

# Level 2 Award in Communications Cabling

## (3667-02)

Qualification handbook for centres  
QCA number (500/8616/9)



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## **City & Guilds**

**1 Giltspur Street**

**London EC1A 9DD**

**T +44 (0)844 543 0000**

**F +44 (0)20 7294 2413**

**[www.cityandguilds.com](http://www.cityandguilds.com)**

**[centresupport@cityandguilds.com](mailto:centresupport@cityandguilds.com)**

# Level 2 Award in Communications Cabling

## (3667-02)

Qualification handbook for centres

<b>Version and date</b>	<b>Change detail</b>	<b>Section</b>
2.0 Jan 2014	Corrected certification requirements	<b>Centre requirements (section 2.4)</b>
3.0 Jan 2018	Updated test specification coverage	<b>Assessment (section 4.2)</b>

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# 1 Introduction to the qualification

This document contains the information that centres need to offer the following qualification:

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## **Level 2 Award in Communications Cabling**

**City & Guilds qualification number**                      **3667-02**

**QCA accreditation number**                                      **500/8616/9**

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This document includes details and guidance on:

- centre resource requirements
- candidate entry requirements
- information about links with, and progression to, other qualifications
- qualification standards and specifications
- assessment requirements

# 1 Introduction to the qualification

## 1.1 Introduction

This award is aimed at candidates who

- do not have access to an NVQ
- wish for career progression within the industry or related sector
- wish to develop the skills learnt from other qualifications
- require evidence towards the underpinning knowledge of the competence qualifications

The purpose of this qualification is to meet the wide ranging needs of the communications cabling industry which is part of the communication technologies sector. The Level 2 Award in Communications Cabling (3667-02) provides the specialist skills and knowledge required to carry out the installation of fibre optics and copper cabling.

This award is aimed at new entrants, eg school leavers or for adults looking for a change in career, eg. existing engineers. It may also serve as an introduction to the subjects for those in the industry including installation managers and network designers.

This VRQ is designed to contribute towards the knowledge and understanding for the related Level 2 Diploma in ICT Professional Competence, while containing additional skills and knowledge which go beyond the scope of the National Occupational Standards. It provides a valuable alternative for those candidates who do not have access to a competence based qualification.

Vocationally Related Qualifications are available in a range of vocational areas, please contact the Customer Relations Unit at City & Guilds for further information.

## 1.2 Qualification structure

The awards are made up of units expressed in a standard format. Each unit is preceded by details of

- the structure of the unit
- the aims and general coverage of the unit
- the relationship of the unit to the appropriate National Occupational Standards
- the outcomes
- the assessment methods
- signposting of opportunities to generate evidence for Key Skills.

For the Level 2 Award in Communications Cabling the units are

### Core units

101 Basic principles of communications systems

### Optional units

The three distinct pathways and optional units within this award are as follows:

- Fibreoptic cabling in an internal environment
- Fibreoptic cabling in an external environment
- Copper cabling in an internal environment



To gain the Level 2 Award in Communications Cabling, learners must be successful in the assessments for one core unit (101) plus one from the three optional units, (units 102–104). A total of two units are required to achieve the award, which can be achieved in any order

### **1.3 Candidate entry and progression**

These vocationally related awards have been designed by City & Guilds to support government initiatives towards the Qualification Credit Framework. They can contribute towards the knowledge and understanding required for the related NVQ while not requiring or proving evidence of occupational competence.

Centres will need to make an initial assessment of each learner and decide on the suitability of the candidate for this qualification.

This award is aimed at new entrants, eg cable installers or for adults looking to enhance their promotion prospects, eg network engineers and who

- do not have access to an competence based qualification
- wish for career progression within the ICT industry or related sector
- wish to develop skills learnt from other qualifications
- require evidence towards the underpinning knowledge of the related competence based qualification

Learners can progress to the Level 3 Diploma in ICT Professional Competence or Certificate in ICT Systems and Principles if they are in work.

## 2 Centre requirements

### 2.1 Obtaining centre and qualification approval

Centres wishing to offer City & Guilds qualifications must gain approval.

New centres must apply for centre and qualification approval.

Existing City & Guilds centres will need to get specific qualification approval to run this award.

Full details of the process for both centre and qualification approval are given in *Providing City & Guilds Qualifications – a guide to centre and qualification approval*, which is available from City & Guilds' regional offices.

City & Guilds reserves the right to suspend an approved centre, or withdraw its approval from an approved centre, to conduct a particular City & Guilds qualification or particular City & Guilds qualifications, for reasons of debt, malpractice or for any reason that may be detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of City & Guilds.

### 2.2 Centre requirements

#### Approval for global online assessment (GOLA)

This qualification is assessed by global online assessment (GOLA).

In addition to obtaining centre and qualification approval, centres are also required to set up a GOLA profile in order to offer online examinations to learners. Setting up a GOLA profile is a simple process that need only be completed once by the centre.

Details of how to set up the profile and GOLA technical requirements are available on the City & Guilds website [www.cityandguilds.com/e-assessment](http://www.cityandguilds.com/e-assessment). The GOLA section of the website also has details of the GOLA helpline for technical queries and downloads for centres and learners about GOLA examinations.

Centres should also refer to *Providing City & Guilds qualifications – a guide to centre and qualification approval* for further information on GOLA.

## 2.3 Recommended delivery strategies

### Physical resources and site agreements

Centres must have access to sufficient equipment in the centre or workplace to ensure candidates have the opportunity to cover all of the practical activities. It is acceptable for centres to use specially designated areas within a centre for some of the units.

The equipment, systems and machinery must meet British, European or International standards and be capable of being used under normal working conditions.

A list of equipment required to deliver each of the optional units of this qualification can be found under the Assessor's assignment guide section of the Assignment guide, this is available for download from the City & Guilds website at [www.cityandguilds.com](http://www.cityandguilds.com).

### Centre Staff

Centre staff must satisfy the requirements for occupational expertise for this qualification. These requirements are as follows:

- Staff should be technically competent in the areas for which they are delivering training and/or should also have experience of providing training. This will be looked for at the approval stage and will be monitored by the external verification process.
- Assessors and tutors should have at least two years' recent relevant technical experience in the specific area they will be assessing. If this experience is part-time it should be over a period of five years.
- Assessors need to have a greater level of experience and understanding than those they are assessing.

