Description	The qualification will provide underpinning knowledge and recognised skills in telecommunications and data installations, design and planning in the workplace.
Venue	Melksham, Wiltshire
Duration	15 Days

Course Overview

Unit 042: Telecommunications Principles (Mandatory Unit)

- **Alternating current (AC) circuits**
- **Effects of line impairments**
- **Characteristics of transmission lines**
- **Transmission of digital signals**
- **Modulating carrier waves**
- **Multiplexing**

Unit 359: Design and plan for an external underground network cabling infrastructure

- **Preliminary surveys**
- **Surveying the site for the provision of cabling infrastructure**
- **Producing preliminary designs**
- **Budget calculation**
- **Relative legislation**
- **3rd party constraints and limitations**

Unit 226: Fibre optic cabling in an external environment

- **Working safely with optical fibres**
- **Installation procedures**
- **Cable preparation**
- **Splicing**
- **Terminating using pigtails**
- **Testing links**

Assessment: **You will be assessed via a combination of online multiple-choice exams, project work and practical competency.**

Description	Cover principles of telecommunications including AC circuits, line impairments and transmissions.
Venue	Melksham, Wiltshire
Duration	5 Days

Course Content

Alternating current (AC) circuits
- **Reactance in circuits**
- **Impedance in terms of resistive and reactive components**
- **Describing series and parallel resonant circuits**
- **Calculating frequency on resonant circuits**

Effects of line impairments
- **dB & dBm's**
- **Signal to noise ratio**
- **Loss & power budgets**

Characteristics of transmission lines
- **Primary line constraints R, G, L and C**
- **Finite and infinite lines**
- **Coaxial**
- **Parallel wires**
- **Calculating bandwidth**

Transmission of digital signals
- **Return, and Non-return to zero digital encoding**
- **Bi-phase digital encoding**
- **Bit rate and bit error rate (BER)**
- **Delay, jitter and binary errors**

Modulating carrier waves
- **Amplitude, frequency and phase shift keying**
- **Shannon/Hartley formula**
- **Baud rate**

Multiplexing
- **Frequency division**
- **Wave division**
- **Synchronous/asynchronous time division**
- **Code division**
- **Digital time division**

City & Guilds 7540

Certificate in ICT Systems and Principles
Unit 226: Fibre Optic Cabling in an
External Environment

Description	Covers the installation, splicing, termination and testing of fibre optic cables
Venue	Melksham, Wiltshire
Duration	5 Days

Course Content

Working safely with copper cabling in an internal environment

- Risk assessments
- Terminating optical fibres
- Relevant legislation
- Testing systems as per standards
- Practical install and testing

Cable preparation and splicing

- Industry tools/equipment
- Cable elements
- Fusion splicing tutorial
- Splicing and dressing into enclosures
- Error messages and basic maintenance
- Parameters and standards

Testing fibre optic systems

- Attenuation
- Optical loss budgets
- Insertion loss testing
- Visual light
- OTDR testing
- Interpreting an OTDR trace
- Documenting test results
- Relevant IT software
- Industry standards and codes of practice

Installation techniques

- Fibre cables dimensions
- Bend radius
- Refractive index
- Termination
- Safe use of hand tools
- Pulling tension
- Cable management
- Inspection methods

City & Guilds 7540

Certificate in ICT Systems and Principles
Unit 359: Design and Plan for an External Network Cabling Infrastructure

Description	Basic principles needed to plan an underground external cable route. Ability to develop and understand how infrastructure is specified, planned and provided.
Venue	Melksham, Wiltshire
Duration	5 Days

Course Content

Survey the site for the provision of an external network cabling infrastructure.
- Data, equipment and tools required
- Hazard identification
- Working safely on site
- Managing variations in plan
- Recording survey findings
- Resource management
- IT software
- Relevant legislation
- 3rd party implications

Schematic designs and detailed plans
- Existing and new infrastructure
- Relevant documentation
- Cost calculations
- Interpreting customer order
- Growth/Strategic planning policies

Identifying a range of options
- Viable options and their importance
- Forecasts
- Existing utilities
- Maintenance and upgrading
- Cost options and implications
- Resource management

Co-ordinate the project
- Work activity delegation
- Programming
- Scheduling work packages
- Resource management
- Critical path analysis
- Scope of works