Course outline: 443 Telecommunications F102A (Elective option B) UEENEEF102A - Install and maintain cabling for multiple access to telecommunication services

Qualification:	Certificate III in Electrotechnology Electrician - UEE30811
Applicable to:	Learners, industry/employers, governments, community and Global Energy Training Solutions as the provider
Unit of competency:	Accessible from: http://training.gov.au/Training/Details/UEENEEF102A
Related policies:	Policy & Procedure 1 – Enrolment Policy Policy & Procedure 2 – Credit Transfer & Recognition of Prior Learning Policy & Procedure 3 – Learner Support Policy & Procedure 4 – Assessment Policy & Procedure 5 – Academic Misconduct Policy & Procedure 6 – Alcohol & Other Drugs Policy & Procedure 7 – Access, Equity & Diversity Policy & Procedure 8 – Vulnerable People Policy & Procedure 9 – Work, Health & Safety Policy & Procedure 10 – Incident, Injury & Rehabilitation Policy & Procedure 11 – Competency, & Qualification Assessment Decisions Policy & Procedure 12 – Complaints & Appeals Policy & Procedure 13 – Privacy Policy & Procedure 14 – Fees Policy & Procedure 15 – Industry & Employer Engagement Policy & Procedure 16 – Trainers & Assessors Policy & Procedure 17 – Administration & Other Staff Policy & Procedure 18 – Quality Assurance Policy & Procedure 19 – Business & Financial Risk Management Policy & Procedure 20 – Changes to Qualifications or Business Policy & Procedure 21 – Conflict of Interest Policy & Procedure 22 – Records Management Policy & Procedure 23 – Marketing & Advertising
Monitor and review:	Policy & Procedure 18 – Quality Assurance
Responsibility:	Ben Murphy – as Proprietor
Questions/queries:	Feedback and suggestions welcomed: office@gets.com.au (+61) 02 6262 0077

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1. Material requirements

- AS/NZS 3000:2007 incorporating amendment 1 and 2
- Scientific calculator, ruler, pens and pencils
- Note book
- Hand tools
- Covered footwear
- Internet access (provided)

2. Session summaries

Day 1	
Required Skills and Knowledge	Telecommunications telephony and switching T1. Principles and characteristics of sound encompassing: • Sound characteristics • Sound waves • Distortion • Attenuation • Resonant frequency • Sound pressure levels T2. Transmission of sound encompassing: • Compression • Rarefaction • Sound transmission • Wavelength • Inverse square rule (attenuation) • Basic telephone construction T3. Telephone transmitters encompassing: • Telephone transmitter functions • Telephone transmitter types • Capacitive transmitters • Moving coil transmitters T4. Telephone receivers encompassing:

	• Telephone receiver functions • Telephone receiver types T5. Telephone circuits encompassing: • Components • Operation of basic telephone • Operation of basic facsimile machine • Cables used, colour and termination types T6. Overview of earthing and protection encompassing: • Function of earthing • Earthing requirements

Day 2	
Required Skills and Knowledge	T7. Customer switching systems (CSS), interfaces and devices encompassing: • System Distribution Frames (SDF) • Power fail and line interface requirements (e.g. Indial, ISDN, Rotary Groups, Extension, Tie-line circuits and the like) T8. Installation of CSS encompassing: • Documentation • CPR rules • CSS interfaces • CPR rules for SDFs T9. Installation and termination requirements overview encompassing: • ACMA regulations and requirements • Technical standards • Programming of CSS • Metering and Public/Pay Phones T10. Hazards encompassing: • Electronic components and circuits • Printed circuit boards • Physical • Static discharge • Chemical Telecommunications Open CPR regulations T1 Cabling provider rules encompassing: • Cabling registrars, auditors and inspectors • Mandatory and voluntary requirements for cabling work • Registration T2 General installation requirements encompassing: • Cabling provider rules requirements • Earth potential rise • Catenary cabling systems • Optical fibre and coaxial cabling systems • Conduits • Surge suppression devices

Day 3	
Required Skills and Knowledge	T3 Cable distribution devices encompassing: • Cable distribution devices • Clearances • General requirement T4 Indoor cabling encompassing: • General requirements for indoor cabling • Required minimum clearances • Damp situations • Cables in lift and hoist shafts T5 Underground cabling encompassing: • Requirements for underground cabling • Protection of underground cabling • Segregation from other services T6 Aerial cabling encompassing: • Requirements for aerial cabling • Minimum clearances • Segregation requirements T7 Earthing encompassing: • Earthing systems • Earthing of equipment • Equipotential bonding T8 Miscellaneous regulations encompassing: • Cabling in heritage buildings • Cabling in public places • Cabling in hazardous areas

Day 4	
Required Skills and Knowledge	Telecommunications installation practices T1 Telecommunication cable types encompassing: • Construction • Characteristics • Applications T2 Cable identification encompassing: • Plans and drawing • Labelling • Documentation T3 Building structures, materials and sequencing encompassing: • Building types • Timber frame • Brick veneer • Double brick • Metal frame • Parts of a building • Sequence of construction • Stages of construction where electrical work is completed

	• Environmental and heritage awareness purpose and regulations T4 Cable installation encompassing: • Hazards • Cable damage prevention • Cable dispensers • Cable enclosures • Types • Fixing • Regulations • Distribution boxes and back mounts • Systems T5 Termination Boundaries and devices encompassing: • Electrical connections • Hazards • Regulations T6 Cable preparation and terminations and hauling mechanisms encompassing: • Indoor Methods • Outdoor Methods

Day 5	
Required Skills and Knowledge	T7 Earthing concepts encompassing: • MEN System • Communication Earthing System • Telecommunication Reference Conductor • Earthing Cable Shield • Testing • Earth Barriers • Purpose of earth testing instruments • Earth Potential Rise • Earthing test procedures • Interpretation of results T8 Surge suppression and system encompassing: • Purpose • Types • Operation • Installation Techniques • Earthing requirements T9 Cable shielding and interference encompassing: • EMI/RFI Principles • Sources • Reduction Techniques • Earthing Cable Shields T10 Telecommunication earthing systems encompassing: • Hazards • Solutions • Installation • Termination • Line taps • Testing

3. Elements and Performance Criteria

Elements and Performance Criteria require practice and demonstration in the work place.

