

1. Module details

Module name Advanced Security Systems

Suggested structured learning time 40 hours

Module code NUE 485

Discipline code 0703225 Electrotechnology

2. Module purpose

To provide a comprehensive introduction to transmission systems used in electronic security systems, including terminology, transmission mediums, computer modems, hardware devices and software packages and standards.

3. Prerequisite modules

Nil

4. Relationship to competency standards

This module provides some of the knowledge and skills underpinning competency in the following standards:

National Electrotechnology Industry Standards, particularly NES 209.

5. Content**Transmission Systems**

- Fibre Optics
 - Introduction
 - Principles
 - Advantages
 - Disadvantages
 - CCTV Applications
 - Components
 - Dangers to eyesight from bare fibres
 - Lasers
- Coaxial
 - Construction
 - Types
 - Features
 - BNC connectors
 - Installation
 - Trouble shooting
- Twisted Pair
 - Features
 - Advantages

- Disadvantages
- Microwave
 - Principles
 - Features
 - Advantages
 - Disadvantages
- Infrared
 - LED
 - LD
 - Advantages
 - Disadvantages
- Telephone Networks
 - Introduction
 - Fast Scan Video Transmission
 - PSTN (Public Switched Telephone Network)
 - ISDN (Integrated Services Digital Network)
 - Video Monitoring stations
 - Securitel systems
- Choosing a medium
 - Distance
 - Harsh environment/high security
 - Cost
 - Advantages
 - Construction of cables
 - Physical properties
 - Applications
 - Terminations
- Intrinsically safe wiring
 - Where it is needed
 - Alternatives
- Modems
 - Commands
 - Uses

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 a classroom/laboratory environment and in a real or simulated security installation.
7 Learning outcome details	
Learning outcome 1	Describe the physical properties of common types of fibre optic cables.
Assessment criteria	<p>1.1 State relevant Occupational Health and Safety standards for Optical Systems.</p> <p>1.2 State the danger to eyesight from Laser light sources and from penetration by optical fibre.</p> <p>1.3 Describe the construction of slotted core, loose tube and cord fibre cables.</p> <p>1.4 List the advantages of each type of cable.</p> <p>1.5 Describe the following specifications as they pertain to fibre optic cables:</p> <ul style="list-style-type: none"> • Simplex • Duplex • Diameter • Bandwidth • Attenuation • Operating temperature • Minimum bending radius.
Learning outcome 2	Describe common applications of fibre optic cables in electronic security systems.
Assessment criteria	<p>2.1 Describe how fibre optic cable may be used to carry video signals in electronic security systems.</p> <p>2.2 Describe how fibre optic cable may be used to carry voice data and control data signals in electronic security systems.</p> <p>2.3 Describe the transmission of multiplex data using fibre optic cable.</p>
Learning outcome 3	Describe common methods of terminating fibre optic cable.
Assessment criteria	<p>3.1 Explain the safe practices required when handling and repairing fibre optic cables.</p>

Learning outcome 4

Assessment criteria

- 3.2 Describe the processes involved when terminating optical fibre cable using optical connectors.
- 3.3 Describe the processes involved when terminating optical fibre cable using mechanical splicing.
- 3.4 Describe the processes involved when terminating optical fibre cable using fusion splicing.

Select the correct cable and wiring method.

- 4.1 Recognise cable selection characteristics including:
 - Current capacity
 - Voltage rating (insulation)
 - Temperature rating
 - Shielding
 - Insertion loss
 - Bandwidth
- 4.2 Describe approved methods of wiring termination and joining.
- 4.3 Given a list of different security applications, select an appropriate medium for data transmission and give reasons for this selection.
- 4.4 Explain the requirements of the SAA Wiring Rules AS3000 and relative rules and instructions for extra low Voltage and data cabling.

Learning outcome 5

Assessment criteria

Identify hazards that may be encountered in wiring systems.

- 5.1 Recognise hazardous situations and locations that may cause:
 - Electric shock
 - Fire
 - Explosions
 - Electromagnetic radiation
- 5.2 Describe the installation of equipment requiring earthing or is double insulated.

Learning outcome 6

Assessment criteria

Identify non hard wiring installation methods.

- 6.1 Identify methods of transmitted alarm conditions.
- 6.2 Identify methods of transmitted arming and disarming of security systems.

