

1. Module details

Module name

Electrical Equipment Safety

Suggested structured learning time

A learner possessing the prerequisite skills and knowledge should achieve the module purpose in 18 to 20 hours.

Module code

NUE504

Discipline code

031317

2. Module purpose

This module provides criteria for assessing knowledge and skills critical to maintaining and repairing electrical appliance components, apparatus and machines.

3. Learning pathway

Intended use in the structured learning program

This module is intended to support learners in a structured program of learning for relevant competency standards unit(s) associated with the electrical equipment. In particular it may also contribute specifically designed courses developed for electrical assembly and servicing.

Therefore before undertaking this module a learner should have acquired demonstrated skills in relevant electrical appliance component, apparatus and machine work using associated tools, workshop practices and testing equipment.

Recommended prerequisites

For the most effective learning this module should be undertaken after the completion of all relevant on and off-the-job requirements associated with the Certificate III in Electrotechnology Assembly and Servicing qualification.

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 other National Competency Standards. For details refer to the module to unit maps available from EE-Oz Training Standards (formerly EEQSBA).

This module assesses part of the critical knowledge and skills supporting the achievement of competency in units:

NES203BA Assemble electrical/electronic apparatus - *electrical*

NES206bB Maintain and repair apparatus and associated circuits – *electrical*

NES208*A Disconnect and reconnect fixed wired electrical equipment connected to supply up to 1000 volts a.c. or 1500 volts d.c.

NES401BA Perform functional apparatus checks - *electrical*
NES402BA Test apparatus and circuits – *electrical*
NES501BA Diagnose and rectify faults in apparatus and associated circuits – *electrical*

Note: The competency unit, NES208A has attached endorsements designated by the following suffixes. More than one endorsement may be achieved:

- Z (Flameproof Exd)
- Y (Increased Safety Exe)
- X (Intrinsically safe Ex i)
- W (Non-sparking Ex n)
- V (Dust-excluding Ignition-proof DIP)
- U (Pressurisation Ex p)
- T (Mixed explosion protection techniques)
 - T1 – Ex “pD” – Pressurisation, dust
 - T2 – Ex “mD” – Encapsulation, dust
 - T3 – Ex “iD” – Intrinsic safety, dust

This module supports in addition to the completion of all prerequisites, the development of essential and critical capabilities required for restricted electrical licensing in respective regulatory jurisdictions.

5. Content

1. Working safely on electrical equipment
2. Ensure the safe operation of electrical equipment
3. Selecting equipment
4. Selecting protection methods and devices

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic and integrated approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments is to include monitoring learner progress; practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving. "Checklist" or atomistic assessment approaches are to be avoided.

Conditions of assessment

Learning and assessment is to take place in a formal learning environment that is conducive to learning.

7. Learning outcome details

Learning outcome 1

Demonstrate the knowledge and skills required to work safely on electrical equipment.

Assessment criteria

- 1.1 State the safety procedures to work safely on electrical equipment and accessories.
- 1.2 Demonstrate and apply safe working practices.

Learning outcome 2

Demonstrate the knowledge and skills required for ensuring the safe operation of electrical equipment.

Assessment criteria

- 2.1 Demonstrate methods for ensuring electrical apparatus and equipment are safe to use.
- 2.2 Describe the minimum requirements for testing for the safe operation of electrical equipment.

Learning outcome 3

Demonstrate the knowledge and skills required for maintaining equipment and apparatus in a variety of situations.

Assessment criteria

- 3.1 Apply the knowledge and skills required to maintain electrical equipment.
- 3.2 Demonstrate the knowledge and skills necessary for maintaining control equipment.

Learning outcome 4

Demonstrate the knowledge and skills required for ensuring electrical fault protection devices will operate as intended.

Assessment criteria

- 4.1 Explain the features and characteristics of electrical overload and fault protection systems.
- 4.2 Apply a method for ensuring electrical protection systems will operate under overload and fault conditions.

8. Delivery of the module

Delivery strategy

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 learners learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require a learning outcome sequence

Resource requirements

other than that indicated in the module.

Resources should be sufficient for learners to carry out learning activities on an individual basis.

Trainers/teachers/facilitators must have qualifications in the relevant subject area for the AQF level program being delivered and, they are engaged to deliver recognised trainer and assessment training and at least three to five years relevant work experience.

State/Territory Occupational Health and Safety Act(s) and OHS Regulation(s) typically place greater emphasis on the interaction between employer and employee. Consultation between employers and employees covers all aspects of work affecting health and safety. A fundamental concept of the legislation is that all employers are to establish risk management systems in their workplaces. Thus training providers/organisations should consider applying the following strategies in the delivery of this module outcome:

- Follow OHS guidelines issued by appropriate training/regulatory bodies, Institute(s), College, Campus and/or Teaching section
- Carry out hazard identification and risk assessment
- Formulate a Work Method Statement (WMS) for all high and medium risk activities and consider a WMS for all low risk activities
- Ensure that Material Safety Data Sheets (MSDS) are freely available for access by teachers and students
- Ensure that equipment operating instructions (either manufacturing or section developed) referred to in the WMS are freely available for access by teachers and students
- Ensure that learners read and understand the student OHS information in the module student assessment guide
- Document used OHS risk management strategies in the roll book

Suggested Learning Resource:

Jenneson, J. R. 1995, *Electrical Principles for Electrical Trades*, McGraw Hill, Sydney

Van den Bergen, B. 1996, *Mathematics for the Electrical Trades*. TAFE Publications, RMIT, Melbourne.

Pethebridge, K., Neeson, I. 1998, *Electrical Wiring Practice*. 5th Ed. McGraw Hill, Sydney

- Class notes, workbook, calculator
- *Standards Australia*, Relevant standards

Equipment resources general:

Standard electrical/electronic theory/practical

classroom/laboratory is required with the following equipment (minimum requirement) and should include an appropriate "wiring centre/cubicle" – that includes the relevant electrical equipment:

- Access to equal sets of the following for the number of learners;
 - a.c. three-phase supply, a.c. single-phase supply, and d.c. power supply where used;
 - testing and measuring instruments;
 - tools and equipment;
 - electrical appliance components, apparatus and machines
- *Note 1: Exact specifications may vary according to resources at individual sites.*
- *Note 2: individual topics may require additional plant and equipment.*

Consumables:

- Miscellaneous electrical components and equipment
- Miscellaneous wiring, leads, and accessories

Where this module is used in an approved Traineeship or Apprenticeship program learners should be advised to obtain, where available, respective EE-Oz Training Standards¹ **User Guides** (these outline in detail what training and work performance the Learner is required to undertake for the program).

Occupational health and safety requirements

A safe and healthy environment will be provided for learners/participants and teacher/trainers/assessors, as well safety procedures with regard to learning and assessment activities shall be formally advised.

¹ EE-Oz Training Standards – ElectroComms and EnergyUtilities Industry Skills Council Ltd formerly ElectroComms and EnergyUtilities Qualifications Standards Body of Australia Ltd (EEQSBA)