

**Level 3 Certificate in Installing,
Testing and Ensuring Compliance of
Electrical Installations in Dwellings
(2397-30) and Level 3 Award In
Approving Electrical Installation
Work in Dwellings (2397-31)**

August 2013 Version 1.0



Qualification at a glance

Subject area	Installing, testing and ensuring compliance of electrical installation work in dwellings
City & Guilds number	2397
Age group approved	18+, 19
Assessment	Multiple choice, practical assignment, portfolio of evidence
Support materials	Qualification Handbook Assessment Pack Practical Logbook
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds number	Accreditation number
Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical Installations in Dwellings	2397-30	600/7888/1
Level 3 Award in Approving Electrical Installation Work in Dwellings in Compliance with Building Regulations	2397-31	600/7880/7



Contents

1	Introduction	5
	Structure	6
2	Centre requirements	8
	Approval	8
	Resource requirements	8
	Learners entry requirements	9
3	Delivering the qualification	10
	Initial assessment and induction	10
	Support materials	10
	Recording documents	10
4	Assessment	11
	Assessment of the qualification	11
	Test specifications	16
	Recognition of prior learning (RPL)	21
5	Units	22
Unit 301/501	Understand and apply Health and Safety legislation, practices and procedures 'electrical installation in dwellings'	23
Unit 302/502	Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings	28
Unit 303/503	Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings	33
Unit 304	Electrotechnical occupational competence - approval of electrical installations in dwellings	41
Unit 305/505	Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings	45
Unit 306/506	Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings	50
Unit 307/507	Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings	59

Unit 308/508	Understand and apply the principles, practices and legislation for the inspection, testing, commissioning, approving and certification of electrical installations in dwellings	67
Unit 309	Approval and certification of electrical installations in dwellings	76
Appendix 1	Relationships to other qualifications	85
Appendix 2	Sources of general information	86



1 Introduction

This document tells you what you need to do to deliver the qualifications:

Area	Description
Who are the qualifications for?	For learners who work in the electrotechnical industry. These qualifications aim to provide expert guidance to learners wishing to gain knowledge and understanding of electrical installations within dwellings. Both qualifications reflect the minimum technical competencies required, to become registered qualified supervisors as of April 6 th 2013
What do the qualifications cover?	It allows learners to learn, develop and practise the skills required for employment and/or career progression in the electrotechnology sector
Are the qualifications parts of a framework or initiative?	It allows learners to progress further in employment within this specific field. The 2397 qualification will be the minimum qualification level, for qualified supervisors responsible for electrical work in domestic properties, subject to Part P of the Building Regulations (England and Wales). There are five different routes satisfying the requirements for registration as a qualified supervisor, including on-site assessment, off-site assessment, a mixture of both and the gaining of appropriate qualifications (2397)
What opportunities for progression are there?	It allows learners to progress into employment within this specific field, or to the following City & Guilds qualifications: <ul style="list-style-type: none"> • Level 3 Diploma in Electrotechnical Technology • Level 3 Award in the Initial Verification and Certification of Electrical Installations • Level 3 Award in the Periodic Inspection, Testing and Certification of Electrical Installations • Level 4 Award in Design and Verification of Electrical Installation.

Structure

To achieve the **Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical Installations in Dwellings (2397-30)**, learners must achieve **27** credits from the mandatory units listed in the table below.

UAN	City & Guilds unit number	Unit title	Credit
Mandatory			
H/504/4494	301/501	Understand and apply Health and Safety legislation, practices and procedures 'electrical installation in dwellings'	4
D/504/4493	302/502	Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings	4
K/504/4898	303/503	Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings	3
R/504/4491	304	Electrotechnical occupational competence- approval of electrical installations in dwellings	1
T/504/5469	305/505	Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings	3
M/504/5471	306/506	Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings	4
T/504/5472	307/507	Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings	3
A/504/5487	308/508	Understand and apply the principles, practices and legislation for the inspection, testing, commissioning, approving and certification of electrical installations in dwellings	5

To achieve the **Level 3 Award in Approving Electrical Installation Work in Dwellings in Compliance with Building Regulations (2397-31)**, learners must achieve **4** credits from the mandatory unit in the table below.

UAN	City & Guilds unit number	Unit title	Credit
Mandatory			
A/504/5473	309	Approval and certification of electrical installations in dwellings.	4



2 Centre requirements

Approval

If your centre is currently approved to offer the:

- 2357 Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (Buildings, Structures and the Environment), or
- 2357 Level 3 NVQ Diploma in Electrotechnical Services (Electrical Maintenance)

you will be eligible for automatic approval for both 2397 complexes. No action will be required by the centre to obtain approval. All other centres will need to go through the full Qualification approval process which can be found through the City & Guilds website

Resource requirements

Physical resources and site agreements

Centres can use specially designated areas within a centre to assess, for example, the installation of specialised electrical systems, alignment and setting up of electric motors and driven devices (pumps, compressors, generators). The equipment, systems and machinery must meet industrial standards and be capable of being used under normal working conditions, for example electric motors must have a method of applying sufficient power and not be connected up to show movement.

Centre staffing

Staff delivering the qualifications must be able to demonstrate that they meet the following occupational expertise requirements.

- be technically competent in the areas for which they are delivering training and/or have experience of providing training:
- hold appropriate qualifications detailed in this handbook
- have recent relevant experience in the specific area they are assessing
- be able to demonstrate occupational competence in the areas of the Building Services Engineering (BSE) for which they are delivering training and/or assessment. This competence must be at a level equal to, or above, the level of training being delivered and must include current knowledge and skills of each industry (for which the assessment is taking place), its techniques, settings, legislative and regulatory requirements, codes of practice and guidance
- have credible experience of providing training and/or assessment.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and internal verifiers

Centre staff should hold, or be working towards, the relevant Assessor/Verifier (A/V) units for their role in delivering, assessing and verifying these qualifications, or meet the relevant experience requirements outlined above.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Learners entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres wishing to enrol learners with prior experience or knowledge within the Electrotechnical sector, should consult the EAS scheme document, which highlights the minimal technical competence criteria required for a proposed qualified supervisor for electrical installations in dwellings only

www.theiet.org/eas

2397-31 (Level 3 Award in Approving Electrical Installation Work in Dwellings in Compliance with Building Regulations) is primarily for learners who have already obtained:

2357 Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (Buildings, Structures and the Environment), or
2357 Level 3 NVQ Diploma in Electrotechnical Services (Electrical Maintenance or earlier certification).

These qualifications are not intended for learners with no prior knowledge or experience within the Electrotechnical industry

Centres must ensure that learners have the potential and opportunity to gain the qualifications successfully.

Age restrictions

City & Guilds cannot accept any registrations for learners under 18 as these qualifications are not approved for under 18s.



3 Delivering the qualification

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific training needs
- support and guidance the learner may need when working towards their qualification
- any units the learners may have already completed, or credit they have accumulated which is relevant to the qualification
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the learner fully understands the requirements of the qualifications, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications:

Description	How to access
Assessment pack	www.cityandguilds.com
Practical logbook	www.cityandguilds.com

Recording documents

Learners and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, **Learning Assistant**, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by learners and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.



4 Assessment

Assessment of the qualification

City & Guilds has written the following assessments to use with this qualification:

- online multiple choice tests
- short answer tests
- assignments.

Time constraints

The following must be applied to the assessment of this qualification:

- candidates must finish their assessment within six months
- assignments should take no longer than 8 hours. If they do, centres should consider why this is, and make sure that they are not trying to gather too much evidence.

Overview of assessment methodologies and evidence

Evidence requirements:

All Candidates

Knowledge Learning Outcomes

The on-line tests are centrally set, centrally marked and quality assured by the City and Guilds.

The projects/assignments are centrally set, centre marked and quality assured by City and Guilds.

and/or

Please Note: Candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings are required to undertake knowledge based professional discussion that is centre devised following centrally specified guidance, centre marked and quality assured by City and Guilds.

