



# Copper Cabling in an Internal Environment

This unit is concerned with the safe installation, procedures and testing of copper communication cables. With the phenomenal growth of Data Communications and the Internet, there is a real requirement for trained technicians who can install and test data networks for a wide range of applications. Utilising our LIVE Ethernet and LAN/WAN simulators, we bring the reality of the working environment into the classroom. This course gives you all the skills you need to install and test copper based communications cables.

## Outcome 1

Work safely with copper cabling in an internal environment

Practical activities

You will:

- Conduct a risk assessment prior to installation of copper cables in an internal environment
- Work safely when installing, terminating and testing copper cables in an internal environment

### Underpinning knowledge

You will be able to:

- State the rules for safe working with copper cabling when undertaking installation
- State the rules for safe working with copper cabling when carrying out preparation
- State the rules for safe working in terms of electrical safety
- State the safe use of battery/electrically powered test equipment and power leads

## Outcome 2

Understand basic electrical theory and safety with reference to data communications cabling

Practical activities

You will:

- Use a multi-meter to measure voltage and resistance

### Underpinning knowledge

You will be able to:

- State the materials that make up electrical conductors and insulators
- Explain capacitance and inductance and their relationship to an electrical cable

- Identify analogue and digital signals
- Identify SI measurement prefixes
- Describe the relationship between MHz and Mbits
- Explain return loss, equal level far end cross talk (ELFEXT), powersum calculations, delay skew, propagation delay, attenuation-to-crosstalk ratio (ACR), length, attenuation, near end cross talk (NEXT), wire map, dc loop resistance, normal velocity of propagation (NVP) and bandwidth
- State the effect of copper cable signalling
- State the rules for copper cable installation and management

## Outcome 3

Install copper communication cabling, following recommended installation procedures in accordance with current applicable standards

Practical activities

You will:

- Check cable and components before installation
- Undertake a site survey prior to commencing work
- Check that correct cable laying procedures are followed

### Underpinning knowledge

You will be able to:

- State the various cable topologies available for the installation of copper cables
- State the different cable types available for use in copper networks
- State the relevant classes, standards and categories of cabling

- State the installation techniques
- State the rules and any special precautions to be observed when carrying out installation

## Outcome 4

Terminate copper communication cabling

Practical activities

You will:

- Terminate connectors in accordance with manufacturer's recommendations and correctly mount connectors into communications panels, wall and floor boxes, cabinets and frames

### Underpinning knowledge

You will be able to:

- Explain how to use cable preparation and termination tools
- State how to terminate registered jack (RJ) 45 connectors from at least three vendors on to UTP and FTP cabling
- State the method of termination RJ 11/line jack unit (LJU) or other relevant connectors to telephone cable
- State how to terminate Cat 5e patch leads
- State insulation displacement contact (IDC) methods of terminating multi-core copper cables within wiring systems and 110 block wiring systems
- State the rules and any special precautions for termination
- Describe how to terminate co-axial cable with Bayonet N Connectors (BNC)

## Outcome 5

Test FTP, UTP and multi-core copper links

Practical activities

You will:

- Test FTP and UTP copper cable permanent links
- Test a multi-core cable installation
- Test installations to relevant performance standards
- Test a telephone cabling system

### Underpinning knowledge

You will be able to:

- Explain the importance of testing cabling plant installations
- State the applications of national and international wiring standards
- Describe the cabling topology
- Explain the application and use of continuity and loop testing equipment
- Explain split pairs, transposed/crossed pairs, reversed pairs and mixed pairs
- State the correct methods of measuring NEXT from both ends of the cable, ACR, return loss (dB), cable length, (dc) resistance (Ohms), propagation delay, cable attenuation, delay skew, wire maps, FEXT and ELFEXT and powersum calculations
- State the

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