In addition, assessors must demonstrate the ability to mark assignments using externally set criteria.

### Assessors and internal verifiers

While the Assessor/Verifier (A/V) units are valued as qualifications for centre staff, they are not currently a requirement for the qualification.

If a learner's work is selected for external verification, samples of work must be available to the appointed external verifier.

### Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge remains current of the occupational area and of best practice in delivery, mentoring, training, assessment and verification, and that it takes account of any national or legislative developments.

## 2.4 Registration and certification

Full details of City & Guilds' administrative procedures for this qualification are provided in the *Directory of qualifications*, provided online to City & Guilds registered centres via the Walled Garden. This information includes details on:

- registration procedures
- enrolment numbers
- fees
- entry for examinations
- claiming certification.

Centres should be aware of time constraints regarding the registration and certification periods for the qualification.

Centres should follow all guidance carefully, particularly noting that fees, registration and certification end dates for the qualification are subject to change.

For the award of a certificate, learners must successfully complete the assessments for the core unit and one optional unit of their chosen pathway, ie the associated assignment and multiple choice test (online).

- Learners must be registered at the beginning of their course. Centres should submit registrations via the Walled Garden under qualification/complex no 3667-02.
- When assignments have been successfully completed, learner results should be submitted via the Walled Garden. Centres should note that results, ie certificates/certificates of unit credit, will not be processed by City & Guilds until verification records are complete.
- Written (multiple choice) tests are available online. Separate administration procedures exist for these.

## **2.5 Quality assurance**

National standards and rigorous quality assurance are maintained by the use of

- City & Guilds set and marked written tests
- City & Guilds assignments, marked by the centre according to externally set marking criteria, with quality assurance provided by the centre and monitored by City & Guilds' external verification system, to ensure that national standards are maintained.

Quality assurance includes initial centre approval, qualification approval, the centre's own procedures for monitoring quality and City and Guilds' ongoing monitoring by an External Verifier. Details of City & Guilds criteria and procedures, including roles of centre staff and External Verifiers can be found in *Providing City & Guilds Qualifications – a guide to centre and qualification approval*

### 3 Course design and delivery

Tutors/assessors should familiarise themselves with the structure and content of the award before designing an appropriate course; in particular they are advised to consider the knowledge and understanding requirements of the relevant competence qualification.

City & Guilds does not itself provide courses of instruction or specify entry requirements. As long as the requirements for the award are met, tutors/assessors may design courses of study in any way that they feel best meets the needs and capabilities of the learners. Units are broadly the same size and centres may deliver them in any order they wish. Centres may wish to introduce other topics as part of the programme which will not be assessed through the qualifications, eg to meet local needs.

It is recommended that centres cover the following in the delivery of the course, where appropriate:

- Health and safety considerations, in particular the need to impress on learners that they must preserve the health and safety of others as well as themselves
- Spiritual, moral, ethical, social, legislative, economic and cultural issues
- Sustainable development, health and safety considerations
- European development consistent with international agreements

Guided learning hours are an estimate of the amount of time needed to complete this qualification. It includes direct teaching, assessment and directed or supported study. It is recommended that 25 guided learning hours should be allocated for the core unit and 40 guided learning hours should be allocated for each of the optional units. This may be on a full time or part time basis. 65 guided learning hours is the estimated requirement for each level 2 pathway.

No specific prior qualifications, learning or experience are required for candidates undertaking the qualification. However, the nature of both the learning and assessment required for the qualification is such that candidates will need basic literacy and numeracy skills: ie the ability to read and interpret written tasks and to write answers in a legible and understandable form. Candidates will also need to be able to organise written information clearly and coherently, although they will not be assessed for spelling or grammatical accuracy.

## 4 Assessment

Within this Level 2 Award in Communications Cabling (3667), national standards and rigorous quality assurance are maintained by the use of City & Guilds multiple choice test (online) for all units and externally set and verified and internally marked assignments for the optional units

The multiple choice tests assess underpinning knowledge and understanding. Assignments (one per optional unit) assess practical activities. City & Guilds provides an assessor's guide and a candidate's guide for the assignments. As assignments are designed to *sample* the practical activities and underpinning knowledge, it is essential that centres ensure that candidates cover the content of the whole unit.

Assessment components are marked Pass or Fail. A pass is the achievement level required for the knowledge and understanding in competence at level 2 and generally represents the ability to follow instructions and procedures.

For learners with particular requirements, centres should refer to City & Guilds policy document *Access to assessment, learners with particular requirements*.

### 4.1 Summary of assessment methods

Units	Title	Assessment components required	Assessment type
Unit 101	Principles of communications cabling	3667-02-101	Multiple choice test (online)
Unit 102	Fibre optic cabling in an internal environment	3667-02-102 3667-02-202	Multiple choice test (online) Assignment
Unit 103	Fibre optic cabling in an external environment	3667-02-103 3667-02-203	Multiple choice test (online) Assignment
Unit 104	Copper cabling in an internal environment	3667-02-104 3667-02-204	Multiple choice test (online) Assignment

## 4.2 Test specifications

**Paper No: 3667-02-101**

**Subject:** Principles of communications cabling

**Duration:** 1 hour

**Assessment type:** multiple choice online

<b>Section/Heading</b>	<b>Outcome</b>	<b>No of questions</b>	<b>%</b>
Basic principles of communications systems	1. Identify safe working practices in communications systems	7	28
	2. Describe the basic principles of SI Units and symbols	4	16
	3. Describe the basic principles of communications systems	8	32
	4. Describe the basic principles of data communication	6	24
<b>Totals</b>		25	100

## 4.2 Test specifications

**Paper No: 3667-02-102**

**Subject:** Fibre optic cabling in an internal environment

**Duration:** 1 hour

**Assessment type:** multiple choice online

<b>Section/Heading</b>	<b>Outcome</b>	<b>No of questions</b>	<b>%</b>
Fibre optic cabling in an internal environment	1. Work safely with optical fibres in an internal environment	2	8
	2. Follow recommended installation procedures	8	32
	3. Prepare fibre optic cable for fibre connectorisation and splicing	2	8
	4. Splice together optical fibres	5	20
	5. Terminate fibre optic cables by fitting connectors	4	16
	6. Test fibre optic links	4	16
<b>Totals</b>		25	100