Application Learning Outcomes:

Evidence **must be** sourced from the real working environment for **application Learning Outcomes** and must be naturally occurring and can be generated by;

- Direct observation of performance in the workplace by a qualified assessor and/or testimony from an expert witness subject to the activity being assessed. This will be the **primary** source of evidence.

and/or

- Candidates reflective account of performance through professional discussion

and/or

- Work plans and work based products e.g. diagrams, drawings, specifications, customer testimony, authorised & authenticated photographs/ images and audiovisual records of work completed, consolidated by supplementary questioning

Please note: Candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings are required to submit auditable evidence of competence from prior achievements that demonstrably match the requirements of the relevant learning outcomes of the identified unit. This evidence must be consolidated by supplementary questioning.

Auditable evidence sourced from a real working environment must be provided to illustrate that, the learner has demonstrated on competence on two separate occasions

Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical Installation in Dwellings

Unit no.	Unit Title	Assessment method	Experience/ requirements	Where to obtain assessment materials
301/501	Understand and apply Health and Safety legislation, practices and procedures 'electrical installation in dwellings'	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings – Please refer to the separate APL document.</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
302/502	Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
303/503	Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
304	Electrotechnical occupational competence- approval of electrical installations in dwellings	Centrally set and centre assessed	<p>To undertake this unit, learners must provide auditable formal evidence that they have the relevant electrotechnical knowledge, understanding, experience and skills at the appropriate level that enables them to carry out the assessment activities effectively and safely as prescribed for each learning outcome.</p> <p>Completion of this unit must be in accordance with the assessment specifications and in a controlled assessment environment. Further details of rig specification can be found on the 2397 web page under the assessment tab</p> <p>The assessment methodology and assessment instruments used for this unit must be in accordance with the “Consolidated Assessment Strategy for Units and Qualifications in the QCF for the Building Services Engineering Sector – SummitSkills, January 2010v2.1” and carried out in an industry approved independent assessment structure.</p>	<p>www.cityandguilds.com</p>

Unit no.	Unit Title	Assessment method	Experience/ requirements	Where to obtain assessment materials
305/505	Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings	Short answer question paper and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>Assignment can be found on www.cityandguilds.com</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
306/506	Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
307/507	Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>
308/508	Understand and apply the principles, practices and legislation for the inspection, testing, commissioning, approving and certification of electrical installations in dwellings	On-line multiple choice test and on-site performance	<p>Overview of assessment methodologies and evidence</p> <p>Only for candidates that have in excess of 24 months experience in installing electrotechnical systems and equipment in dwellings - Please refer to the separate APL document</p>	<p>E-volve</p> <p>Practical logbook can be found on www.cityandguilds.com</p>

Level 3 Award in Approving Electrical Installation Work in Dwellings in Compliance with Building Regulations

Unit no.	Unit Title	Assessment method	Experience/Requirements	Where to obtain assessment materials
309	Approval and certification of electrical installations in dwellings	Centrally set and centre assessed	<p>To undertake this unit, learners must provide auditable formal evidence that they have the relevant electrotechnical knowledge, understanding, experience and skills at the appropriate level that enables them to carry out the assessment activities effectively and safely as prescribed for each learning outcome.</p> <p>The assessment methodology and assessment instruments used for this unit must be in accordance with the “Consolidated Assessment Strategy for Units and Qualifications in the QCF for the Building Services Engineering Sector – SummitSkills, January 2010v2.1” and carried out in an industry approved independent assessment structure.</p>	Practical logbook can be found on www.cityandguilds.com

Test specifications

The way the knowledge is covered by each test is laid out in the tables below:

Unit 301/501 Understand and apply Health and Safety legislation, practices and procedures (electrical installations in dwellings)

Test paper: 2397-501

Duration: 60 minutes

Passmark: 27 out of 36 marks (75%)

Conditions: Closed book. A non-programmable calculator is permitted.

Unit	Outcome	No. of questions	%
301 /501	1 Know how relevant Health and Safety legislation applies in the workplace	8	22
	3 Understand the procedures for dealing with health and safety in the work environment	8	22
	5 Understand the procedures and practices for establishing a safe working environment	20	56
Total		36	100

Unit 302/502: Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings

Test paper: 2397-502

Duration: 60 minutes

Passmark: 19 out of 32 marks (60%)

Conditions: Closed book. A non-programmable calculator is permitted.

Unit	Outcome	No. of questions	%
302 /502	1 Understand the environmental legislation, working practices and principles which are relevant to work activities	9	28
	3 Understand how work methods and procedures can reduce material wastage and impact on the environment	3	9
	5 Understand how and where environmental technology systems can be applied in relation to electrical installations in dwellings	13	41
	6 Understand the safety requirements of Photovoltaic (PV) installations in dwellings	7	22
Total		32	100

Unit 303/503: Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings

Test paper: 2397-503

Duration: 75 minutes

Passmark: 21 out of 36 marks (60%)

Conditions: Closed book. A non-programmable calculator is permitted.

Unit	Outcome	No. of questions	%
303/503	1 Understand the types of technical and functional information that is available for the installation of electrotechnical systems and equipment in dwellings	8	22
	2 Understand the procedures for supplying technical and functional information to relevant people	3	8
	4 Understand the requirements for overseeing health and safety in the work environment	2	6
	6 Understand the requirements for liaising with others when organising and overseeing work activities	7	19
	8 Understand the requirements for organising and overseeing work programmes for the installation	12	34
	9 Understand the requirements for organising the provision and storage of resources that are required for work activities	4	11
Total		36	100

Unit 305/505: Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings

Test paper: 2397-505 Written (Short answer questions)

Duration: 2 hours

Passmark: 63 out of 105 (60%)

Conditions: Open book. BS 7671, IET On-site Guide (or AEU Electrician's Guide), IET Guide to the Building Regulations, non-programmable scientific calculator.

Unit	Outcome	Number of questions	%
305 /505	1 Understand electrical supply and distribution systems for consumer supply	8	23
	2 Understand the principles of internal and external earthing arrangements for electrical installations for buildings, structures and the environment	8	23
	4 Understand the principles for selecting cables, cable carriers, circuit protection devices, electrotechnical equipment and accessories for electrical installations in dwellings	19	54
	Total	35	100

Unit 306/506: Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings

Test paper: 2397-506

Duration: 90 minutes

Passmark: 25 out of 42 marks (60%)

Conditions: Closed book. A non-programmable calculator is permitted.

Unit	Outcome	Number of questions	%
306/506	1 Understand the relationship between different electrical properties and AC electrical circuits and equipment.	10	24
	2 Understand the principles, regulatory requirements and procedures for completing the safe isolation of electrical circuits and complete electrical installations	1	2
	4 Understand how to complete the reporting and recording of electrical fault diagnosis and correction work on electrical installations in dwellings	2	5
	5 Understand how to complete the preparatory work prior to fault diagnosis and correction work on electrical installations in dwellings	11	26
	6 Understand the procedures and techniques for diagnosing electrical faults on electrical installations in dwellings	13	31
	8 Understand the procedures and techniques for correcting electrical faults in electrical installations in dwellings	5	12
Total		42	100

Unit 307/507: Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings

Test paper: 2397-507

Duration: 90 minutes

Passmark: 27 out of 45 marks (60%)

Conditions: Open book: the following BS7671 reference materials are permitted for this test:

- IET On-site Guide
- IET Electrician's Guide to the Building Regulations

A non-programmable calculator is also permitted.

Unit	Outcome	Number of questions	%
307/507	1 Understand the procedures for checking the work location prior to the commencement of work activities	5	11
	3 Know the regulatory requirements which apply to the installation of wiring systems, associated equipment and enclosures in dwellings	33	73
	6 Understand the practices and procedures for installing wiring systems, associated equipment, enclosures and accessories in dwellings	5	11
	8 Understand the procedures and applications of different methods of terminating and connecting conductors, cables, and flexible cords in electrical wiring systems and equipment in dwellings	2	5
Total		45	100

Unit 308/508: Understand and apply the principles, practices and legislation for the inspection, testing, commissioning and certification of electrical installations in dwellings

Test paper: 2397-508

Duration: 75 minutes

Passmark: 22 out of 38 marks (60%)

Conditions: Closed book. A non-programmable calculator is permitted.