	<p>6.3 Identify methods of transmitted video and data signals.</p>
<p>Learning outcome 7</p>	<p>Describe modem interface requirements</p>
<p>Assessment criteria</p>	<p>7.1 Explain the requirements for DTE to DCE to DCE to DTE.</p> <p>7.2 Describe the necessary interface for:</p> <ul style="list-style-type: none"> – PC to PC via modem – Alarm panel to monitoring system via modem. <p>7.3 Describe the features and specifications of a Hayes compatible smart modem.</p>
<p>Learning outcome 8</p>	<p>Describe modem protocols</p>
<p>Assessment criteria</p>	<p>8.1 Explain the following modem standards</p> <ul style="list-style-type: none"> – V.22 – V.32 – V.42 – X.25 <p>8.2 Explain the following modem protocols</p> <ul style="list-style-type: none"> – Full-duplex – Half-duplex – X modem <p>8.3 Configure and install hardware and software for the correct operation of an alarm system that will indicate alarm conditions via a modem.</p>
<p>8 Delivery of the module</p>	
<p>Delivery strategy</p>	<p>Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective way to achieve this is by the integration of theory and practice where students learn by experimentation and through research and laboratory reports. It is recommended that learning and assessment be facilitated in a holistic manner, which may require a learning outcome sequence other than that indicated in the module.</p>
<p>Recommended resource requirements</p>	<p>Minimum teacher qualifications:</p> <p>Certificate IV Assessment & Workplace Training</p> <p>Trade qualifications in the electrical/electronic discipline and a demonstrated high level of competency in security</p>

installations. This would normally be achieved by relevant workplace experience in this field.

Non human resources:

Resources should be sufficient for students to carry out practical exercises on an individual basis. This will require, as a minimum:

- Multimeters
- Typical circuit drawings
- A selection of alarm control panels and sensors
- A selection of cables and connectors
- Fibre optic terminating kit
- Suitable PC
- A range of modems

Manufacturers' Handbooks for systems used in a laboratory.

Manufacturers' installation guides for systems used in a laboratory.

Various security panels sourced locally.

Textbooks

CCTV Surveillance, Herman Kruegle. Butterworth-Heinemann.

Security 'A Guide', Neil Cumming. Butterworth-Heinemann.

Reference books and Standards

AS2201.1-1998, Australian Standard – Intruder alarm systems, Part 1: Systems installed in client's premises.

AS2201.2-2000, Australian Standard – Intruder alarm systems, Part 2: Monitoring centres.

AS2201.3-1992, Australian Standard – Intruder alarm systems, Part 3: Detection devices for internal use.

AS2201.4 -1990, Australian Standard – Intruder alarm systems, Part 4: Wire-free systems installed in client's premises.

AS2201.5-1992, Australian Standard – Intruder alarm systems, Part 5: Alarm transmission systems.

ACA's Communications Cabling Manual.

Magazines

Security Electronics Magazine, Bridge Publishing Aust. Pty. Ltd, 25 Renwick Street, Leichhardt, NSW, 2040,

Internet: <http://www.semweb.com>

Internet resources

Ademco - <http://www.ademcoint.com>
Australian Communications Guide –
<http://www.austelguide.com.au>
Crow - <http://www.crowaust.com.au>
Dedicated Micros – <http://dedicatedmicros.com>
Detection Systems - <http://www.detectionsys.com>
Detection Systems Australia (EDM) -
<http://www.edm.com.au>
Direct Alarm supplies (DAS) - <http://www.das.com.au>.
Digital Security Controls (DSC) - <http://dscsec.com>
Interlogix Inc. - <http://www.intelogixinc.com>
Interlogix Security and Life Safety Group -
<http://www.interlogixsecurity.com>
Inner Range Pty Ltd. - <http://www.innerrange.com.au>
Ness Security Products - <http://www.ness.com.au>
Paradox Security Systems - <http://www.paradox.ca>
Sentrol – <http://www.sentrol.com>
Southwest Microwave –
<http://southwestmicrowave.com>
Tecom Systems – <http://www.tecom.com.au>

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).

Equipment

It is strongly advised that students have access to a range of product literature available from manufacturers and suppliers of security alarm systems.

Specialised facilities and equipment made available by the training provider include the following:

- Control and indicating equipment
- Visual warning devices and audible warning devices.

In addition students will require access to the following:

- Standard electronic laboratory equipment should be available for practical exercises.
- Standard electronic industry hand tools for assembly and installation of equipment.

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

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers, as well as safety procedures followed with regard to teaching/learning activities.