## 4.2 Test specifications

**Paper No: 3667-02-103**

**Subject:** Fibre optic cabling in an external environment

**Duration:** 1 hour      **Assessment type:** multiple choice online

<b>Section/Heading</b>	<b>Outcome</b>	<b>No of questions</b>	<b>%</b>
Fibre optic cabling in an external environment	1. Work safely with optical fibres in an external environment	3	12
	2. Follow recommended installation procedures	7	28
	3. Prepare fibre optic cable for fibre connectorisation and splicing	2	8
	4. joint fibre optic cables by splicing	5	20
	5. Terminate fibre optic cables by splicing on pre-terminated pigtails	4	16
	6. Test fibre optic links	4	16
<b>Totals</b>		25	100

## 4.2 Test specifications

**Paper No: 3667-02-104**

**Subject:** Copper cabling in an internal environment

**Duration:** 1 hour      **Assessment type:** multiple choice online

<b>Section/Heading</b>	<b>Outcome</b>	<b>No of questions</b>	<b>%</b>
Copper cabling in an internal environment	1. Work safely with copper cabling in an internal environment	3	12
	2. understand basic electrical theory and safety with reference to data communications cabling	7	28
	3. Install copper communications cabling, following recommended installation procedures in line with current applicable standards	5	20
	4. Terminate copper communications cabling	5	20
	5. Test FTP/UTP and multicore copper links	5	20
<b>Totals</b>		25	100

## 5 Units

### Availability of units

The units for this qualification are available to download from the City & Guilds website at **[www.cityandguilds.com](http://www.cityandguilds.com)**

### Structure of units

The units in this qualification are written in a standard format and comprise the following:

- title
- level
- credit value
- unit aim
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria

**Level:** 2

**Credit value:** 3

**NDAQ number:** M/600/8494

### **Rationale**

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

### **Outcomes**

There are **4** outcomes to this unit. The candidate will be able to:

- 1 identify safe working practices in communications systems
- 2 describe the basic principles of SI Units and symbols
- 3 describe the basic principles of communications systems
- 4 describe the basic principles of data communication

### **Guided learning hours**

The recommended guided learning hours for this unit are **25**

### **Connection with other awards**

This unit contributes towards the knowledge and understanding required for the level 2 Diploma in ICT Professional Competence

### **Assessment**

Assessment will be by means of a multiple choice test (online) based on the test specification, covering underpinning knowledge. Candidates must successfully complete the on-line multiple choice test to achieve the unit.

## Unit 101

## Principles of communications cabling

### Outcome 1

### Identify safe working practices in Communication systems

#### Underpinning knowledge

The candidate will be able to

- 1 state the rules for safe working when undertaking installation eg
  - statutory requirements, Health and Safety at Work Act (HASAWA)/Control of Substances Hazardous to Health (COSHH) or relevant national safety standards
  - working in confined spaces
  - electrical safety including grounding/bonding
  - fire stopping
  - asbestos awareness
- 2 state the rules for safe working when carrying out preparation in terms of
  - safe use of cutting and stripping tools
  - safe handling and containment of cleaning materials
  - the disposal of waste material
- 3 state the rules for safe working and any special precautions when carrying out a communications installation in terms of
  - identification of hazardous working conditions
  - selection and use of tools and materials
  - hazardous environment
- 4 state the rules for safe working and any special precautions to be observed when terminating cables in terms of
  - identification of hazardous working conditions
  - correct and safe use of tools and equipment
  - correct waste disposal
  - storage of tools
  - safe working when handling cable
  - care in using chemicals for cleaning
  - care in use of resins and adhesives.

## Unit 101

### Outcome 2

## Principles of communications cabling

Describe the basic principles of SI units and symbols

### Underpinning Knowledge

The candidate will be able to:

- 1 identify basic SI units
  - metre (m)
  - kilogram (kg)
  - second (s)
  - ampere (A)
  - Kelvin (K)
- 2 identify names and symbols for preferred SI prefixes
  - tera (T)
  - giga (G)
  - mega (M)
  - kilo (k)
  - milli (m)
  - micro ( $\mu$ )
  - nano (n)
  - pico (p)
- 3 identify waves and wave motion
  - sound waves
  - electromagnetic waves
- 4 define amplitude, wavelength ( $\lambda$ ), frequency (f) and the unit of frequency (hertz)
- 5 state the relationship between velocity, frequency and wavelength ( $v = f\lambda$ )

## Unit 101

## Principles of communications cabling

### Outcome 3

Describe the basic principles of communications systems

#### Underpinning Knowledge

The candidate will be able to:

- 1 state the meaning of 'telecommunications'
- 2 identify basic communication systems
  - information source (transmitter)
  - information destination (receiver)
  - transmission/ transfer link (communications channel)
- 3 outline the basic principles of cable systems: eg the source is directly connected to the receiver by means of cable links; attenuation is directly proportional to the distance travelled
- 4 state the sources of interference: eg electromagnetic radiation and unwanted signals
- 5 list sources of distortion: eg non-linearity, harmonics
- 6 identify the properties of differing types of transmission links (channels)
  - properties: typical attenuation in dB, normalised attenuation in dB/km, susceptibility to interference, unwanted radiation of signals
  - fixed links: wired (shielded and unshielded copper multipairs, shielded and unshielded copper twisted pairs, copper coaxial), optical fibre
- 7 identify various methods of communicating over a channel
  - simplex (one-way communication)
  - duplex (two-way communication)
  - half/semi-duplex (two-way communication but only one-way at any one time)
  - broadcast
  - serial
  - parallel
- 8 identify types of information carried by communication systems: eg sound, picture or data
- 9 state the systems available for communication eg internet, telephone, radio and television
- 10 categorise signals into audio, video and data types
- 11 state the difference between ac and dc signals
- 12 identify the following terms in relation to ac signals: frequency, amplitude, phase, wavelength, period, velocity, harmonics
- 13 state the differences between analogue and digital signals
- 14 state the meaning of bandwidth
- 15 state the meaning of the baseband of complex signals
- 16 distinguish between baseband and broadband
- 17 recognise that analogue information may be converted to digital signals and vice versa

- 18 state that variation of the amplitude, frequency or phase of a carrier wave can be used to convey information
- 19 state the meaning of 'gain' in communication systems
- 20 state the meaning of 'attenuation' in communication systems
- 21 explain why gain and attenuation are usually measured in decibels (dBs)
- 22 state the relationship for the power ratio expressed in dBs for the following ratios and vice versa:
  - 2 (3dB)
  - 4 (6dB)
  - 8 (9dB)
  - 10 (10dB)
  - 100 (20dB)
  - 1000 (30dB)
  - 1000000 (60dB)
  - 1/2 (-3dB)
  - 1/4 (-6dB)
  - 1/8 (-9dB)
  - 1/10 (-10dB)
  - 1/100 (-20dB) etc
- 23 calculate, in dBs, the overall gain and/or attenuation of simple systems given the gain/attenuation of the individual stages
- 24 explain the meaning of multiplexing in communication systems
- 25 state the advantages and disadvantages of optical fibre compared to copper.