Unit	Outcome	Number of questions	%
308/508	1 Understand the procedures and regulatory requirements for completing the safe isolation of an electrical circuit and complete electrical installations in preparation for inspection, testing and commissioning	2	5
	3 Understand the principles and regulatory requirements for inspecting, testing, commissioning and approving electrical installations in dwellings	7	19
	4 Understand the regulatory requirements and procedures for completing the inspection of electrical installations in dwellings	2	5
	6 Understand the regulatory requirements and procedures for the safe testing and commissioning of electrical installations in dwellings	24	63
	7 Understand the procedures and requirements for the completion of electrical installation certificates and related documentation for electrical installations in dwellings	3	8
Total		38	100

Recognition of prior learning (RPL)

Recognition of prior learning means using a person's previous experience or qualifications which have already been achieved to contribute to a new qualification.

RPL is allowed and is also sector specific. For this qualification learners with previous knowledge and experience should consult the RPL document, titled RPL Guidance, which can be found under the centre documents tab, on the 2397 web page.



5 Units

Availability of units

The following units can also be obtained from The Register of Regulated Qualifications: <http://register.ofqual.gov.uk/Unit>

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number
- title
- level
- credit value
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

Unit 301/501 Understand and apply Health and Safety legislation, practices and procedures 'electrical installation in dwellings'

UAN:	H/504/4494
Level:	Level 3
Credit value:	4
GLH:	35

Learning outcome
The learner will: 1. know how relevant Health and Safety legislation applies in the workplace.
Assessment criteria
The learner can: 1.1 specify their own roles and responsibilities and those of others with regard to current relevant legislation such as: <ul style="list-style-type: none"> • The Health and Safety at Work Act • The Electricity at Work Regulations • The Management of Health and Safety at Work Regulations • Workplace (Health and Safety and Welfare) Regulations • Control of Substances Hazardous to Health (COSHH) Regulations • Working at Height Regulations • Personal Protective Equipment at Work Regulations • Manual Handling Operations Regulations • Provision and Use of Work Equipment Regulations • Control of Asbestos at Work Regulations • Environmental Protection Act • The Hazardous Waste Regulations • The Electrical and Electronic Equipment Waste Regulations 1.2 specify particular health and safety risks which may be present and the requirements of current health and safety legislation for the range of work operations when installing wiring systems and electrotechnical equipment in dwellings including: <ul style="list-style-type: none"> • preparation and planning • installation • termination and connection • inspection, testing and commissioning • fault diagnosis and rectification • maintenance.

Learning outcome
The learner will: 2. be able to apply relevant Health and Safety legislation in the workplace.
Assessment criteria
The learner can: 2.1 identify which workplace health and safety procedures are relevant to the working environment and comply with their duties and obligations as defined by current legislation and organisational procedures 2.2 produce a risk assessment and method statement in accordance with organisational procedures and the limits of their responsibility 2.3 work within the requirements of: <ul style="list-style-type: none"> • risk assessments • method statements • safe systems of work.

Learning outcome
The learner will: 3. understand the procedures for dealing with health and safety in the work environment.
Assessment criteria
The learner can: 3.1 state the procedures that should be followed in the case of accidents which involve injury, including requirements for the treatment of electric shock/electrical burns 3.2 specify appropriate procedures which should be followed when emergency situations occur in the workplace, including: <ul style="list-style-type: none"> • procedures for summoning emergency services • information that emergency services require • alarm and evacuation procedures • designated escape routes • fire fighting procedures • application of first aid 3.3 state the limitations of their responsibilities in terms of health and safety in the workplace 3.4 state the actions to be taken in situations which exceed their level of responsibility for Health and Safety in the workplace 3.5 state the procedures that should be followed in accordance with the relevant health and safety regulations for reporting health, safety and/or welfare issues in the workplace 3.6 specify appropriate responsible persons to whom health and safety and welfare related matters should be reported, including: <ul style="list-style-type: none"> • employer • employees • customer/client • safety officers • H&S Executive/Inspectors • Environmental Health Officers.

Learning outcome
The learner will: 4. be able to assess the work environment for hazards and identify remedial actions in accordance with health and safety legislation.
Assessment criteria
The learner can: 4.1 identify unsafe situations and conditions and take remedial actions 4.2 assess the work environment and revise work practices accordingly to take into account hazards which could cause harm, including the handling of potentially hazardous: <ul style="list-style-type: none"> • materials • tools • equipment 4.3 identify any hazards which may present a high risk and report their presence to relevant persons who have overall responsibility for health and safety in the workplace 4.4 apply measures to control health and safety hazards in accordance with the limits of their capabilities and job responsibility 4.5 select and use correct personal protective equipment and protection measures to ensure the health and safety of themselves and others in the work environment.

Learning outcome
The learner will: 5. understand the procedures and practices for establishing a safe working environment.
Assessment criteria
The learner can: 5.1 define what is meant by the term hazard in relation to Health and Safety legislation in the workplace 5.2 specify the appropriate protective clothing and equipment that is required for identified work tasks 5.3 state the first aid facilities that must be available in the work area in accordance with health and safety regulations and their application 5.4 describe safe practices and procedures when using: <ul style="list-style-type: none"> • access equipment (PASMA requirements) • portable power tools (eg cartridge gun, drills, grinders) • tools and materials storage facilities • dangerous substances eg cutting compounds and adhesives 5.5 specify the warning signs for the seven main groups of hazardous substance, as defined by The Chemical (Hazard Information and Packaging for Supply) Regulations (CHIP) 5.6 explain practices and procedures for addressing hazards in the work place such as: <ul style="list-style-type: none"> • temporary electrical supplies • trailing leads/cables

	<ul style="list-style-type: none"> • slippery or uneven surfaces • presence of dust and fumes • handling and transporting equipment or materials • contaminants and irritants • fire • working at height • working in confined spaces • hazardous malfunctions of equipment • improper use and storage of tools and equipment
5.7	identify the correct type of fire extinguisher for a particular type of fire
5.8	<p>explain situations where asbestos may be encountered, including:</p> <ul style="list-style-type: none"> • asbestos in decorative finishes (artex, plaster, floor tiles) • asbestos in accessories (flash guards and matting in fuse carriers and on distribution board covers) • asbestos in insulation storage compartments, vessels and pipework
5.9	specify the procedures for dealing with the suspected presence of asbestos in the workplace.

Learning outcome	
The learner will:	
6.	be able to apply methods and procedures to ensure work on site is in accordance with Health and Safety legislation
Assessment criteria	
The learner can:	
6.1	demonstrate personal conduct and behaviour around the workplace, to ensure that the health and safety of themselves and others is not endangered
6.2	<p>apply procedures to ensure the safe use, maintenance and storage of tools, plant and equipment as stipulated in:</p> <ul style="list-style-type: none"> • workplace policies (company and site) • supplier and manufacturer information and instructions
6.3	comply with hazard warning, mandatory instruction and prohibition notices
6.4	apply procedures to ensure the safety of the work location through the correct use of guards and notices
6.5	use access equipment correctly
6.6	<p>demonstrate the correct procedures to follow in the event of injury to themselves or others, including:</p> <ul style="list-style-type: none"> • application of basic first aid procedures • notification of emergency services • reporting of incidents.

Unit 301/501 Understand and apply Health and Safety legislation, practices and procedures 'electrical installation in dwellings'

Supporting information

Assessment requirement

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector, - SummitSkills, Apr 2010v2.1a (06.10).

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed on our website at:

Details of auditable evidence, assessment requirements and guidance for

each learning outcome can be accessed via the SummitSkills website.

