

1. Module details

Module name

Installation of Fire Alarm Systems

Suggested structured learning time

A learner possessing the prerequisite skills and knowledge should achieve the module purpose in 60 hours.

Module code

NUE491

Discipline code

0703110

2. Module purpose

This module provides an introduction to the installation of automatic fire detection and alarm equipment. It focuses on standards and codes and the types of equipment used.

3. Learning pathway

Intended use in the structured learning program

This module is intended to supplement supervised workplace experience in installing fire alarm systems. In particular it applies to the installation of fire alarm cabling and components and the relevant regulation and standards.

Therefore before undertaking this module a Learner should have an understanding of how services integrate with building structures and the need to work safely.

Recommended prerequisites

For the most effective learning this module should be undertaken only after modules covering Occupational Health and Safety and NUE490 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 NUEITAB.

5. Content

1. Installation of control and indicating equipment
 - Purpose of fire alarm panels:
Role of fire alarm panels including signal processing, warning device activation, fire brigade notification and control of other systems, all of which are outlined in the BCA and AS1670.
 - Operational principles of fire alarm and indicator panels:
Performance aspects of differing types of fire and indicator panels as set out in AS1670 and AS4428.
 - Types of fire alarm and indicator panels:
Types of fire alarm panels include conventional (collective) and addressable (analogue).
2. Installation of cabling
 - Qualifications of fire system cable installers: it is important that learners be informed that the following regulations apply for work carried out in electrical and telecommunications installations:
 - 1) **Electrical work licensed - State and Territory Licensing Authorities permit licensed electrician only to carry out work on installations covering Low Voltage Fixed Wiring (50 to 1000 volts) as defined by AS/NZ3000:2000**
 - 2) **Cabling Provider Rules (CPR) – The Australian Communications Authority (ACA) has registration rules for those performing telecommunications cabling work. Two levels apply Restricted or Open Cabling Provider Rules**
 - Cabling installation techniques:
Cabling techniques include those designed to protect the cable from fire and reduce interference from other electronic installations.
 - Standards and regulations for cabling:
Cabling installation techniques include those set out in AS1670, AS3000 and the Australian Communications Authority's (ACA) cabling provider rules.
3. Installation of warning devices
 - Installation of visual warning devices:
Installation requirements for visual warning devices include those set out in AS1670.
 - Installation of audible warning devices:
Installation requirements for audible warning devices include those set out in AS1670.

4. Installation of smoke and heat detectors
 - Installation of ionisation, photoelectric and optical beam type smoke detectors:
Installation requirements for smoke detectors include those set out in AS1668 and AS1670 and the BCA.
 - Installation of aspirating smoke detectors:
Installation requirements for smoke detectors include those set out in AS1670 and the BCA and manufacturer's specifications.
 - Installation of heat detectors:
Installation requirements for heat detectors include those set out in AS1670.
5. Commissioning of fire alarm installations
 - Operation of a fire alarm installation:
Commissioning requirements include those set out in the BCA, AS1670 and manufacturers specifications.
 - Conformance documentation:
Conformance documentation includes that required by AS1670, state government building regulations and the Australian Communications Authority (ACA).

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 an environment that is conducive to a learner's development.

7. Learning outcome details

Learning outcome 1

Select, install and commission control equipment (CIE) in accordance with all relevant codes, standards and manufacturers requirements

Assessment criteria

- 1.1 Identify and classify a range of fire alarm panels according to the manufacturer's installation specifications.
- 1.2 Install and connect a range of fire and control indicator panels in various building sites.

Learning outcome 2	Demonstrate the installation techniques required to install cables typically used within fire systems in accordance with all codes, standards and manufacturer's specifications
Assessment criteria	<ul style="list-style-type: none">2.1 State the qualification requirements of fire system cable installers for low voltage (50 –1000 volts) fixed wiring and communication cabling2.2 List various types of cables used within fire alarm installations along with their particular functions.2.3 Select and install mineral insulated metal sheathed cable (MIMS), fire rated cable and data cable in accordance with all codes, standards and manufacturers specifications for a selected application.2.4 Identify the need to comply with Australian Communications Authority (ACA) requirements for cabling connected to the telecommunications network.2.5 State the qualification requirements of fire system cable installers for extra low voltage communication cabling work
Learning outcome 3	Install warning devices in accordance with all codes, standards and manufacturer's specifications.
Assessment criteria	<ul style="list-style-type: none">3.1 Carry out an installation of two types of visual warning devices in accordance with all relevant codes, standards and manufacturer's instructions.3.2 Check the operation of an installed visual warning device to ensure compliance with performance specifications set out in relevant codes and standards.3.3 Carry out an installation of two types of audible warning devices in accordance with all relevant codes, standards and manufacturer's instructions.3.4 Check the operation of an installed audible warning device to ensure compliance with performance specifications set out in relevant codes and standards.
Learning outcome 4	Install smoke and heat detectors in accordance with all codes, standards and manufacturer's specifications.
Assessment criteria	<ul style="list-style-type: none">4.1 Carry out an installation of a photoelectric or ionisation detectors with a base in accordance with all relevant codes, standards and manufacturer's instructions.

- 4.2 Carry out an installation of a photoelectric or ionisation detectors without a base in accordance with all relevant codes, standards and manufacturer's instructions.
- 4.3 Carry out an installation of a heat detector with a base in accordance with all relevant codes, standards and manufacturer's instructions.
- 4.4 Carry out an installation of a heat detector without a base in accordance with all relevant codes, standards and manufacturer's instructions.
- 4.5 Carry out an installation of an optical beam type detector in accordance with all relevant codes, standards and manufacturer's instructions.
- 4.6 Carry out the installation of an aspirating smoke detector system in accordance with all relevant codes, standards and manufacturer's instructions.

Learning outcome 5

Commission a fire alarm installation

Assessment criteria

- 5.1 Identify a range of local and transmitted alarm equipment and classify them according to their correct use.
- 5.2 Configure control outputs of an alarm panel to provide the correct sequence of equipment operation.
- 5.3 Confirm that the software of an alarm panel is configured for the system in which it is being installed.
- 5.4 List the reporting requirements for a commissioned fire alarm installation.
- 5.5 Complete installation and commissioning documentation in accordance with all relevant Regulations, codes, standards and manufacturer's requirements.

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 learning outcome sequence other than that indicated in the module.

Resource requirements

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

Suggested Learning Resource:

- AS1603 Automatic Fire Detection and Alarm Systems
- AS1670 Automatic Fire Detection and Alarm Systems – System design, installation and commissioning (All parts)
- AS1668.1 The use of Mechanical Ventilation and Air-conditioning in Buildings (Part 1: Fire and smoke control in buildings)
- AS1851.8 Maintenance of Fire Protection Equipment (Part 8: Automatic fire detection and alarm systems)
- AS3000 Electrical Installations
- TS-009 Cabling Rules
- FPAA001 Code of Practice for the Installation and Maintenance of Fire Protection Equipment
- BCA96 Building Code of Australia

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

Specialised facilities and equipment required by the training provider include:

- Access to a range of building sites where fire alarm systems are being installed
- Control and indicating equipment
- Visual warning devices and audible warning devices

In addition students will require access to:

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

**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 EEQSBA¹ *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 EEQSBA – ElectroComms and EnergyUtilities Qualifications Standards Body of Australia Ltd.