## Unit 101

## Principles of communications cabling

### Outcome 4

Describe the basic principles of data communication

#### Underpinning knowledge

The candidate will be able to:

- 1 state that data networks allow computers or other data terminals to exchange information
- 2 state the advantages and disadvantages of digital communication
- 3 state the advantages and disadvantages of analogue communications
- 4 identify analogue and digital signals eg
  - a analogue signal and the basic concepts of voice and video signals
  - b how digital signals are produced
  - c why digital signals are used rather than analogue
  - d the methods by which digital signals are transmitted
- 5 state that binary encoding is typically used on digital networks
- 6 distinguish between 'bits' (b) and 'bytes' (B)
- 7 state the meaning of bit error rate (BER) and give typical figures for copper and optical fibre systems
- 8 explain that there are two methods of transmitting data: serial using a single transmission line and parallel using multiple lines
- 9 explain the advantages of transmitting data by these two methods:
  - serial: can be used over longer distances
  - parallel: can send higher data rates over shorter distances
- 10 identify applications for serial data communication and parallel data communication
- 11 explain why 'modems' are required for computer communication
- 12 state the main categories of computer networks:
  - local area networks (LAN)
  - metropolitan area networks (MAN)
  - wide area networks (WAN)
  - storage area network (SAN)
- 13 identify the basic topologies of computer networks: eg star, bus, ring.

**Level:** 2

**Credit value:** 6

**NDAQ number:** K/501/3957

### Rationale

This unit is concerned with the installation, splicing, connectorisation, termination and testing of fibre optic cable in a typical datacomms environment, characterised by low fibre count cables (typically less than 24 fibres) terminated in patch panels/equipment racks. This would usually take place in an indoor environment involving multimode and singlemode end to end cabling.

### Learning outcomes

There are **six** learning outcomes to this unit. The candidate will be able to:

- 1 work safely with optical fibres in an internal environment
- 2 follow recommended installation procedures
- 3 prepare fibre optic cable for fibre connectorisation and splicing
- 4 splice together optical fibres
- 5 terminate fibre optic cables by fitting connectors
- 6 test fibre optic links

### Guided learning hours

The recommended guided learning hours for this unit are **40**

### Connection with other awards

This unit contributes towards the knowledge and understanding required for the level 2 Diploma in ICT Professional Competence

### Assessment

The outcomes from this unit will be assessed by the following two methods:

- Practical activities will be assessed by means of a set assignment for the unit.
- Underpinning knowledge will be assessed by means of a multiple choice online test based on the test specification.

Candidates must successfully complete **both** the **on-line multiple choice test and the practical assignment** to achieve the unit.

## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 1

Work safely with optical fibres in an internal environment

#### Practical Activities

The candidate will be able to:

- 1 conduct a risk assessment prior to installation of optical fibres in an internal environment
- 2 work safely when installing, splicing, terminating and testing optical fibre in an internal environment.

#### Underpinning knowledge

The candidate will be able to:

- 1 state the rules for safe working when undertaking the installation of fibre cables eg
  - statutory requirements, HASAWA/COSHH or relevant national safety standards
  - laser safety and the Optical Radiation Directive (ORD)
- 2 state the rules for safe working with fibre cables when carrying out preparation in terms of
  - safe use of cutting and stripping tools
  - safe handling and containment of cleaning materials
  - proper disposal of waste material
- 3 state the rules for safe working and any special precautions when splicing in terms of
  - identification of hazardous working conditions
  - understanding the dangers of high voltage systems employed in fusion splicing machines
- 4 state the rules for safe working and any special precautions to be observed when terminating fibres onto connectors in terms of
  - identification of hazardous working conditions
  - use of tools and equipment
  - disposal of waste material
  - handling fibre cable
  - use of chemicals for cleaning
  - use of resins and adhesives

## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 2

Follow recommended installation procedures

#### Practical activities

The candidate will be able to

- 1 check cable and components before installation
- 2 ensure that specified cable laying procedures are followed
- 3 test laid cable before jointing/termination
- 4 follow verbal and written work plans and instructions

#### Underpinning knowledge

The candidate will be able to

- 1 state the use of fibre optics in LANs
- 2 distinguish between the following types of optical fibre
  - single-mode
  - multimode
  - graded-index
  - stepped-index
- 3 state the fibre specifications and parameters
  - core/cladding diameters
  - buffer or secondary (buffer) and primary coating diameters
  - refractive index
  - numerical aperture
  - attenuation
  - operational wavelengths
  - operational characteristics of LEDs and lasers
  - laser enhanced fibres eg principles of reduced attenuation and increased bandwidth for restricted mode launch conditions in multimode fibres

- 4 state the recommended fibre and cable inspection test methods and documentation
  - visual checks and optical
  - continuity
  - point defects
  - length certification
  - component documentation insertion loss and return loss
  - return loss and reflectance
- 5 identify the component parts of an optical fibre used in communication systems
- 6 state the use of the following components
  - termination enclosures
    - a glands
    - b couplings
    - c mountings
    - d fibre management tray
    - e grounding/bonding
  - connectors
  - pre-terminated cable assemblies
- 7 explain the main types of equipment used for cable installation eg rods, pulling ropes, fuse link protectors, socks, grips, fused connectors and swivels
- 8 state best practice for undertaking cable installation and fibre management in terms of
  - a cable tensile strength
  - b minimum bend radius (MBR)
  - c adequate protection and support
  - d correct identification and labelling
  - e provision of spare cable
- 10 state the methods of testing laid cable before jointing/termination in relation to
  - a point defects
  - b fibre continuity

## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 3

Prepare fibre optic cable for fibre connectorisation and splicing

#### Practical activities

The candidate will be able to:

- 1 prepare cable for connectorisation and splicing
- 2 prepare coated fibre for connectorisation and splicing.