Unit 302/502 Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings

UAN:	D/504/4493
Level:	Level 3
Credit value:	4
GLH:	35

Learning outcome
The learner will: 1. understand the environmental legislation, working practices and principles which are relevant to work activities.
Assessment criteria
The learner can: 1.1 specify the current, relevant legislation for processing waste, including the: <ul style="list-style-type: none"> • Environmental Protection Act • hazardous waste regulations • Pollution Prevention and Control Act • Control of Pollution Act • control of noise at work regulations • packaging (essential requirements) regulations • Environment Act • waste electrical and electronic equipment regulations 1.2 describe what is meant by the term environment 1.3 describe the ways in which the environment may be affected by work activities: <ul style="list-style-type: none"> • land contamination • air pollution • pollution of water courses 1.4 identify and interpret the requirements for electrical installations in dwellings as outlined in relevant sections of the Building Regulations and the Code for Sustainable Homes

1.5	state materials and products that are classed as: <ul style="list-style-type: none"> • hazardous to the environment • recyclable
1.6	describe the organisational procedures for processing materials that are classed as: <ul style="list-style-type: none"> • hazardous to the environment • recyclable.

Learning outcome	
The learner will:	
2.	be able to apply environmental legislation, working practices and principles for electrical installations in dwellings
Assessment criteria	
The learner can:	
2.1	demonstrate workplace procedures for the safe handling, storage and disposal of hazardous materials and products, in accordance with any of the following: <ul style="list-style-type: none"> • Environmental Protection Act • the hazardous waste regulations • Pollution Prevention and Control Act • Control of Pollution Act • the control of noise at work regulations • packaging (essential requirements) regulations • Environment Act • The Waste Electrical and Electronic Equipment Regulations
2.2	demonstrate work practices and procedures which are in accordance with the requirements for electrical installations in dwellings as specified in the relevant sections of the Building Regulations and the Guide for Sustainable Homes
2.3	demonstrate appropriate organisational procedures for reporting environmental hazards.

Learning outcome	
The learner will:	
3.	understand how work methods and procedures can reduce material wastage and impact on the environment
Assessment criteria	
The learner can:	
3.1	state installation methods that can help to reduce material wastage
3.2	explain why it is important to report any hazards to the environment that arise from work procedures
3.3	specify environmentally friendly materials, products and procedures that can be used in the installation of wiring systems and electrotechnical equipment in dwellings.

Learning outcome
The learner will: 4. be able to apply work methods and procedures to reduce material wastage and the impact of work activities on the work environment
Assessment criteria
The learner can: 4.1 demonstrate prefabrication and installation methods which can help to reduce material wastage 4.2 identify and use environmentally friendly materials, products and procedures for the installation and maintenance of wiring systems and electrotechnical equipment in dwellings.

Learning outcome
The learner will: 5. understand how and where environmental technology systems can be applied in relation to electrical installations in dwellings
Assessment criteria
The learner can: 5.1 describe the fundamental operating principles of the following environmental technology systems: <ul style="list-style-type: none"> • solar photovoltaic, including function of inverters • wind energy generation (Micro) • micro hydro generation • heat pumps • Combined Heat and Power (CHP) including micro CHP • solar thermal hot water heating 5.2 state the applications and limitations of the following environmental technology systems: <ul style="list-style-type: none"> • solar photovoltaic • wind energy generation (Micro and Macro) • micro hydro generation • heat pumps • Combined Heat and Power (CHP) including micro CHP • solar thermal hot water heating 5.3 state the local authority building control requirements which apply to the installation of environmental technology systems in relation to electrical installations in dwellings.

Learning outcome

The learner will:

6. understand the safety requirements of Photovoltaic (PV) installations in dwellings

Assessment criteria

The learner can:

- 6.1 state the requirements for positioning, fixing and connecting the following components:
 - AC isolator
 - DC isolator
 - inverter
 - DC cabling from PV module to DC isolator
 - DC cabling from DC isolator to inverter
- 6.2 clarify that:
 - PV modules cannot be switched off and that measures are necessary to ensure contact cannot be made with live connections.
 - recognise that voltage is generated at low light levels and can lead to risk of electric shock
 - PV modules as current limiting devices not damaged by short circuits and therefore not liable to be protected by fuses
- 6.3 describe methods of verifying and securing (locking off) circuit isolation.

Unit 302/502 Understand and apply environmental legislation, working practices and the principles of environmental technology systems associated with electrical installations in dwellings

Supporting information

Assessment requirement

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,- SummitSkills, Apr 2010v2.1a (06.10).

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed on our website at:

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Unit 303/503 Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings

UAN:	K/504/4898
Level:	Level 3
Credit value:	3
GLH:	25

Learning outcome
The learner will: 1. understand the types of technical and functional information that is available for the installation of electrotechnical systems and equipment in dwellings.
Assessment criteria
The learner can: 1.1 specify sources of technical and functional information which apply to electrotechnical installations, including: <ul style="list-style-type: none"> • manufacturer information and data • supplier information and data • information from their employing organisation • installation specifications • specifications, drawings and diagrams 1.2 interpret technical and functional information and data from: <ul style="list-style-type: none"> • manufacturer information and data <ul style="list-style-type: none"> - materials - components - equipment - measuring and test instruments • supplier information and data <ul style="list-style-type: none"> - materials - components - equipment - measuring and test instruments • information from their employing organisation • installation specification • client/customer specifications

<ul style="list-style-type: none"> • specifications, drawings and diagrams • records and certificates for: <ul style="list-style-type: none"> - inspection - testing - installation completion
<p>1.3 interpret technical and functional information relating to electrotechnical products or equipment:</p> <ul style="list-style-type: none"> • operation • controls • settings • adjustments
<p>1.4 describe the work site requirements and procedures in terms of:</p> <ul style="list-style-type: none"> • services provision • ventilation provision • waste disposal procedures • equipment and material storage • health and safety requirements • access by personnel
<p>1.5 identify equipment and systems that are compatible to site operations and requirements.</p>

<p>Learning outcome</p>
<p>The learner will:</p> <p>2. understand the procedures for supplying technical and functional information to relevant people.</p>
<p>Assessment criteria</p>
<p>The learner can:</p> <p>2.1 state the limits of their responsibility for supplying technical and functional information to:</p> <ul style="list-style-type: none"> • clients • customers • site managers <p>2.2 specify organisational policies/procedures for the handover and demonstration of electrotechnical systems and equipment, including requirements for confirming and recording handover</p> <p>2.3 state the appropriateness of different customer relations methods and procedures</p> <p>2.4 identify methods of providing technical and functional information appropriate to the needs of:</p> <ul style="list-style-type: none"> • clients • customers • site managers <p>2.5 explain the importance of ensuring that:</p> <ul style="list-style-type: none"> • information provided is accurate and complete • information is provided clearly, courteously and professionally • copies of information provided are retained

<ul style="list-style-type: none"> • the installation, on completion: <ul style="list-style-type: none"> - functions in accordance with the specification - is safe - complies with industry standards <p>2.6 describe methods for checking that relevant persons have an adequate understanding of the technical and non-technical information provided, including appropriate Health and Safety information.</p>

Learning outcome
The learner will:
3. be able to provide relevant people with technical and functional information for work on electrical systems and equipment in dwellings.
Assessment criteria
The learner can:
3.1 identify the relevant people who need to be supplied with technical and functional information
3.2 identify any additional information that may also be required such as: <ul style="list-style-type: none"> • health and safety information • isolation procedures for products/equipment in case of emergencies
3.3 liaise with relevant people to determine the information they require to ensure that systems, equipment or components can be operated safely and effectively
3.4 identify appropriate technical and functional information that is required for the work activity.

Learning outcome
The learner will:
4. understand the requirements for overseeing health and safety in the work environment.
Assessment criteria
The learner can:
4.1 state the applicable Health and Safety requirements with regard to overseeing the work of others
4.2 state the procedures for: <ul style="list-style-type: none"> • interpreting risk assessments • applying method statements • monitoring changing conditions in the workplace • complying with site organisational procedures • managing health and safety on site • organising the safe and secure storage of tools and materials.

Learning outcome
The learner will: 5. be able to oversee health and safety during work on electrical installations in dwellings.
Assessment criteria
The learner can: 5.1 produce risk assessments and method statements, to cover their own work and others working in the area (colleagues and other operatives) in accordance with their level of responsibility 5.2 follow procedures to confirm that work is being completed in accordance with health and safety legislation and industry standards.

