**

- cement sheet
- masonry
- plaster
- timber
  - treated pine
  - untreated pine
  - hardwood
  - plywood
  - particle board
  - cedar

**2. Adhesives**

- PVA wood gules
- araldite
- liquid nails
- multipurpose adhesives

**3. Hand skills**

- hammering
- screwing
- sawing/cutting
- filing/rasping
- chiselling
- sanding
- clamping
- mitring
- joining
- plastering
- rendering
- drilling
  - wood, masonry/concrete and steel
  - drill sharpening
  - care/maintenance of drills

#### 4. Soldering

- techniques
  - soldering irons
  - gas
  - solder pot (basting)
  - brazing
  - CAD welding
- materials
  - solder - tin-lead alloy, silver and silver alloy
  - flux – passive and active

#### 5. Crimping

- techniques
  - ratchet
  - compression
- lugs
  - stanco
  - courtney
  - pre-insulated
  - un-insulated
  - patch leads
- compounds

#### 6. Cable joins

- tee
- whye
- marriage

#### 7. Conduit/Truck/Ducting

- pvc
  - flexible
  - rigid
- steel

- flexible
- rigid
- pipe
  - round
  - square
- dual purpose/segregated

#### **8. Cable tray/ladder**

- perforated tray
- mesh

#### **9. Fasteners**

- saddles
  - pvc
  - steel
  - ramset
- unistrut supports
- catenary supports
- plugs
  - masonry anchor
  - nylon
  - wood
- loxins
- toggle bolts
  - spring
  - gravity
- turn buckles
- screws/bolts
  - metal thread
  - self tapping
  - wood
  - dynabolts
  - eye bolts
  - U-bolts

#### **10. Fastening devices/tools**

- battery drills
- battery screw drivers
- manual fasteners
  - screwdrivers – flat, phillips and posidrive
  - spanners – open, ring and socket
  - grips – multi and vice

## 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

Learning and assessment will take place in an environment that is conducive to a learner's development.

## 7. Learning outcome details

### Learning outcome 1

#### **State common applications for different types of building materials**

### Assessment criteria

- 1.1 Identify different common types of building materials used in the electrotechnology.
- 1.2 List common applications for each type of building material used in the electrotechnology.

### Learning outcome 2

#### **Use different types of adhesives on a variety of building materials**

### Assessment criteria

- 2.1 Identify common types of adhesives used in the electrotechnology.
- 2.2 List common applications for each type of adhesive.
- 2.3 Join a variety of building materials using common adhesives.

### Learning outcome 3

#### **Use industry best practice techniques to cut, shape and prepare building materials for use in the electrotechnology industry**

### Assessment criteria

- 3.1 Identify tools and equipment necessary to cut, shape and prepare building materials.
- 3.2 List common applications for a variety of hand tools and equipment used to cut, shape and prepare building materials.
- 3.3 Demonstrate safe and proper use and maintenance of a variety of hand tools and equipment.

**Learning outcome 4****Assessment criteria**

- 3.4 Cut, shape and prepare a variety of building materials, in accordance with prescribed plans and specifications.  
The range of building materials is to include:
- timber
  - plaster
  - masonry
  - cement sheeting

**State common applications for different types of soldering and crimping, normally used in the Electrotechnology Industry**

- 4.1 Identify common soldering techniques.
- 4.2 State common applications for the full range of soldering techniques used in Electrotechnology trades.
- 4.3 Identify common crimping techniques.
- 4.4 State common applications for the full range of crimping techniques used in the Electrotechnology trades.

**Learning outcome 5****Assessment criteria****Solder cables using commonly accepted electrotechnology industry best practices**

- 5.1 State the requirements necessary for soldering copper and aluminium cables, using:
- soldering irons
  - gas torches
  - solder pots
  - brazing
  - CAD welding
- 5.2 Describe the procedures for soldering cables configured as:
- tee joins
  - whye joins
  - marriage joins
- 5.3 Describe the procedures for fitting solder lugs to a variety of cable types.
- 5.4 Demonstrate the soldering process of cables and solder lugs, used commonly in electrotechnology.

<b>Learning outcome 6</b>	<b>Crimp cables using commonly accepted electrotechnology industry best practices</b>
<b>Assessment criteria</b>	<p>6.1 State the requirements necessary for crimping copper and aluminium cables, using:</p> <ul style="list-style-type: none"> <li>- ratchet crimpers</li> <li>- compression crimpers</li> </ul> <p>6.2 Describe the procedures for crimping a variety of cable types.</p> <p>6.3 Demonstrate the crimping process of cables, used commonly in electrotechnology.</p>
<b>Learning outcome 7</b>	<b>State common applications for different types of conduit, cable tray/ladder and duct/trunking</b>
<b>Assessment criteria</b>	<p>7.1 Identify different common conduit, cable tray/ladder and duct/trunking types used in the electrotechnology industry.</p> <p>7.2 List common applications for each type of conduit, cable tray/ladder and duct/trunking.</p>
<b>Learning outcome 8</b>	<b>Use different types of fastening devices on a variety of fasteners</b>
<b>Assessment criteria</b>	<p>8.1 Identify different common types of fasteners used in the electrotechnology industry.</p> <p>8.2 List common applications for each type of fastener.</p> <p>8.3 Insert a selection of fasteners using a variety of powered fastening devices, such as:</p> <ul style="list-style-type: none"> <li>- manual tools</li> <li>- battery drills</li> <li>- battery screw drivers</li> </ul>
<b>Learning outcome 9</b>	<b>Bend and shape conduit using industry best practice techniques and secure to vertical and horizontal surfaces</b>
<b>Assessment criteria</b>	<p>9.1 State requirements for determining the appropriate type and size of conduit.</p> <p>9.2 Calculate lengths, radii and shape of conduit in accordance with plans and specifications.</p> <p>9.3 Cut and shape conduit to dimension as defined within the plans and specifications.</p>

<b>Learning outcome 10</b>	9.4 Inspect conduit for burrs, nicks, excessive kinks or other damage.
	9.5 Secure conduit to surfaces using appropriate fastening devices and techniques.
	<b>Bend and shape cable tray/ladder using industry best practice techniques and secure to vertical and horizontal surfaces</b>
	10.1 State the requirements for determining the appropriate cable tray/ladder type and size.
	10.2 Calculate lengths, radii and shape of cable tray/ladder in accordance with plans and specifications.
	10.3 Cut and shape cable tray/ladder to dimension as defined within the plans and specifications.
	10.4 Inspect cable tray/ladder for burrs, excessive kinks or other damage.
	10.5 Secure cable tray/ladder to surfaces using appropriate fastening devices and techniques.
<b>Learning outcome 11</b>	<b>Bend and shape duct/trunking using industry best practice techniques and secure to vertical and horizontal surfaces</b>
<b>Assessment criteria</b>	11.1 State the requirements for determining the appropriate duct/trunking type and size.
	11.2 Cut and shape duct/trunking to dimension as defined within the plans and specifications.
	11.3 Inspect duct/trunking for burrs or other damage.
	11.4 Secure duct/trunking to surfaces using appropriate fastening devices and techniques.
<b>8. Delivery of the module</b>	
<b>Delivery strategy</b>	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.

*Suggested Learning Resource:*

Appropriate materials and equipment are to be supplied to meet the needs of delivery for each student.

**Occupational health and safety requirements**

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.