#### Underpinning knowledge

The candidate will be able to

- 1 state the characteristics of cables as indoor/outdoor/universal
  - breakout
  - distribution
  - loose tube
  - single ruggedised
  - single fibre cable
- 2 state the basic constructional features of fibre optic cable and coatings in relation to
  - fibre size
  - fibre coating
  - material combinations
- 3 select and use cable cutting and stripping tools
  - Kevlar cutters
  - jacket stripper
  - sheath remover
  - primary stripper
  - secondary strippers
- 4 state the purpose and use of fibre cleaning materials and the techniques involved in relation to
  - degreasing solvents
  - solvent application

- 5 state the rules and any special precautions to be observed when carrying out preparation in terms of
- correct use of cutting and stripping tools
  - required fibre lengths for application
    - a connectorisation
    - b splicing
    - c patching
  - care in handling optical fibre cable

## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 4

### Splice together optical fibres

#### Practical activities

The candidate will be able to:

- 1 prepare bare fibre for splicing
- 2 splice fibres using fusion splice techniques
- 3 splice fibres, using mechanical splice techniques where appropriate

#### Underpinning knowledge

The candidate will be able to

- 1 explain the benefits and criteria for using the main splice methods eg
  - fusion
  - mechanical
- 2 state the working principles of splicing in terms of
  - fibre preparation techniques
  - cleaving methods
  - splicing methods
  - splicing on pigtailed
- 3 explain how to use fibre cleaving tools and the fibre preparation techniques
- 4 state the possible causes of faults in cleaving caused by
  - incorrect cleave angle
  - hackle
  - burrs
  - ingress of dirt
  - inadequate fibre length
  - problems with fibre coatings
- 5 identify splice equipment according to range and application in relation to
  - fusion splice machines (including manual and automatic)
  - the selection of splicing program for multimode and singlemode fibre
- 6 identify mechanical splices, accessories and splice protection housings
- 7 identify splice protection systems for working within patch panels
- 8 identify potential problems when undertaking splicing and describe possible causes
- 9 state the performance requirements of splices according to European standards



## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 5

### Terminate fibre optic cables by fitting connectors

#### Practical activities

The candidate will be able:

- 1 fit a variety of fibre optic connector styles, to a minimum of two cables. At least one of the termination techniques should be pot and polish.

#### Underpinning knowledge

The candidate will be able to

- 1 state the types and uses of common connectors in current use for appropriate termination methods
  - connectors eg
    - i. Straight Tip (ST)
    - ii. Subscriber Connector (SC)
    - iii. fibre connector (FC) / physical contact (PC)
    - iv. Latch Connector (LC)
  - termination methods eg
    - i. epoxy plus polish
    - ii. rapid termination techniques including anaerobic adhesive, pre-glued, pre-polish and crimp types
- 2 identify termination tools and materials eg
  - crimp
  - scribe
  - curing oven
  - polishing tools
  - epoxy/syringe
  - polishing papers
- 3 state the fitting procedures for connectors in relation to
  - fibre preparation
  - cable termination
  - testing

- 4 state the possible causes of common faults in termination eg
  - chip
  - crack
  - scratch
  - pitting
  - concentricity error
- 5 state the performance tests for termination
  - visual inspection by microscope
  - Code of Practice inspection criteria defined in current European standards
  - insertion loss measurement

## Unit 102

## Fibre optic cabling in an internal environment

### Outcome 6

### Test fibre optic links

#### Practical activities

The candidate will be able to

- 1 test fibre continuity using a visible light source
- 2 measure the insertion loss using an infra-red light and power meter
- 3 test link performance using Optical Time Domain Reflectometer (OTDR) techniques
- 4 document test results

#### Underpinning knowledge

The candidate will be able to

- 1 explain how to perform loss calculations
- 2 state the range of test methods and the purpose of testing to measure cable performance in relation to
  - fibre and connector loss
  - insertion loss
  - individual component loss
  - fibre continuity
  - fibre and system lengths
- 3 state the uses of the following test equipment
  - visible light source
  - light source and power meter
  - OTDR
- 4 explain how to use insertion loss testing equipment and procedures to measure
  - connector insertion loss
  - cabling system losses
- 5 identify the following features on an OTDR trace
  - fault location of breaks and ends
  - measurement of fibre loss
  - splice loss
  - connector insertion and return loss
  - distance measurements

- 6 state typical procedures for testing eg
  - terminated fibre
  - unterminated fibre
  - test directions
- 7 explain how to apply and operate test equipment to prevent sources of error by
  - calibration
  - launch stability
  - test lead connection
  - spatial resolution
  - elimination of ghosting
  - fibre mismatch
  - minimisation of dead zone
- 8 document test results and compare with acceptable link and component performance

**Level:** 2

**Credit value:** 5

**NDAQ number:** M/501/3958

### **Rationale**

This unit is concerned with the installation, splicing, termination and testing of fibre optic cables, typically a multi-element, singlemode fibre cable of at least 24 fibres, used in an external environment.

### **Outcomes**

There are **six** outcomes to this unit. The candidate will be able to:

- 1 work safely with optical fibres in an external environment
- 2 follow recommended installation procedures
- 3 prepare fibre optic cable for fibre splicing
- 4 joint fibre optic cables by splicing
- 5 terminate fibre optic cables by splicing on pre-terminated pigtails
- 6 test fibre optic links.

### **Guided learning hours**

The recommended guided learning hours for this unit are **40**

### **Connection with other awards**

This unit contributes towards the knowledge and understanding required for the level 2 Diploma in ICT Professional Competence

### **Assessment**

The outcomes from this unit will be assessed using the following assessment methods

- Practical activities will be assessed by means of a set assignment for the unit
- Underpinning knowledge will be assessed by means of a multiple choice online test based on the test specification.

Candidates must successfully complete both assessments to achieve the unit.

