

1 Module Details	
Module Name	Security Systems 1
Nominal duration	One module It is anticipated that a student holding the prescribed entry skills will achieve the module purpose in 36 to 40 hours.
Module code	NUE480
Discipline code	0703230
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 Prerequisites	Electrical Concepts and Applications or equivalent (NUE058)
4 Relationship to competency standards	This module provides some of the skills and knowledge underpinning competence in the following standards. Electrical Contracting Industry Awards Standards, Electronic Stream Unit 5.1
5 Content	<ol style="list-style-type: none">1. Security systems<ul style="list-style-type: none">• Introduction• Devices• Systems2. Relays<ul style="list-style-type: none">• Types• Applications• Open collector transistor connection to3. Methods of Electrical Connection<ul style="list-style-type: none">• Crimped• Screw connectors• Soldered• Insulation4. Batteries<ul style="list-style-type: none">• Types• Applications• Maintenance5. Industry visit<ul style="list-style-type: none">• Security manufacturer or distributor6. Mechanical detectors<ul style="list-style-type: none">• Pressure pads• Trip wires• Window tape• Screens

	<ul style="list-style-type: none"> • Switches including reed switch • Vibration
	<p>7. Electro-mechanical detectors</p> <ul style="list-style-type: none"> • Ultra sonic • Microwave • Glass break (high frequency vibration) • Smoke • Active Infra Red beams • Passive Infra Red • Strain system • Electromagnetic
	<p>8. Interfacing detectors to alarm panel</p> <ul style="list-style-type: none"> • Types of cable used in industry • Anti-tamper and current sensing • End Of Line resistor • Revision of Ohm's Law • Measurement of Current and Voltage
	<p>9. Safety and the Security Installer</p> <ul style="list-style-type: none"> • Construction Safety Act (or equivalent State law) • Factories Shops and Industries Act (or equivalent State law) • Regulations under both acts • Specific examples that affect contractors
6 Assessment strategy	
Assessment methods	<p>Questioning. Written tests/problem solving/assignments. Practical tests/written reports.</p>
Conditions of assessment	<p>Normally learning and assessment will take place in a classroom/laboratory environment. Where possible, an industrial visit to a security wholesaler or security company should be arranged.</p>
7 Learning Outcome Details	
Learning Outcome 1	<p>Explain implications of various safety Acts and Regulations that affect the security contractor and general Safety requirements in the security industry.</p>
Assessment criteria	<p>1.1 Explain the legal implications of placing a ladder and associated work equipment in a public thoroughfare.</p> <p>1.2 Explain the need for public liability insurance.</p> <p>1.3 Explain the term 'vicarious liability' in relation to an indictable mishap</p> <p>1.4 Demonstrate the safe approach to finding mains voltage cables in wall cavities with the use of electromagnetic field detection equipment.</p>

Learning Outcome 2	Describe the importance of reliable electrical connections and perform soldering.
Assessment criteria	<ol style="list-style-type: none">2.1 Make a number of soldered connections with wire, terminals and printed circuit board and examine for correctness.2.2 State the temperature regions of the three states of solder.2.3 Describe and select suitable soldering equipment for use in the security industry.2.4 Identify reliable and unreliable soldered joints.2.5 Perform solder removal tasks.2.6 Describe the purpose of a range of connecting systems.
Learning Outcome 3	Define and measure electrical quantities associated with battery charging circuits
Assessment criteria	<ol style="list-style-type: none">3.1 Define the following electrical quantities:<ul style="list-style-type: none">• Voltage• Current• Resistance3.2 Measure the above electrical quantities using both digital and analog multimeters.3.3 Show how to measure a loaded terminal voltage on a sealed lead acid battery3.4 Describe applications and maintenance for batteries used in the security industry.
Learning Outcome 4	Identify and select resistors used in the security industry.
Assessment criteria	<ol style="list-style-type: none">4.1 Describe the need for resistors in a security system.4.2 Identify 1% resistor values with the use of the five band colour code.4.3 State the range of typical resistor values used in alarm systems.4.4 Calculate the equivalent resistance of the following types of resistor networks:<ul style="list-style-type: none">• Series• Parallel• Series/parallel4.5 Demonstrate the use of Ohm's Law.4.6 State the reasons for End Line Resistor (ELR) systems in ELR circuits, balanced bridge circuits and the two resistor ELR.

