

1. Module details

Module name

Appliance Electronics

Suggested structured learning time

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

Module code

NUE149

Field of Education code

031317

2. Module purpose

This module will provide students with the underpinning knowledge and skills necessary to identify, test, fault determine and replace basic electronic components commonly found in domestic appliances.

Learners will gain an understanding of the principles of operation of electronic components commonly found in domestic appliances.

It covers electronic safety, electronic concepts, power supply concepts, electronic components and field service procedures.

3. Learning pathway

Intended use in the structured learning program

This module intended to supplement extensive workplace exposure to domestic appliance servicing work. In particular it applies to the principles of basic electronic components found in domestic appliances. Therefore before undertaking this module an apprentice should have a clear understanding and experience of:

- problem solving series, parallel and series / parallel circuits
- the fundamental concepts of alternating current and sinusoidal waveforms
- electro-magnetism and its application to the operation of motors and generators
- basic and derived units of mechanical and electrical measurement and the skills to manipulate equations to solve problems involving these units.
- the principles of electrical conduction, the electrical characteristics of material and the conversion of electrical energy to other forms and visa versa.
- physiological and damaging effects of current and how these are dealt with in practice
- the relationship between voltage and current and develop skills in working safely with circuits and using and caring for electrical measuring instruments including an introduction to the use of a CRO.

Recommended prerequisites	For the most effective learning this module should be undertaken only after modules in Electrical Concepts and Applications; and Applied Electricity 1 have been completed.
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	
Summary of content	Safety Personal Safety Manual handling - Safe handling - Static protection Electronic Concepts Analog Digital - Binary number systems Power Supply Concepts Block diagram of a power supply Types of power supply - Linear, Switched Mode Power supply protection circuitry types - over voltage, under voltage, short circuited load

Electronic Components
Capacitors
Circuit boards
Diodes
Displays
Inductors
Integrated circuits
LCD's
LED's
Rectifiers
Sensing transducers
– Temperature
* Positive Temperature Co-efficient (PTC)
* Negative Temperature Co-efficient (NTC)
– Pressure
– Humidity
– Motion
– Other
Switches
Resistors
Thermistors
Transistors
Touch pads
Field Service Procedures
Diagnosing
Replacing
Testing
Confirmation of repair
Customer communication

6. Assessment strategy

Assessment methods	Assessment should be progressive reflecting a holistic approach to ensure the module is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of item types, such as multiple choice, short answer and problem solving.
Conditions of assessment	Normally learning and assessment will take place in a formal learning environment.
7. Learning outcome details	
Learning outcome 1	Demonstrate safe working procedures when working with electronic appliances.
Assessment criteria	1.1 Demonstrate safe working procedures when working with electronic appliances.
Learning outcome 2	Demonstrate knowledge of Analog and Digital circuits.
Assessment criteria	2.1 Explain the differences between digital and analogue signals. 2.2 Identify and measure the signal levels and types at the terminals of blocks within a typical digital/ analogue system. 2.3 Describe the binary numbering system. 2.4 Test and measure digital outputs.
Learning outcome 3	Demonstrate knowledge of the basic operating principles and application of d.c. power supplies.
Assessment criteria	3.1 Explain the precautions to be taken when connecting or disconnecting a power supply from a circuit. 3.2 Define the purpose of a power supply in an electrical/electronic system. 3.3 Perform tests to isolate power faults in non-functional electrical/electronic equipment.
Learning outcome 4	Demonstrate knowledge of the function of basic electronic appliance components.
Assessment criteria	4.1 Demonstrate knowledge of the function of basic electronic appliance components. 4.2 Explain the function of a variety of electronic components.

	4.3 Explain the operation of a variety of electronic components.
Learning outcome 5	Apply test procedures (inputs and outputs) for checking various electronic components and fault find major component failures in component assemblies.
Assessment criteria	5.1 Select and use appropriate fault finding techniques. 5.2 Apply test procedures for component assemblies. 5.3 Apply the necessary procedures when testing discrete component parts. 5.4 Prepare a report to the customer.
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 students 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 other than that indicated in the module.
Resource requirements	Resources should be sufficient for students to carry out exercises on an individual basis. Useful references include: Fletcher, R and Warner, N, <i>Introducing Design in Electronics</i> , Jacaranda Press Standards Australia, Standards New Zealand: AS/NZS 3760 (Latest edition) <i>In-service Safety Inspection and Testing of Electrical Equipment</i> AS/NZS 4836 (Latest edition) <i>Safe Working Practice on Low-voltage Electrical Installations</i> WorkCover NSW, <i>WorkCover Code of Practice - Low Voltage Electrical Work Local electricity distributor and authority regulations</i>

**Occupational health
and safety requirements**

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*).

A safe and healthy environment will be provided for learners and teachers. Safety procedures for the particular learning facilities shall be followed as part of the learning / teaching activity and assessment.

¹ EE-Oz Training Standards – ElectroComms and EnergyUtilities Industry Skills Council Ltd formally EEQSBA