## Unit 103

## Fibre optic cabling in an external environment

### Outcome 1

Work safely with optical fibres in an external environment

#### Practical activities

The candidate will be able to:

- 1 conduct a risk assessment prior to installation of optical fibres in an external environment
- 2 work safely when installing, splicing, terminating and testing optical fibre in an external environment.

#### Underpinning knowledge

The candidate will be able to

- 1 state the rules for safe working when undertaking installation
  - a statutory requirements, HASAWA/COSHH and New Roads and Street Works Act (NRSWA) or relevant national safety standards
  - b laser safety and the Optical Radiation Directive (ORD)
- 2 state the rules for safe working when carrying out preparation in terms of
  - a cutting and stripping tools
  - b handling and containment of cleaning materials
  - c disposal of waste material
- 3 state the rules for safe working and any special precautions when splicing in terms of
  - a identification of hazardous working conditions
  - b use of tools and materials
  - c disposal of waste material
  - d the dangers of high voltage systems employed in fusion splicing machines
  - e use of heat guns when shrinking down cable gland onto joint enclosures
- 4 state the rules for safe working and any special precautions to be observed when testing with reference to
  - a identification of hazardous working conditions
  - b correct handling of optical fibre cable and connectors
  - c correct and safe use of test equipment
  - d avoidance of eye-damage from visible and infra-red radiation using lasers and LED based systems.

## Unit 103

## Fibre optic cabling in an external environment

### Outcome 2

Follow recommended installation procedures

#### Practical activities

The candidate will be able:

- 1 check cable and components before installation
- 2 check that correct cable laying procedures are followed
- 3 test laid cable before jointing/termination
- 4 follow verbal or written work plans

#### Underpinning knowledge

The candidate will be able to

- 1 explain the use of fibre optics in the communications network
- 2 state the fibre specifications and parameters in terms
  - a nominal core/cladding diameters
  - b buffer or secondary (buffer) and primary coating diameters
  - c refractive index
  - d numerical aperture
  - e attenuation
  - f operational wavelengths including C and L band
- 3 state the recommended fibre and cable inspection test methods and documentation
  - a visual checks
  - b continuity
  - c point defects
  - d length verification
  - e component documentation insertion loss
  - f return loss and reflectance
- 4 state the use of the following components
  - a termination and joint enclosures
    - i. glands
    - ii. couplings
    - iii. mountings
  - b connectors
  - c cable assemblies

- 5 explain the use of installation equipment
  - a winches, fused connectors and swivels, blowing equipment, gas testing
- 6 state the requirements for checking cable and components in accordance with relevant European standards
- 7 state the best practice for undertaking cable installation and fibre management in terms of
  - a cable tensile strength
  - b minimum bend radius
  - c adequate protection and support
  - d correct identification and labelling
  - e provision of spare cable
- 8 state the methods of testing laid cable before joints/termination in terms of
  - a fibre continuity
  - b OTDR testing.



## Unit 103

## Fibre optic cabling in an external environment

### Outcome 3

### Prepare fibre optic cable for fibre splicing

#### Practical activities

The candidate will be able to:

- 1 prepare cable for splicing
- 2 prepare coated fibre for splicing

#### Underpinning knowledge

The candidate will be able to

- 1 identify characteristics of cables as indoor, outdoor and universal, eg
  - a breakout
  - b distribution
  - c loose tube
  - d single ruggedised
  - e mini loose tube/microsheath
  - f ribbon
  - g blown fibre
- 2 state basic constructional features of singlemode fibre cable and coatings in relation to
  - a fibre size and type
  - b fibre coating
  - c material combinations
- 3 select and use cable cutting and stripping tools eg
  - a Kevlar cutters
  - b jacket stripper
  - c sheath remover
  - d primary stripper
  - e secondary stripper
- 4 state the purpose and use of fibre cleaning materials and the techniques involved in relation to
  - a degreasing solvents
  - b solvent application
- 5 state the rules and any special precautions to be observed when carrying out preparation in terms of
  - a correct use of cutting and stripping tools
  - b required fibre lengths for splicing applications
    - i. splicing
    - ii. connectorisation
  - c care in handling fibre cable

## **Unit 103      Fibre optic cabling in an external environment**

### **Outcome 4      Joint fibre optic cables by splicing**

#### **Practical activities**

The candidate will be able to:

- 1      set up working environment for outdoor cable jointing
- 2      prepare bare fibre for splicing
- 3      splice fibres using fusion splice techniques
- 4      organise cables, tubes and fibres into joint housing
- 5      seal joint enclosure.

#### **Underpinning knowledge**

The candidate will be able to

- 1      state the requirements for a cable jointing environment
- 2      state the working principles of splicing in terms of
  - a      fibre preparation techniques
  - b      cleaving methods
  - c      splicing methods
  - d      splicing on pigtails
- 3      explain how to use fibre cleaving tools
- 4      state the possible causes of faults in cleaving, eg
  - a      incorrect cleave angle
  - b      burrs
  - c      ingress of dirt
  - d      inadequate fibre length
  - e      problems with fibre coatings
- 5      identify splice equipment according to range and application in relation to
  - a      fusion splice machines (including manual and automatic)
  - b      selection of splicing program
- 6      identify mechanical splices, accessories and splice protection housings
- 7      identify potential problems when undertaking splicing and describe possible causes
- 8      describe the use of splice management and protection systems and procedures for working with multi element cables within a joint housing

- 9 state the sealing and cable retention methods for joint closure systems
- 10 state the rules and special precautions for splicing in terms of
  - a use of tools and materials
  - b identification of acceptable/unacceptable cleaves and splices
  - c handling optical fibre cable.

## Unit 103

## Fibre optic cabling in an external environment

### Outcome 5

Terminate fibre optic cable by splicing on pre-terminated pigtails

#### Practical activities

The candidate will be able to:

- 1 set up work environment for cable termination
- 2 organise cables, tubes and fibres into Optical Distribution Frame (ODF)
- 3 prepare bare fibre for splicing
- 4 prepare secondary coated fibre for splicing
- 5 splice fibres using fusion splice techniques.