Learning outcome
The learner will: 6. understand the requirements for liaising with others when organising and overseeing work activities.
Assessment criteria
The learner can: 6.1 describe techniques for the communication with others for the purpose of: <ul style="list-style-type: none"> • motivation • instruction • monitoring • cooperation 6.2 describe methods of determining the competence of operatives for whom they are responsible, such as: <ul style="list-style-type: none"> • checking competency scheme registration cards • checking technical qualifications • written references from previous employers • informal monitoring of performance on site 6.3 specify their role in terms of: <ul style="list-style-type: none"> • responsibility for other staff • liaison with their employer • communication with: <ul style="list-style-type: none"> - customers - clients - site managers - sub-contractors (where appropriate) - other trades - the public 6.4 identify appropriate methods for communicating with and responding to others, including: <ul style="list-style-type: none"> • customers • clients • site managers

	<ul style="list-style-type: none"> • sub-contractors (where appropriate) • other trades • the public
6.5	specify procedures for re-scheduling work to co-ordinate with changing conditions in the workplace and to coincide with other trades
6.6	clarify organisational procedures for completing the documentation that is required during work operations.

Learning outcome	
The learner will:	
7.	be able to co-ordinate liaison with other relevant persons during work activities.
Assessment criteria	
The learner can:	
7.1	comply with approved procedures to ensure effective co-ordination with other workers/contractors, including steps to resolve issues which are outside the scope of their job role
7.2	apply communication techniques that are clear, accurate and appropriate to the situation.

Learning outcome	
The learner will:	
8.	understand the requirements for organising and overseeing work programmes for the installation.
Assessment criteria	
The learner can:	
8.1	describe how to plan: <ul style="list-style-type: none"> • work allocations • duties of operative for whom they are responsible • coordination with other services and personnel
8.2	specify procedures for carrying out work activities that will: <ul style="list-style-type: none"> • maintain the safety of the work environment • maintain cost effectiveness • ensure compliance with programmes of work
8.3	identify the industry standards that are relevant to activities carried out during the installation of electrotechnical systems and equipment in dwellings, including the current editions of: <ul style="list-style-type: none"> • management of health and safety regulations • Health & Safety at Work Act • electricity at work regulations • Building Regulations (2010) – Parts A, B, C, E, F, L, M,P • BS 7671 Requirements for Electrical Installations • BS EN Graphical Symbols
8.4	identify their responsibilities within the scope of the work programme

8.5	<p>identify how to determine the estimated time required for the completion of work activities taking into account influential factors such as:</p> <ul style="list-style-type: none"> • the deployment and availability of suitable personnel • the delivery and availability of equipment, components and material • weather conditions • work to be completed by other trades • specification variations
8.6	<p>state the possible consequences of not:</p> <ul style="list-style-type: none"> • completing work within the estimated time • meeting the requirements of the programme of work • using the specified materials • installing materials and equipment as specified
8.7	<p>specify methods of producing and illustrating work programmes such as:</p> <ul style="list-style-type: none"> • bar charts • spread sheets • critical path analysis.

Learning outcome	
The learner will:	
9. understand the requirements for organising the provision and storage of resources that are required for work activities.	
Assessment criteria	
The learner can:	
9.1	<p>interpret the installation specification and work programme to identify resource requirements for the following:</p> <ul style="list-style-type: none"> • materials • components • equipment • labour • tools • measuring and test instruments
9.2	<p>Interpret the material schedule to confirm that materials available are:</p> <ul style="list-style-type: none"> • the right type • fit for purpose • in the correct quantity
9.3	specify the storage and transportation requirements for all materials required in the work location
9.4	specify procedures to ensure the safe and effective storage of materials, tools and equipment in the work location.

Learning outcome

The learner will:
10. be able to organise and oversee work activities and operations.

Assessment criteria

The learner can:

- 10.1 organise operatives by allocating duties and responsibilities to make the best use of their competence
- 10.2 monitor the work of operatives to ensure it is in accordance with:
 - industry working practices
 - programme of work
 - health and safety requirements
- 10.3 apply the correct procedures when a non compliance is identified during the completion of work activities.

Unit 303/503 Understand and apply the practices and procedures for overseeing and organising the work environment when installing electrical installations in dwellings.

Supporting information

Assessment requirement

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,- SummitSkills, Apr 2010v2.1a (06.10).

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Unit 304

Electrotechnical occupational competence - approval of electrical installations in dwellings

UAN:	R/504/4491
Level:	Level 3
Credit value:	1
GLH:	4

Learning outcome

The learner will:

1. be able to interpret specifications, drawings and diagrams.

Assessment criteria

The learner can:

- 1.1 interpret specifications and technical data for the inspection and functional testing of:
 - protective earthing systems
 - a ring final circuit
 - a general lighting circuit
 - three-phase motor circuit
 - intruder alarm circuit.

Learning outcome

The learner will:

2. be able to undertake risk assessments.

Assessment criteria

The learner can:

- 2.1 review safe working practices
- 2.2 undertake a risk assessment
- 2.3 complete risk assessment documentation in accordance with organisational procedures.

Learning outcome
The learner will: 3. be able to carry out the safe isolation of electrical circuits and complete electrical installations.
Assessment criteria
The learner can: 3.1 locate correct means of isolation 3.2 follow correct procedures for the isolation of electrical circuit(s) and complete electrical installations 3.3 isolate circuit (s) in correct sequence 3.4 select correct test and measuring instruments 3.5 correctly test for the presence of an electrical supply.

Learning outcome
The learner will: 4. be able to complete the visual inspection, initial verification and certification of an electrical installation.
Assessment criteria
The learner can: 4.1 comply with correct procedures 4.2 record relevant findings on correct documentation <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test results.

Learning outcome
The learner will: 5. be able to complete the testing and certification of an electrical installation in a dwelling in accordance with industry requirements.
Assessment criteria
The learner can: 5.1 select and use the correct measuring instruments 5.2 confirm instruments function accurately 5.3 measure the continuity of protective conductors 5.4 measure the continuity of ring final circuit conductors 5.5 measure the insulation resistance of the installation and its circuits 5.6 confirm the polarity of the installation's electrical outlets and components 5.7 determine the installation's Earth Fault-Loop Impedance (EFLI) 5.8 determine the installation's Prospective Fault Current (PFC) 5.9 carry out functional tests on the installation's equipment and components

5.10	complete the correct documentation in accordance with statutory and non-statutory regulations: <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test results.
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Learning outcome	
The learner will:	
6.	be able to diagnose, and recommend how to rectify, electrical faults in an electrical installation in accordance with industry requirements.
Assessment criteria	
The learner can:	
6.1	undertake an assessment of risk accordingly
6.2	carry out safe isolation in the correct sequence as appropriate to fault diagnosis procedures
6.3	select and use correctly, fit for purpose tools, equipment and instruments
6.4	carry out relevant checks and preparations
6.5	locate faults from given information
6.6	state how the identified faults can be rectified.

Unit 304 Electrotechnical occupational competence- approval of electrical installations in dwellings

Supporting information

Assessment requirement

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector, Summit Skills, Apr 2010v2.1a (06.10).

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Unit 305/505 Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings

UAN:	T/504/5469
Level:	Level 3
Credit value:	3
GLH:	25

Learning outcome
The learner will: 1. understand electrical supply and distribution systems for consumer supply.
Assessment criteria
The learner can: 1.1 describe how electricity is generated and transmitted for consumption in dwellings 1.2 specify the features and characteristics of a generation and transmission system including: <ul style="list-style-type: none"> • power stations – fossil fuel, hydro, oil, nuclear • super-grid and standard grid system • transformers • transmission voltages • sub-stations • above and below ground distribution 1.3 describe the main characteristics of: <ul style="list-style-type: none"> • single phase electrical supplies • three phase electrical supplies • three phase and neutral supplies • earth-fault loop path 1.4 describe the operating principles, applications and limitations of the following types of transformer: <ul style="list-style-type: none"> • core • double-wound • auto

1.5	explain the relationship between kVA, kVAr and kW
1.6	explain the characteristics and applications, of the following systems: <ul style="list-style-type: none"> • TN-S • TN-C-S • TT • IT

Learning outcome	
The learner will:	
2.	understand the principles of internal and external earthing arrangements for electrical installations for buildings, structures and the environment.
Assessment criteria	
The learner can:	
2.1	explain the key principles relating to earthing and bonding
2.2	explain the key principles relating to the protection of electrical systems, including: <ul style="list-style-type: none"> • automatic disconnection and the implications of exposed and extraneous conductive parts within a building forming a circuit to the mass of earth or Main Earthing Terminal (MET) under fault conditions • the basic principles of shock protection, circuit overload and short-circuit protection: <ul style="list-style-type: none"> - maximum disconnection times for different types of circuit - discrimination between protective devices - fault current capacities of devices
2.3	explain the operating principles, applications and limitations of protective devices, including: <ul style="list-style-type: none"> • RCDs/RCBOs • fuses (BS3036, re-wireable, BS88 HBC) • CBs (thermal, magnetic and combined tripping)
2.4	specify what is meant by the following terms relating to earthing and the function of earth protection: <ul style="list-style-type: none"> • earth fault loop impedance • Protective Multiple Earthing (PME).

