

1. Module details**Module name****Mains Layout: Underground Mains Design****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

Module code

NUE234

Discipline code

0703130

2. Module purpose

This module provides a general introduction to underground mains design and in particular the design of a low voltage underground service.

3. Prerequisites

NUE229 Mains Layout: Data Acquisition.

4. Relationship to competency standards

This module addresses Unit 4.3 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing.

5. Content**Footpath alignments**

standard

non standard

Location of underground cables and services

use of plans

enterprise

other authorities

Recording site data

measuring distances

site safety

Civil works requirements

footpath cutting and reinstatement

trench cross sections

tunneling

conduits

bends

pits

Cable selection

cable size

ratings

types

cable installation

pulling techniques

Positioning pillars and joints

service pillars
 joint types
 pole terminations
 switchgear termination

6. Assessment strategy

Assessment methods

Short answer questions (written, oral or graphic or computer based).
 Suitable practical exercises which assess the skills required of each learning outcome.

Conditions of assessment

Theory room for written tests together with practical field observation.
 Learners must demonstrate competence in all learning outcomes to the standard described by the assessment criteria and perform all activities in a safe manner in accordance with State Occupational Health and Safety Acts and Regulations, Codes of Practice and Work Procedures when applicable.

7. Learning outcome details

Learning outcome 1

State standard Local Authority footpath alignments.

Assessment criteria

1.1 Interpret excavation notices and local Authority plans for the purpose of extracting relevant data to the industry codes of practice and accuracy.

Learning outcome 2

Locate underground cables and services.

Assessment criteria

2.1 From a video presentation list the visual features on an underground services installation as per industry practices.
 2.2 State the safe methods of lifting pit lids as per codes of practice and work instructions to industry standard accuracy.

Note These performances will be assessed in combination with learning outcome 3.

Learning outcome 3	Observe and record site data for an underground design project.
Assessment criteria	<p>3.1 Locate (on site) various underground services and record this data as input to a mains design project to industry standard accuracy.</p> <p>3.2 Open pits in a safe manner and record incoming ducts and services as inputs to a mains design project.</p>
Learning outcome 4	Nominate civil works requirements from design data.
Assessment criteria	4.1 Create simple underground civil works design using standard trench cross-sections and conduct configurations to industry standard accuracy.
Learning outcome 5	Select a suitable low voltage cable type.
Assessment criteria	5.1 Determine cable sizes and ratings, cable installation methods and pulling techniques as per Australian Standards, codes of practice and work instructions.
Learning outcome 6	Select and position joints, terminations and pillars for low voltage installations.
Assessment criteria	6.1 Determine service pillar positions, joint types, pole and switchgear types of terminations in accordance with Australian Standards, codes of practice and work instructions to industry standard accuracy.
8. Delivery of the module	
Delivery strategy	<p>Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose.</p> <p>It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning sequence other than indicated in the body of this module descriptor.</p>
Resource requirements	<p>Enterprise construction manuals</p> <p>Relevant Australian standards</p> <p>Enterprise work manuals and standing instructions</p> <p>Acts and Regulations</p>
Occupational health and safety requirements	Learners should be made aware of Occupational Health and Safety issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.