#### Underpinning knowledge

The candidate will be able to

- 1 state a range of connectors suitable for a telecomms environment
- 2 state the requirements for efficient and effective cable termination
- 3 state the working principles of splicing in terms of
  - a fibre preparation techniques
  - b cleaving methods
  - c splicing methods
- 4 explain how to use fibre cleaving tools and the correct fibre preparation techniques
- 5 state the possible causes of faults in cleaving, eg
  - a incorrect cleave angle
  - b burs
  - c ingress of dirt
  - d inadequate fibre length
  - e problems with fibre coating
- 6 identify splice equipment according to range and application in relation to
  - a fusion splice machines (including manual and automatic)
  - b the selection of splicing program
- 7 state the use of a variety of mechanical splices, accessories and splice protection housings
- 8 state the use of splice management and protection systems and procedures for working with multi element cables within an ODF.

## Unit 103

## Fibre optic cabling in an external environment

### Outcome 6

### Test fibre optic links

#### Practical activities

The candidate will be able to:

- 1 test fibre continuity using a visible light source
- 2 measure the insertion loss using an infra-red light and power meter
- 3 test link performance using OTDR techniques
- 4 Record results of acceptable link and performance with reference to relevant specification.

#### Underpinning knowledge

The candidate will be able to

- 1 state the range of test methods and the purpose of testing to measure cable performance in relation to
  - a fibre and connector loss
  - b fibre continuity
  - c splice loss
  - d fibre and system lengths
  - e loss budgets
- 2 state the use and principles of operation of the following test equipment
  - a visible light source
  - b light source and power meter
  - c OTDR
- 3 Explain how to apply and operate an OTDR in terms of
  - a fault location of breaks and bends
  - b measurement of fibre loss
  - c splice loss
  - d connector insertion and return loss
  - e distance measurements
- 4 state the procedures for testing in accordance with relevant European standards and test conditions
  - a terminated fibre
  - b unterminated fibre
  - c test directions
- 5 explain how to apply and operate test equipment to prevent sources of error by
  - a calibration
  - b launch stability
  - c test lead connection
  - d cladding modes
  - e spatial resolution
  - f elimination of ghosting
  - g fibre mismatch
  - h minimisation of dead zone
- 6 document test results and compare with acceptable link and component performance

**Level:** 2

**Credit value:** 6

**NDAQ number:** F/600/6815

### Unit aim

This unit is concerned with the safe installation, procedures and testing of copper communication cables.

### Outcomes

There are **five** outcomes to this unit. The candidate will be able to:

- 1 work safely with copper cabling in an internal environment
- 2 understand basic electrical theory and safety with reference to data communications cabling
- 3 install copper communication cabling, following recommended installation procedures in accordance with current applicable standards
- 4 terminate copper communication cabling
- 5 test FTP, UTP and multicore copper links.

### Guided learning hours

The recommended guided learning hours for this unit are **40**

### Connections with other awards

This unit contributes towards the knowledge and understanding required for the level 2 Diploma in ICT Professional Competence

### Assessment

The outcome from this unit will be assessed using the following assessment methods

- Practical activities will be assessed by means of a set assignment for the unit
- Underpinning knowledge will be assessed by means of a multiple choice online test based on the test specification.

Candidates must successfully complete **both assessments to achieve the unit.**

## **Unit 104**

### Outcome 1

## **Copper cabling in an internal environment**

Work safely with copper cabling in an internal environment

### **Practical activities**

The candidate will be able to:

- 1 conduct a risk assessment prior to installation of copper cables in an internal environment
- 2 work safely when installing, terminating and testing copper cables in an internal environment

### **Underpinning knowledge**

The candidate will be able to state the rules for :

- 1 safe working with copper cabling when undertaking installation eg statutory requirements HASAWA/COSHH or relevant national safety standards working in confined spaces
- 2 safe working with copper cabling when carrying preparation in terms of use of tools and equipment, personal safety requirements, identification of hazardous work conditions
- 3 safe working in terms of electrical safety eg compliance with BS7671 or relevant national standard, use of earthing
- 4 the safe use of battery/electrically powered test equipment and power leads

## Unit 104

## Copper cabling in an internal environment

### Outcome 2

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

#### Practical activities

The candidate will be able to:

- 1 use a multi-meter to measure voltage and resistance
- 2 use Ohm's law to solve simple electrical circuit problems

#### Underpinning knowledge

The candidate must be able to

- 1 distinguish between different electrical conductors and different insulators
- 2 state the materials that make up electrical conductors and insulators
- 3 explain capacitance and inductance and their relationship to a copper cable
- 4 recognise the international standard symbols for electrical components
- 5 state the effects of an electric current
  - heating
  - chemical
  - magnetic
- 6 state the SI units of current (ampere), potential difference (volt) and resistance (ohm)
- 7 state Ohm's law and its use in solving simple electrical circuit problems
- 8 describe the relationship between MHz and Mbits
- 9 explain the following test parameters
  - 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
  - nominal velocity of propagation (NVP)
  - bandwidth
- 10 state the effect of signalling when using copper communications cables with respect to
  - basic concept of characteristic impedance ( $Z_0$ )
  - the reason for maintaining the twist in copper pairs and their effect on the cable's characteristic impedance
  - the cable's characteristic impedance of not complying with the minimum bend radius
  - applying excessive pull tension
- 11 state the rules for copper cable installation and management in terms of compliance with European and International standards
- 12 interpret cable wiring diagrams.



## Unit 104

## Copper cabling in an internal environment

### Outcome 3

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

#### Practical activities

The candidate will be able to:

- 1 check cable and components before installation
- 2 undertake a site survey prior to commencing work
- 3 check that correct cable laying procedures are followed.