Learning outcome	
The learner will:	
3.	be able to confirm the electrical supply is in accordance with the installation specification.
Assessment criteria	
The learner can:	
3.1	verify the compatibility of the electrical supply to the requirements of the installation specification
3.2	identify the earthing arrangement for the electrical installation.

<p>Learning outcome</p> <p>The learner will:</p> <p>4. understand the principles for selecting cables, cable carriers, circuit protection devices, electrotechnical equipment and accessories for electrical installations in dwellings.</p>
<p>Assessment criteria</p> <p>The learner can:</p> <p>4.1 explain how external influences can affect the choice of wiring systems and enclosures</p> <p>4.2 state the current ratings for different circuit protection devices</p> <p>4.3 specify and apply the procedure for selecting appropriate overcurrent protection devices</p> <p>4.4 state what is meant by diversity factors and explain how a circuits maximum demand is established after diversity factors are applied</p> <p>4.5 specify and apply the procedure for selecting a suitable type and size of cable, including:</p> <ul style="list-style-type: none"> • calculating the current demand of single- phase circuits • environment where the cable is to be installed • selecting a protective device • applying factors for: <ul style="list-style-type: none"> - grouping - thermal insulation - ambient temperature - installation condition or protective device type • establishing the installation method • selecting a suitably sized cable • checking voltage drop is not excessive • determining circuit disconnection times, as relevant, $R1 + R2$, Z_e and Z_s • considering thermal constraints <p>4.6 determine the cable-carrying capacity of conduit and trunking as appropriate to the size and number of cables to be installed in accordance with BS7670</p> <p>4.7 state the constructional features, applications, advantages and limitations of the following types of cable:</p> <ul style="list-style-type: none"> • thermosetting insulated cables including flexes • single and multicore thermoplastic (PVC) and thermosetting insulated cables • PVC/PVC flat profile cable • SWA PVC cable • armoured/braided flexible cables and cords • fire resistant cable <p>4.8 state the constructional features, applications, advantages and limitations of the following types of cable and conductor containment systems:</p> <ul style="list-style-type: none"> • conduit (PVC and Metallic) • trunking (PVC and Metallic)

4.9	<p>describe how the following environmental factors can affect the selection of wiring systems and enclosures, associated equipment and accessories, including:</p> <ul style="list-style-type: none"> • ambient temperature • effect of moisture on insulation • corrosive substances • UV rays • damage by animals • mechanical stress and vibration damage • aesthetic considerations • exposure to the elements
4.10	<p>state the types of wiring systems, associated equipment and accessories used for:</p> <ul style="list-style-type: none"> • lighting systems • power systems (final circuits) • distribution systems (sub mains) • environmental control/building management systems (including heating and cooling systems) • security systems – fire alarm/prevention, unlawful entry, emergency lighting.

Learning outcome	
The learner will:	
5.	be able to confirm that planned work is in accordance with the installation specification.
Assessment criteria	
The learner can:	
5.1	verify that cable types and sizes meet the requirements of the installation specification
5.2	verify that protective devices meet the requirements of the installation specification
5.3	verify that enclosures, equipment and accessories meet the requirements of the installation specification.

Unit 305/505 Understanding and applying the principles, practices and procedures for the planning, preparation and selection of wiring systems and electrotechnical equipment in dwellings

Supporting information

Evidence requirements

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,-SummitSkills, Apr 2010v2.1a (06.10).

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Unit 306/506 Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings

UAN:	M/504/5471
Level:	Level 3
Credit value:	4
GLH:	35

Learning outcome
The learner will: 1. understand the relationship between different electrical properties and AC electrical circuits and equipment.
Assessment criteria
The learner can: 1.1 identify and determine values of: <ul style="list-style-type: none"> • resistance • resistivity • power • frequency • current • voltage • energy • impedance • power factor • actual power • reactive power • apparent power 1.2 identify appropriate electrical instruments for the measurement and calculation of different electrical values including: <ul style="list-style-type: none"> • resistance • power • frequency • current • voltage • energy • impedance.

<p>Learning outcome</p> <p>The learner will:</p> <p>2. understand the principles, regulatory requirements and procedures for completing the safe isolation of electrical circuits and complete electrical installations.</p>
<p>Assessment criteria</p> <p>The learner can:</p> <p>2.1 specify and undertake the correct procedure for completing safe isolation with regard to:</p> <ul style="list-style-type: none"> • carrying out safe working practices • correctly identifying circuit(s) to be isolated • identifying suitable points of isolation • selecting correct test and proving instruments in accordance with relevant industry guidance and standards • applying correct testing methods • selecting locking devices for securing isolation • placing of warning notices • applying correct sequence for the safe-isolation of an electrical circuit and complete electrical installation <p>2.2 state the implications of carrying out safe isolations to:</p> <ul style="list-style-type: none"> • other personnel • customers/clients • public • building systems (loss of supply) <p>2.3 state the implications of not carrying out safe isolations to:</p> <ul style="list-style-type: none"> • self • other personnel • customers/clients • public • building systems (presence of supply) <p>2.4 identify all health and safety requirements which apply when diagnosing and correcting electrical faults in electrotechnical systems and equipment in dwellings including those which cover:</p> <ul style="list-style-type: none"> • working in accordance with risk assessments/ permits to work/method statements • safe use of tools and equipment • safe and correct use of measuring instruments • provision and use of PPE • reporting of unsafe situations.

Learning outcome
The learner will: 3. be able to confirm safety of the system and equipment prior to diagnosing and correcting electrical faults in accordance with statutory and non-statutory regulations.
Assessment criteria
The learner can: 3.1 carry out safe isolation procedures in accordance with regulatory requirements for electrical installations 3.2 ensure the health and safety of themselves and others within the work location during inspection, testing and commissioning 3.3 select and use appropriate warning notices and barriers 3.4 check the safety of electrical systems prior to the commencement of diagnosing and correcting electrical faults.

Learning outcome
The learner will: 4. understand how to complete the reporting and recording of electrical fault diagnosis and correction work on electrical installations dwellings.
Assessment criteria
The learner can: 4.1 state the procedures for reporting and recording information on electrical fault diagnosis and correction work 4.2 state the procedures for informing relevant persons about information on electrical fault diagnosis and correction work and the completion of relevant documentation 4.3 explain why it is important to provide relevant persons with information on fault diagnosis and correction work clearly, courteously and accurately.

Learning outcome
The learner will: 5. understand how to complete the preparatory work prior to fault diagnosis and correction work on electrical installations in dwellings.
Assessment criteria
The learner can: 5.1 specify safe working procedures that should be adopted for completion of fault diagnosis and correction work, including: <ul style="list-style-type: none"> • effective communication with others in the work area • use of barriers • positioning of notices • safe isolation 5.2 interpret and apply the logical stages of fault diagnosis and correction work that should be followed: <ul style="list-style-type: none"> • identification of symptoms

- collection and analysis of data
 - use of sources/types of information such as the IET Wiring regulations, installation certificates, installation specifications, drawings/diagrams, manufacturer's information and operating instructions
 - maintenance records
 - experience (personal and of others)
 - checking and testing (eg supply, protective devices)
 - interpreting results/information
 - fault correction
 - functional testing
 - restoration
- 5.3 identify and describe common symptoms of electrical faults, including:
- loss of supply
 - low voltage
 - operation of overload or fault current devices
 - component/equipment malfunction/failure
 - arcing
- 5.4 state the causes of the following types of fault:
- high resistance
 - transient voltages
 - insulation failure
 - excess current
 - short-circuit
 - open circuit
- 5.5 specify the types of faults and their likely locations in:
- wiring systems
 - terminations and connections
 - equipment/accessories
- 5.6 state the special precautions that should be taken with regard to the following:
- lone working
 - electro-static discharge (friction, induction, separation)
 - electronic devices (damage by over voltage)
 - IT equipment (eg shutdown, damage).

