

1. Module details	
Module name	Security Systems 1
Suggested structured learning time	40 hours
Module code	NUE 480
Discipline code	0703225 Electrotechnology
2. Module purpose	This module aims to provide the student with basic skills to select and install security equipment. On completion of this module the student will be able to describe the safety requirements necessary in the security industry and describe the operation and use of various detectors used in the security industry.
3. Prerequisite modules	NUE 058 Electrical Concepts and Applications NBB 002 Occupational Health and Safety NUE 184 Electronic Hand Soldering Technology
4. Relationship to competency standards	This module provides some of the skills and knowledge underpinning competence in the following: Electrotechnology Industry Training Package National Units of Competency, specifically NES 105i and NES 209.
5. Content	Security systems <ul style="list-style-type: none">• Introduction• Devices• Systems• Safety Resistors <ul style="list-style-type: none">• Colour Code• Security Type Value Mechanical detectors <ul style="list-style-type: none">• Pressure pads• Trip wires• Window tape• Screens• Switches• Vibration

	<p>Electro-mechanical detectors</p> <ul style="list-style-type: none"> • Ultra-sonic • Microwave • Glass break • Smoke • Active infra-red beams • Passive infra-red • Electromagnetic <p>Relays</p> <ul style="list-style-type: none"> • Types • Applications <p>Industry visit</p> <ul style="list-style-type: none"> • Security manufacturer or distributor
<p>6. Assessment strategy</p> <p>Assessment methods</p> <p>Conditions of assessment</p>	<p>Questioning</p> <p>Written tests, problem solving and assignments</p> <p>Practical tests and written reports.</p> <p>Normally learning and assessment will take place in a classroom or laboratory environment. Where possible, an industrial visit to a security wholesaler or security company should be arranged.</p>
<p>7. Learning outcome details</p> <p>Learning outcome 1</p> <p>Assessment criteria</p>	<p>Explain the meaning of public liability and its implications in the workplace and hazardous situations.</p> <p>1.1 Explain the concept of and the need for public liability insurance.</p> <p>1.2 Explain the term ‘vicarious liability’.</p> <p>1.3 Explain the legal implications of setting up work equipment in a public thoroughfare.</p> <p>1.4 Demonstrate approaches to resolving potentially hazardous work situations in public areas.</p> <p>Identify and select resistors used in the security industry.</p>

Learning Outcome 2

Assessment Criteria

- 2.1 Describe the need for resistors in a security system.
- 2.2 Identify resistor values by a colour code.
- 2.3 State the range of typical resistor values used in alarm systems.
- 2.4 State the reasons for End Line Resistor (ELR) systems in ELR circuits, balanced bridge circuits and the two resistor ELR.
- 2.5 State the reasons for Dual End Line Resistor (ELR) systems and the values as seen by the panel.

Learning Outcome 3

Assessment Criteria

Select, install and describe the operation of a range of detectors used in a security system.

- 3.1 Describe the construction and operating principles of mechanical detectors.
- 3.2 Describe precautions and procedures to be observed when using the following devices.
Magnets
Vibration (hammer type, ball and pin type)
Screens
Switches
Pressure mats
Trip wires
Window tape
- 3.3 Describe the construction and operating principles of electro-mechanical detectors.
- 3.4 State the most appropriate applications for the following devices.
 - Gun diode and flat PCB
 - Active IR beams
 - Single twin type
 - Beam fence
 - Missing pulse system
 - Glass break
 - Smoke
 - Ultra-sonic
 - Optical fibre
 - Strain system
 - Resistance circuit

	3.5	Define the terms used with PIR's.
	3.6	Describe the construction and use of Pyro sensors
	3.7	State the RF problems associated with PIR sensors
	3.8	Define the area of coverage and fields of a range of sensors.
	3.9	Draw blocks diagrams for single, dual and quad PIRs.
	3.10	Explain the following. <ul style="list-style-type: none"> • Room reference • Trip points • Internal counts • Pulse count added • RFI and EMI • White light and voltage surges • Voltage diagrams as in a trigger circuit • Voltage versus time
	3.11	Describe causes and solutions to false triggering.
	3.12	Explain the absence of IR sensing.
	3.13	Describe the comparison method, for example, comparison with intruder and IC reference
	3.14	Describe the double comparison method, for example, the dual/dual pyro method.
	3.15	Explain typical uses for a relay type output.
Learning outcome 4		Describe a Passive Infra-red system.
Assessment criteria	4.1	Describe anti-masking, for example detecting damage of a PIR by a potential intruder.
	4.2	Write a report on a PIR unit tested in the classroom
Learning outcome 5		Report on visit to a security wholesaler or a security company, where appropriate.
Assessment criteria	5.1	Write a report summarising an industrial visit if appropriate.

8. Delivery of the module

Delivery strategy

The delivery strategy 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 that may require a learning outcome sequence other than that indicated in the body of this module.

Also an integrated theory and practice approach should be used where students learn by experimentation and through research, industrial visits and laboratory reports.

Recommended resource requirements

Minimum teacher qualifications:

Certificate IV Assessment & Workplace Training

Trade qualifications in the electrical/electronic discipline and a demonstrated high level of competency in security installations. This would normally be achieved by relevant workplace experience in this field.

Other human resources:

Stores/laboratory assistant

Non human resources:

Resources must be sufficient for students to carry out learning activities on an individual basis.

A range of experimental circuit components and measuring equipment and practical equipment. Resources should be sufficient for students to carry out experiments on an individual basis.

Trade pamphlets.

Trade information documents.

Appropriate texts.

User Guides

Where this module is used in an approved Traineeship or Apprenticeship program students should be advised to obtain, where available, respective EEQSBA¹ *User Guides* (these outline in detail what training and work performance the student is required to undertake for the program).

¹ EEQSBA - ElectroComms and EnergyUtilities Qualifications Standards Body of Australia Ltd

Occupational health and safety requirements

References

- Committee SF/1, Safe working industry. AS 1470, *Code of General Principles for Safe Working in Industry*, Standards Australia, Sydney.
- Philips, P. 1996, *Electrical Principles 1*, Thomas Nelson, Melbourne.
- Relevant State Occupational Safety and Health Acts and Regulations. Local state or territory.
- Cumming, N. 1992, *Security: A guide to Security System Design and Equipment Selection and Installation*. 2nd ed. Butterworth Heineman, Boston.
- Manufacturers Data Equipment for various detectors (Security).

A safe and healthy environment will be provided for students in regards to classroom and laboratory safety.