

1 Module Details	
Module Name	Advanced Security Systems
Nominal duration	It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 to 40 hours
Module code	NUE485
Discipline code	0703230 Electronic Installation and Maintenance
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 Prerequisites	Security Systems 1 (NUE480) and Security Systems 2 (NUE483)
4 Relationship to competency standards	This module provides some of the knowledge and skills underpinning competency in the following standards: National Electrotechnology Industry Standards, Units Metals and Engineering Industry Standards, Units
5 Content	<ol style="list-style-type: none">1. Transmission Systems<ul style="list-style-type: none">• Fibre Optics<ul style="list-style-type: none">• Introduction• Principles• Advantages• Disadvantages• CCTV Applications• Components• Dangers to eyesight from bare fibres• Lasers• Coaxial<ul style="list-style-type: none">• Construction• Types• Features• BNC connectors• Installation• Trouble shooting• Twisted Pair<ul style="list-style-type: none">• Features• Advantages• Disadvantages• Microwave<ul style="list-style-type: none">• Principles• Features• Advantages• Disadvantages

	<ul style="list-style-type: none"> • Infrared <ul style="list-style-type: none"> • LED • LD • Advantages • Disadvantages • Telephone Networks <ul style="list-style-type: none"> • Introduction • Fast Scan Video Transmission • PSTN (Public Switched Telephone Network) • ISDN (Integrated Services Digital Network) • Video Monitoring stations • Securitel systems • Choosing a medium <ul style="list-style-type: none"> • Distance • Harsh Environment / High Security • Cost <ul style="list-style-type: none"> • Advantages • Construction of cables • Physical properties • Applications • Terminations
	<ol style="list-style-type: none"> 2. Intrinsically safe wiring <ul style="list-style-type: none"> • Where needed • Alternatives 3. Modems <ul style="list-style-type: none"> • 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	<ol style="list-style-type: none"> 1.1 State relevant Occupational Health and Safety standards for Optical Systems 1.2 State the danger to eyesight from Laser light sources

	and from penetration by optical fibres.
	1.3 Describe the construction of slotted core, loose tube and cord fibre cables.
	1.4 List the advantages of each type of cable.
	1.5 Describe the following specifications as they pertain to fibre optic cables:- <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	2.1 Describe how fibre optic cable may be used to carry video signals in electronic security systems 2.2 Describe how fibre optic cable may be used to carry voice data and control data signals in electronic security systems. 2.3 Describe the transmission of multiplex data using fibre optic cable.
Learning Outcome 3	Describe the common methods of terminating fibre optic cable.
Assessment criteria	3.1 Explain the safe practices required when handling and repairing fibre optic cables. 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.
Learning Outcome 4	Select the correct cable and wiring method.
Assessment criteria	4.1 Recognise cable selection characteristics including: <ul style="list-style-type: none">• 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 AS 3000 and relative rules and instructions for extralow Voltage and data cabling.

Learning Outcome 5	Identify hazards that may be encountered in wiring systems.
Assessment criteria	<p>5.1 Recognise hazardous situations and locations that may cause:-</p> <ul style="list-style-type: none"> • Electric shock • Fire • Explosions • Electromagnetic radiation <p>5.2 Describe the installation of equipment requiring earthing Or is double insulated.</p>
Learning outcome 6	Identify non hard wiring installation methods
Assessment criteria	<p>6.1 Identify methods of transmitted alarm conditions</p> <p>6.2 Identify methods of transmitted arming and disarming of security systems</p> <p>6.3 Identify methods of transmitted video and data signals</p>
Learning outcome 7	Describe modem interface requirements
Assessment criteria	<p>Explain the requirements for DTE to DCE to DCE to DTE</p> <p>7.1 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>7.2 Describe the features and specifications of a Hayes compatible smart modem</p>
Learning outcome 8	Describe modem protocols
Assessment criteria	<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 • Xmodem <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>
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 way to achieve this is by the integration of theory and practice where students learn by experimentation and through research and

Resource requirements

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.

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

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.