Learning outcome

The learner will:

6. understand the procedures and techniques for diagnosing electrical faults on electrical installations in dwellings.

Assessment criteria

The learner can:

- 6.1 state the dangers of electricity in relation to the nature of fault diagnosis work
- 6.2 describe how to identify supply voltages
- 6.3 select the correct test instruments (in accordance with HSE guidance document GS 38) for fault diagnosis work, including:
 - voltage indicator
 - low resistance ohm meter
 - insulation resistance testers
 - EFLI and PFC tester
 - RCD tester
 - tong tester/clamp on ammeter
- 6.4 describe how to confirm test instruments are fit for purpose, functioning correctly and are correctly calibrated
- 6.5 state the appropriate documentation that is required for fault diagnosis work and explain how and when it should be completed
- 6.6 explain why carrying out fault diagnosis work can have implications for customers and clients
- 6.7 specify and undertake the procedures for carrying out the following tests and their relationship to fault diagnosis:
 - continuity
 - insulation resistance
 - polarity
 - earth fault loop impedance
 - RCD operation
 - current and voltage measurement
- 6.8 identify whether test results are acceptable and state the actions to take where unsatisfactory results are obtained.

Learning outcome
The learner will: 7. be able to carry out procedures to identify faults on electrical installations in dwellings.
Assessment criteria
The learner can: 7.1 use effective methods of communication to ascertain clear and detailed information about reported faults and any components which require replacing 7.2 identify and use appropriate system specification documents which relate to the electrotechnical systems and equipment being worked upon 7.3 report information about potential disruption that may be a consequence of fault diagnosis and correction work to relevant people, such as: <ul style="list-style-type: none"> • other workers/colleagues • customers/clients 7.4 assess the safe working practices which apply in the working environment to confirm that it is safe for fault identification work to take place 7.5 perform suitable diagnostic tests on the installed electrotechnical systems to successfully identify faults including: <ul style="list-style-type: none"> • loss of supply • overload • short-circuit and earth fault • transient voltage • high resistance joints • component, accessory or equipment faults 7.6 use appropriate methods for locating faults on electrical systems and equipment, including: <ul style="list-style-type: none"> • procedures and sequences – logical approach • safe working practices • interpretation of data 7.7 use appropriate tools and instruments correctly to complete fault diagnosis work, including: <ul style="list-style-type: none"> • voltage indicator • low resistance ohm meter • insulation resistance testers • EFLI and PFC tester • RCD tester • tong tester/clamp on ammeter 7.8 confirm test instruments are fit for purpose, functioning correctly and are correctly calibrated.

Learning outcome
The learner will: 8. understand the procedures and techniques for correcting faults in electrical installations in dwellings.
Assessment criteria
The learner can: 8.1 identify and explain factors which can affect fault correction, repair or replacement, including: <ul style="list-style-type: none"> • cost • availability of replacement parts • down time (planning) • legal and personal responsibility (eg contracts, warranties, relevant personnel) • access to installation • provision of emergency or stand by supplies 8.2 specify the procedures for functional testing and identify tests that can verify fault correction, including: <ul style="list-style-type: none"> • continuity • insulation resistance • polarity • earth fault loop impedance • RCD operation • values of current and voltage 8.3 state the appropriate documentation that is required for fault correction work and explain how and when it should be completed 8.4 explain how and why relevant people need to be kept informed during completion of fault correction work including: <ul style="list-style-type: none"> • other workers/colleagues • customers/clients 8.5 specify the methods for restoring the condition of building fabric including: <ul style="list-style-type: none"> • brickwork • plastering • decorative finishings 8.6 state the methods to ensure the safe disposal of any waste and that the work area is left in a safe and clean condition.

Learning outcome
The learner will: 9. be able to correct faults on electrical installations in dwellings.
Assessment criteria
The learner can: 9.1 confirm appropriate repairs, removals and replacements and their implications with relevant people including: <ul style="list-style-type: none"> • other workers/colleagues • customers/clients 9.2 perform fault correction procedures correctly and safely using appropriate tools, equipment and material 9.3 perform the removal and replacement of components and associated equipment from electrotechnical systems to ensure: <ul style="list-style-type: none"> • ease of access to enable future maintenance • accordance with: <ul style="list-style-type: none"> - relevant regulations - manufacturer's instructions - organisational procedures 9.4 apply appropriate procedures to ensure electrotechnical systems, equipment and components are left safe, in accordance with industry regulations, if the fault cannot be corrected immediately 9.5 perform appropriate inspection and testing procedures to confirm that systems, equipment and components are functioning correctly after completion of fault correction work 9.6 record test results and other appropriate information regarding the fault correction work clearly and accurately and report to relevant people, such as: <ul style="list-style-type: none"> • other workers/colleagues • customers/clients • representatives of other services.

Unit 306/506 Understand and apply the principles, practices and legislation for diagnosing and correcting electrical faults in electrical installations in dwellings

Supporting information

Evidence requirements

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,- SummitSkills, Apr 2010v2.1a (06.10).

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed on our website at:

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed via the SummitSkills website.

Unit 307/507 Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings

UAN:	T/504/5472
Level:	Level 3
Credit value:	3
GLH:	25

Learning outcome	
The learner will:	
1.	understand the procedures for checking the work location prior to the commencement of work activities.
Assessment criteria	
The learner can:	
1.1	state the preparations that should be completed before electrical installation work starts, including: <ul style="list-style-type: none"> • interpretation of specifications to produce accurate material and equipment requisites • identification and selection of material, equipment and components compatible to installation specification • confirmation of site readiness for installation • confirmation that tools, equipment and instruments are fit for purpose • confirmation of provision for secure site storage of tools, equipment, materials and components • identification of suitable access equipment • identification of suitable installation, fixing and fitting methods • identification of points in the installation programme where co-ordination with other trades and personnel may be necessary
1.2	explain how to check for any pre-existing damage to customer/client property, such as: <ul style="list-style-type: none"> • dwelling wall/floor fabric • equipment and components • dwelling décor and floor finishes and state why it is important to do this prior to commencement of any work activity
1.3	state the actions that should be taken if pre-existing damage to customer/client property is identified
1.4	specify methods for protecting the fabric and structure of the dwelling before and during installation work.

Learning outcome
The learner will: 2. be able to prepare the working environment for the installation of wiring systems, enclosures and associated equipment
Assessment criteria
The learner can: 2.1 ensure the health and safety of themselves and others within the work location 2.2 identify and use suitable personal protective equipment throughout the completion of work activities 2.3 complete preparatory work for the installation of electrical systems, enclosures and associated equipment, to include: <ul style="list-style-type: none"> • interpretation of installation specifications to produce material and equipment requisites • identification and selection of material, equipment and components which are compatible with the installation specification • identification of suitable methods, procedures and practices • confirmation of site readiness for installation work to begin • confirmation of secure site storage facilities for tools, equipment, materials and components • confirmation that safe isolation has been carried out (if appropriate) in accordance with regulatory requirements • completion of a risk assessment.

Learning outcome
The learner will: 3. know the regulatory requirements which apply to the installation of wiring systems, associated equipment and enclosures in dwellings.
Assessment criteria
The learner can: 3.1 specify the main requirements of the following topics in accordance with the current version of the IET Wiring Regulations and describe how they impact upon the installation of wiring systems, associated equipment and enclosures in dwellings: <ul style="list-style-type: none"> • selection and erection of wiring systems, associated equipment and enclosures • isolation and switching • protection against fire • protection against electric shock • special locations • segregation

- 3.2 specify the requirements of the following:
- Building Regulations for the Installation of Electrotechnical Systems and Equipment in Dwellings:
 - Part A
 - Part B
 - Part C
 - Part E
 - Part F
 - Part L
 - Part M
 - Part P.

