

CITY & GUILDS 3666-02 Unit 1

Certificate in Communications Cabling Level 2

Basic Principles of Communications Systems

This unit is concerned with safe working practices and the basic principles of communications systems.

This is the core unit of the C&G 3666-02 qualification and must be completed in addition to one of the optional units of Unit 2, Unit 3 or Unit 4 to achieve the full Level 2 Certificate in Communications Cabling.



Satellite
Communications



Data Communications



Fibre Optics



Telecommunications and
Information Communication
Technologies

Outcome 1

Identify the safe working practices in communication systems

Underpinning knowledge

You will be able to:

- State the rules for safe working when undertaking installation including:
 1. Statutory requirements
 2. Working in confined spaces and
 3. Electrical safety
- State the rules for safe working when carrying out preparation in terms of
 1. Safe use of cutting and stripping tools
 2. Safe handling and containment of cleaning materials
 3. The disposal of waste material
- State the rules for safe working and any special precautions when splicing in terms of
 1. Identification of hazardous working conditions
 2. Selection and use of tools and materials
 3. The dangers of high voltage systems employed in fusion splicing machines
- State the rules for safe working and any special precautions to be observed when terminating the cables in terms of
 1. Identification of hazardous working conditions
 2. Correct and safe use of tools and equipment
 3. Correct waste disposal
 4. Storage of tools
 5. Safe working when handling cable
 6. Care in using chemicals for cleaning
 7. Care in use of resins and adhesives

Outcome 2

Describe the basic principles of communication systems

Underpinning knowledge

- S1 Units and symbols

You will be able to:

1. Identify basic SI Units
2. Identify names and symbols for preferred SI prefixes
3. Identify waves and wave motion
4. Define amplitude, wavelength (λ), frequency (f) and the unit of frequency (hertz)
5. State the relationship velocity, frequency and wavelength ($v = f\lambda$)
6. Define "efficiency" in terms of input and output energy

- Basic electricity (DC)

You will be able to:

1. Recognise the international standard symbols for electrical components
2. State the effects of an electrical current
3. Distinguish between electrical conductors and insulators
4. State the S1 units of current (ampere), potential difference (volt) and resistance (ohm)
5. State Ohm's law and use the law to solve simple electrical circuit problems

- Communication Systems

You will be able to:

1. State the meaning of "telecommunications"
2. Identify basic communication systems
3. Outline the basic principles of cable systems
4. State the sources of interface
5. List sources of distortion
6. Identify the properties of differing types of transmission links (channels)
7. Identify various methods of communicating over a channel
8. Identify types of information carried by communication systems
9. State the systems available for communication
10. Categorise signals into audio, video and data types
11. State the differences between analogue and digital signals
12. State the meaning of bandwidth
13. State the meaning of the baseband of complex signals
14. Recognise that analogue information may be converted to digital signals and vice versa
15. State that variation of the amplitude, frequency or phase of a carrier wave can be used to convey information
16. State the meaning of "gain" in communication systems
17. State the meaning of "attenuation" in communication systems
18. Explain why gain and attenuation are usually measured in decibels (dBs)
19. State the relationship for the power ratio expressed in dBs for a number of ratios and vice versa
20. Calculate in dBs the overall gain and/or attenuation of simple systems given the gain/attenuation of the individual stages
21. Explain the meaning of multiplexing in communication systems
22. State the advantages and disadvantages of optical fibre compared to copper

- Data Communication

You will be able to:

1. Explain the meaning of a network
2. State that data networks allow computers or other data terminals to exchange information
3. State the advantages of digital communication over analogue methods
4. Recognise that digital networks carry binary information
5. Distinguish between "bits" and "bytes"
6. State the meaning of bit error rate and give typical figures for copper and optical fibre
7. Explain that there are two methods of transporting data: serial and parallel
8. Explain the advantages and disadvantages of transmitting data by serial and parallel methods
9. Identify applications for serial data communication and parallel data communication
10. Explain why "modems" are required for computer communication over analogue lines
11. State that there are three main categories of computer networks
12. Identify the basic topologies of computer networks

Success stories



MARK SKINNER

Ex Royal Marines

Formula 1 Communications Specialist



MAL POWYS

Ex Army

Comms Engineer in Afghanistan

CTTS Ltd

The National Training Centre,
Jubilee Place, Lindum Business Park,
Station Road, North Hykeham,
Lincolnshire LN6 3QX UK
T: +44 (0)1522 880900
F: +44 (0)1522 880901
E: info@cable-training.co.uk
www.cable-training.co.uk