Element		Performance Criteria	Work Performance
1:Prepare to install and maintain cabling.	1.1	OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.2	Health and safety risks are identified and established risk control measures and procedures are followed in preparation for the work.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.3	Remote power feeding is identified and established risk control measures prepared.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.4	The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.5	Cable routes are planned within the constraints of the building structure, significants and regulations.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.6	Earthing requirements are determined with consideration of existing earthing arrangements, where applicable and of cable system earth upper and lower resistance limitations.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.7	Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.8	Sources of materials that may be required for the work are established in accordance with established routines and procedures.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	1.9	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
2:Install and maintain cabling	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.2	Installed support structure is checked to ensure cable will not be exposed to damage during installation and general operation.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.3	Catenary supports are secured to building structure and tensioned where necessary to ensure cable weight can be carried in operating conditions with interference and safety segregation maintained including adherence to AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.4	Protective earthing of metal work is installed in accordance with requirements and to industry standards.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.5	Cables/wires are handled in accordance with manufacturer's application specifications including tension and bending stress requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.6	Sufficient excess is allowed at cable ends to facilitate termination.	☐ Satisfactory ☐ Needs improvement ☐ Not performed

	2.7	Telecommunication outlet ends of cable are uniquely labelled to match identifier at originating location.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.8	Cable is placed and secured to maintain safety and interference segregation in accordance with legislative and industry standards.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.9	Cable ties not tightened to the point of causing cable sheath damage or transmission impairment are trimmed flush to prevent risk of personal damage.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.10	Cables installed as catenaries or supported by catenaries in external environment shall meet minimum above ground clearances and clearances from hazardous electrical services as per AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.11	Cables installed underground shall meet minimum depth of cover and segregation from hazardous electrical and other services as per AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.12	Over-voltage protection devices are fitted to all cable pairs, where required, to suppress voltage surges with the devices protectively earthed in accordance with AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.13	TRC/CES/Earth wire insulation is protected against damage and TRC/CES and protective earths segregated in accordance with relevant industry and legislative standards AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.14	Procedures for referring non-routine events to immediate supervisor for directions are followed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.15	Cabling is installed efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	2.16	Routine quality checks are carried out to ensure cabling complies with requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
3:Terminate and test cables and earth wires.	3.1	Established OHS risk control measures and procedures for carrying out the work are followed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.2	Cable sheath removed to allow for correct termination length and without damage to underlying conductors and their insulation.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.3	Terminating modules are installed in accordance to manufacturer specifications and cable pairs neatly and sequentially fanned for termination.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.4	Conductors are terminated in accordance with recommended colour code sequence using appropriate termination tools in the manufacturer's specified manner.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.5	Cable shield (if applicable) is earthed to manufacturer specifications and relevant industry codes of practice including AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.6	Visual inspection is undertaken to confirm termination colour code sequence has been followed prior to end-to-end testing of wire and pair termination integrity.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.7	Cable pairs are tested and clearly labelled to provide an accurate identification in accordance with requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed

	3.8	TRC/CES/Earth wires are terminated with connectors recommended by manufacturers in accordance with relevant industry codes of practice including AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.9	TRC/CES /Earth wire continuity is maintained through out and interface requirements with electrical systems are observed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.10	TRC/CES /Earthing installation is tested for continuity, insulation resistance and conductive resistance as per relevant industry standards including AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.11	Earthing system is labelled in accordance with requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.12	Compatibility of alterations with existing systems is confirmed and new work tested both in isolation and when integrated with existing systems.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.13	Procedures for referring non-routine events to immediate supervisor for directions are followed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.14	Cabling is terminated efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	3.15	Routine quality checks are carried out and a defect rectified to ensure cabling complies with requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
4:Complete cabling work, records and reporting.	4.1	OHS work completion risk control measures and procedures are followed.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	4.2	Work site is cleaned and made safe in accordance with established procedures.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	4.3	Record sheets and plans of cable location, type and infrastructure are accurately created or updated and stored in accordance with customer requirements.	☐ Satisfactory ☐ Needs improvement ☐ Not performed
	4.4	Cable pair record books are created or updated to provide an accurate record of pair locations, inter-connections and usage in accordance with industry codes of practice and AS/ACIF S009.	☐ Satisfactory ☐ Needs improvement ☐ Not performed

4. Assessments

Assessment	When	Satisfactory mark/outcome
Theory assessment 1	Day 5	70%
Practical assessment 1	Day 4	100%
Workplace Observation	After theory and practical assessments	Must be valid, sufficient, authentic and current
Employer Competency report		
Structured workplace experience interview		
Note: Once all theory, practical and on-site assessments are complete, competency assessment decisions can be made in conjunction with the learner, employer and registered training organisation.		

5. Version control

Version	Date of release	Author	Authorised by	Position	Rational for change
V1	5/10/2015	Ben Murphy	Ben Murphy	Proprietor	Initial release
V2	7/2/2017	Ben Murphy	Ben Murphy	Proprietor	Added Licensed outcome Added Elements and Performance Criteria