	4.7	Wire a single EOL resistor to provide a sealed condition.
	4.8	Wire a detector with split EOL resistors to provide a sealed condition.
	4.9	Demonstrate how zone doubling can be accomplished through the use of dual EOL resistors.
	4.10	Demonstrate the effects of open circuits and short circuits on alarm inputs.
Learning Outcome 5		Select, install and describe the operation of a range of detectors used in a security system.
Assessment criteria	5.1	Describe the construction and operating principles of mechanical detectors.
	5.2	Describe precautions and procedures to be observed when using the following devices: <ul style="list-style-type: none"> • Magnets • Vibration (hammer type, ball & pin type) • Switches • Pressure mats • Trip wires • Window tape
	5.3	Describe the construction and operating principles of electro-mechanical detectors.
	5.4	State the most appropriate applications for the following devices: <ul style="list-style-type: none"> • Microwave detector • Active IR beams • Single twin type • Beam fence • Missing pulse system • Glass break • Smoke • Ultra sonic • Optical fibre • Strain system • Resistance circuit
	5.5	Define the terms used with PIR's.
	5.6	Describe the following terms used with PIR sensors: <ul style="list-style-type: none"> • Barrier lens • Dual corridor lens • Long range lens • Wide angle lens
	5.7	State the RF problems associated with PIR sensors.
	5.8	Define the area of coverage and fields of a range of sensors.
	5.9	Draw block diagrams for single, dual and quad PIR's.
	5.10	Explain the following: <ul style="list-style-type: none"> • Room reference

	<ul style="list-style-type: none"> • Trip points • Internal count • Pulse count added • RFI and EMI • White light and voltage surges • Temperature effects
	5.11 Describe causes and solutions to false triggering.
	5.12 Explain the absence of IR sensing.
	5.13 Describe the following terms: <ul style="list-style-type: none"> • Dual opposed trigger • Adaptive signal processing • PET immunity • Motion analyser II signal processing • Automatic temperature compensation
	5.14 Describe the Comparison method, ie, comparison with intruder and IC reference.
	5.15 Describe the double comparison method, ie, the dual/dual pyro method.
Learning Outcome 6	Describe a Passive Infra-red III (PIR III) system.
Assessment criteria	6.1 Describe Anti-masking, ie, detecting damage of a PIR by a potential intruder.
	6.2 Write a report on a PIR unit tested in the classroom.
Learning Outcome 7	Report on an industrial visit to a security wholesaler or a security company, where appropriate.
Assessment criteria	7.1 Write a report summarising an industrial visit if appropriate.
Learning Outcome 8	Describe the relay connected to an open collector output on an alarm panel.
Assessment Criteria	8.1 Describe the use of NC and NO relays
	8.2 Show how a transistor “pulls down” current when used as a switch (<u>brief</u> as student has not covered transistor devices but needs to know this terminology as referred to by equipment manufacturers)
	8.3 Sketch the wiring diagram for a relay connected to an open collector output on an alarm panel
	8.4 Explain typical uses for a relay type output
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

	<p>in a holistic manner which may require a learning outcome sequence other than that indicated in the body of this module.</p> <p>Also an integrated theory/practice approach should be used where students learn by experimentation and through research, industrial visits and laboratory reports.</p>
Resource requirements	<p>Minimum teacher qualifications: 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.</p> <p>Other Human Resources: Stores/laboratory assistant: On class hours: Off class hours: 18 hours</p> <p>Non Human Resources: 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.</p>
Occupational health and safety requirements	<p>A safe and healthy environment will be provided for students In regards to classroom and laboratory safety.</p>