#### Underpinning knowledge

The candidate must be able to

- 1 describe the various cable topologies available for the installation of copper cables eg
  - point to point
  - star
  - branching tree
  - bus
  - ring
  - grid
  - mesh
- 2 state the different cable types available for use in copper networks eg
  - coaxial cables
  - multi-core cables
  - unshielded twisted pair (UTP)
  - shielded twisted pair (STP)
  - foil screen twisted pair (FTP)
  - supplementary/secondary shielded TP cable types
- 3 state the relevant classes, standards and categories of cabling including categories 5e and 6 and classes D and E
- 4 state requirements for
  - a interpreting wiring diagrams and drawings
  - b fixing cabling communication racks
  - c providing cable supports and wall fixing
  - d fixing horizontal and vertical cables
  - e interpreting cable labelling and colour codes
  - f compliance with appropriate building regulations
- 5 state the rules and any special precautions to be observed when carrying out installation
- 6 state the rules and any special precautions to be observed when carrying out a site survey

## Unit 104

## Copper cabling in an internal environment

### Outcome 4

### Terminate copper communication cabling

#### Practical activities

The candidate will be able to:

- 1 terminate hardware in accordance with manufacturer's recommendations and correctly mount into communications panels/wall/floor boxes/cabinets and frames, etc.
- 2 terminate registered jack (RJ) 45 connectors from at least three vendors on to UTP and FTP cabling

#### Underpinning knowledge

The candidate must be able to

- 1 explain how to use cable preparation and termination tools
- 2 state how to terminate Cat.5e patch leads
- 3 state insulation displacement contact (IDC) methods of terminating multi-core copper cables within wiring systems and 110 block wiring systems
- 4 state the method of terminating line jack units (LJUs) to telephone cable
- 5 state the rules and any special precautions for termination in terms of
  - a problems with incorrect cable termination
  - b selection and use of tools and connectors
- 6 identify in which situations/environments you would use stranded and solid core cables

## Unit 104

## Copper cabling in an internal environment

### Outcome 5

### Test FTP, UTP and multicore copper links

#### Practical activities

The candidate will be able to:

- 1 use a range of commercially available cable testing equipment that will test
  - a FTP and UTP copper cable permanent links
  - b a multi-core cable installation
  - c installations to relevant performance standards ie categories 5e and 6, and classes D and E
  - d a telephone cabling system

#### Underpinning knowledge

The candidate must be able to

- 1 explain the importance of testing cabling plant installations
- 2 state the applications of national and international testing standards
- 3 explain the application and use of continuity and loop testing equipment
- 4 explain the terms
  - a split pairs
  - b transposed/crossed pairs
  - c reversed pairs
  - d mixed pairs
- 5 state the correct methods of measuring the following
  - a NEXT from both ends of the cable
  - b ACR
  - c return loss (dB)
  - d cable length
  - e (dc) resistance (Ohms)
  - f propagation as a delay in units of ns
  - g cable attenuation (dB)
  - h delay skew
  - i wire maps
  - j FEXT and ELFEXT
  - k powersum calculations
- 6 state the methods for testing telephone cabling.

# Appendix 1 Relationships to other qualifications

## Links to other qualifications and frameworks

City & Guilds has identified the connections to other qualifications. This mapping is provided as guidance and suggests areas of overlap and commonality between the qualifications. It does not imply that candidates completing units in one qualification are automatically covering all of the content of the qualifications listed in the mapping.

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications. For example, units within a QCF qualification may be similar in content to units in the NQF qualification which the candidate may have already undertaken and this may present opportunities for APL.

This qualification has connections with the Level 2 Award/Certificate/Diploma in ICT Systems and Principles and the Level 2 Award in Communications Cabling

Relationship between the Vocational Qualification and Level 2 Award/Certificate/Diploma in ICT Systems and Principles (7540) and the level 2 Award in Communications Cabling

NQF units		QCF units	
City & Guilds Level 2 Certificate in Communications Cabling		City & Guilds Level 2 Award in Communications Cabling (7540-12)	
Unit Number/Title		<b>Related units</b>	
101	Basic principles of communications systems	3667-02-101	Principles of communications cabling
102	Fibre optic cabling in an internal environment	3667-02-102 7540-02-225	Fibre optic cabling in an internal environment
103	Fibre optic cabling in an external environment	3667-02-103 7540-12-226	Fibre optic cabling in an external environment
104	Copper cabling in an internal environment	3667-02-104 7540-12-227	Copper cabling in an internal environment

## Literacy, language, numeracy and ICT skills development

This qualification includes opportunities to develop and practise many of the skills and techniques required for success in the following qualifications:

- Functional Skills (England) – see [www.cityandguilds.com/functionalskills](http://www.cityandguilds.com/functionalskills)
- Essential Skills (Northern Ireland) – see [www.cityandguilds.com/essentialskillsni](http://www.cityandguilds.com/essentialskillsni)
- Essential Skills Wales

There might also be opportunities to develop skills and/or portfolio evidence if candidates are completing any Key Skills alongside this qualification.

## Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres homepage** on [www.cityandguilds.com](http://www.cityandguilds.com).

***Centre Guide – Delivering International Qualifications*** contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve ‘approved centre’ status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

***Providing City & Guilds qualifications – a guide to centre and qualification approval*** contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve ‘approved centre’ status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

***Ensuring quality*** contains updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document contains information on:

- Management systems
- Maintaining records
- Assessment
- Internal verification and quality assurance
- External verification.

***Access to Assessment & Qualifications*** provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden**  
Find out how to register and certificate candidates on line
- **Qualifications and Credit Framework (QCF)**  
Contains general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **Events**  
Contains dates and information on the latest Centre events
- **Online assessment**  
Contains information on how to register for GOLLA assessments.

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## Useful contacts

### UK learners

#### General qualification information

**T: +44 (0)844 543 0033**

**E: [learnersupport@cityandguilds.com](mailto:learnersupport@cityandguilds.com)**

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### International learners

#### General qualification information

T: +44 (0)844 543 0033

F: +44 (0)20 7294 2413

**E: [intcg@cityandguilds.com](mailto:intcg@cityandguilds.com)**

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### Centres

Exam entries, Registrations/enrolment, Certificates, Invoices, Missing or late exam materials, Nominal roll reports, Results

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

**E: [centresupport@cityandguilds.com](mailto:centresupport@cityandguilds.com)**

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### Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

F: +44 (0)20 7294 2404 (BB forms)

**E: [singlesubjects@cityandguilds.com](mailto:singlesubjects@cityandguilds.com)**

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### International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

**E: [intops@cityandguilds.com](mailto:intops@cityandguilds.com)**

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### Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, GOLLA, Navigation, User/menu option, Problems

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

**E: [walledgarden@cityandguilds.com](mailto:walledgarden@cityandguilds.com)**

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### Employer

Employer solutions, Mapping, Accreditation, Development Skills, Consultancy

T: +44 (0)121 503 8993

**E: [business\\_unit@cityandguilds.com](mailto:business_unit@cityandguilds.com)**

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### Publications

Logbooks, Centre documents, Forms, Free literature

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

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London  
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