Learning outcome
The learner will:
4. be able to correctly interpret appropriate information for the installation of wiring systems, enclosures and associated equipment in dwellings
Assessment criteria
The learner can:
4.1 use information and documentation that is current and relevant to the work required, including: <ul style="list-style-type: none"> • installation specifications • work schedules • work programmes • regulatory documents (including current version of the IET Wiring Regulations and relevant guidance notes) • method statements • manufacturer's instructions
4.2 use documentation to confirm that materials and equipment is of the correct quantity and is free from damage, including: <ul style="list-style-type: none"> • materials schedules • operating instructions • tools and instruments
4.3 use appropriate procedures to record: <ul style="list-style-type: none"> • contract variations • site instructions
4.4 demonstrate that authorisation has been obtained from the relevant person(s) prior to commencement of the work, including: <ul style="list-style-type: none"> • other workers • customers/clients
4.5 produce a record of any pre work damage or defects to existing equipment or building features, and report to the relevant person (customer, client, site manager, line manager).

Learning outcome
The learner will: 5. understand the practices, procedures and regulatory requirements for completing the safe isolation of electrical circuits and complete electrical installations in dwellings.
Assessment criteria
The learner can: 5.1 specify and undertake the correct procedure for completing safe isolation with regard to: <ul style="list-style-type: none"> • carrying out safe working practices • correctly identifying circuit(s) to be isolated • identifying suitable points of isolation • selecting correct test and proving instruments in accordance with relevant industry guidance and standards • applying correct testing methods • selecting locking devices for securing isolation • placing of warning notices • applying correct sequence for the safe-isolation of an electrical circuit and complete electrical installation 5.2 state the implications of carrying out safe isolation to: <ul style="list-style-type: none"> • other personnel • customers/clients • public • building systems (loss of supply) 5.3 state the implications of not carrying out safe isolation to: <ul style="list-style-type: none"> • self • other personnel • customers/clients • public • building systems (presence of supply).

Learning outcome
The learner will: 6. understand the practices and procedures for installing wiring systems, associated equipment, enclosures and accessories in dwellings.
Assessment criteria
The learner can: 6.1 state the procedures for selecting and safely using appropriate hand tools, power tools and adhesives for electrical installation work 6.2 state the procedures for selecting and safely using equipment for measuring and marking out for wiring systems, equipment and enclosures 6.3 state the criteria for selecting and safely using tools and equipment for fixing and installing wiring systems, associated equipment and enclosures

6.4	state the criteria for selecting and safely using fixing devices for wiring systems, associated equipment and enclosures, giving consideration to: <ul style="list-style-type: none"> • load bearing capacity • fabric of structure • environmental considerations • aesthetic considerations
6.5	specify installation methods and procedures to ensure that: <ul style="list-style-type: none"> • wiring systems, enclosures, cables and accessories are securely fixed and installed • the mechanical integrity of wiring systems is maintained in accordance with the installation specification and statutory and non-statutory regulations
6.6	specify methods and techniques for restoring the building fabric.

Learning outcome	
The learner will:	
7.	be able to install wiring systems, enclosures, associated equipment and accessories safely, in accordance with the installation specification.
Assessment criteria	
The learner can:	
7.1	ensure that the planned locations for the wiring system(s) and its associated equipment are compatible with other site services requirements
7.2	use different measuring and marking out techniques which are appropriate to the wiring system, wiring enclosure and/or associated equipment that is being installed
7.3	ensure that the planned locations are visually acceptable and in accordance with the installation specification
7.4	produce a planned programme of work for the fitting and fixing of wiring systems, wiring enclosures, associated equipment and accessories in accordance with: <ul style="list-style-type: none"> • a safe system of work • co-ordination with other trades • relevant regulations (eg IET Wiring Regulations, Building Regulations) • Installation specification • manufacturers' instructions
7.5	install the following in accordance with the IEE Wiring Regulations, the installation specification and agreed planned programme of work: <ul style="list-style-type: none"> • thermosetting insulated cables including flexes • single and multicore thermoplastic (PVC) and thermosetting insulated cables • PVC/PVC flat profile cable • SWA/PVC cable • armoured/braided flexible cables and cords • fire resistant cable

7.6	install the following in accordance with the IET Wiring Regulations, the installation specification and agreed planned programme of work: <ul style="list-style-type: none"> • conduit (PVC and metallic) • trunking (PVC and metallic)
7.7	install the following types of electrical equipment and accessories, in accordance with the IEE Wiring Regulations, the installation specification, manufacturers' instructions and the agreed planned programme of work: <ul style="list-style-type: none"> • isolators and switches • socket-outlets • consumer units • earthing fault and overcurrent protective devices • luminaires • auxiliary equipment (eg heating/water system components)
7.8	dispose of unwanted material and equipment in accordance with site procedures and statutory requirements.

Learning outcome	
The learner will:	
8.	understand the procedures and applications of different methods of terminating and connecting conductors, cables, and flexible cords in electrical wiring systems and equipment in dwellings
Assessment criteria	
The learner can:	
8.1	explain the advantages, limitations and applications of the following connection methods: <ul style="list-style-type: none"> • screw • crimped • non screw compression
8.2	describe the procedures for proving that terminations and connections are electrically and mechanically sound
8.3	explain the consequences of terminations not being electrically and mechanically sound in terms of: <ul style="list-style-type: none"> • high resistance joints • corrosion and erosion.

Learning outcome
The learner will: 9. be able to terminate and connect conductors, cables, and flexible cords in electrical wiring systems and equipment in dwellings.
Assessment criteria
The learner can: 9.1 specify the health and safety requirements appropriate to terminating and connecting conductors, cables and flexible cords in electrical wiring systems and equipment, including: <ul style="list-style-type: none"> • selection and use of tools • PPE • risk assessment • reporting of unsafe situations • adherence to relevant statutory and non-statutory regulations 9.2 interpret and apply the techniques and methods for the safe and effective termination and connection of: <ul style="list-style-type: none"> • thermosetting insulated cables including flexes • single and multicore thermoplastic (PVC) and thermosetting insulated cables • PVC/PVC flat profile cable • SWA/PVC cable • armoured/braided flexible cables and cords • fire resistant cable.

Learning outcome
The learner will: 10. be able to confirm any variations to the installation specification or planned programme of work.
Assessment criteria
The learner can: 10.1 confirm that, where variations to the installation specification and/or work programme have been identified, appropriate action has been taken after agreement of relevant persons (eg customer, client, site manager) 10.2 verify that the completed system meets specified requirements in terms of ensuring that components and equipment are of the correct type, fit for purpose and are installed in accordance with the IET Wiring Regulations, the installation specification and as appropriate, with manufacturer instructions.

Unit 307/507 Understand and apply the practices and procedures for the installation and connection of wiring systems and electrotechnical equipment in dwellings.

Supporting information

Evidence requirements

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,- SummitSkills, Apr 2010v2.1a (06.10).

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Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed via the SummitSkills website.

Unit 308/508 Understand and apply the principles, practices and legislation for the inspection, testing, commissioning, approving and certification of electrical installations in dwellings

UAN:	A/504/5487
Level:	Level 3
Credit value:	5
GLH:	40

Learning outcome
The learner will: 1. understand the procedures and regulatory requirements and for completing the safe isolation of an electrical circuit and complete electrical installations in preparation for inspection, testing and commissioning.
Assessment criteria
The learner can: 1.1 state the requirements of the Electricity at Work Regulations 1989 for the safe inspection of electrical systems and equipment, in terms of those carrying out the work and those using the building during the inspection 1.2 specify and undertake the correct procedure for completing safe isolation with regard to: <ul style="list-style-type: none"> • carrying out safe working practices • correctly identifying circuit(s) to be isolated • identifying suitable points of isolation • selecting correct test and proving instruments in accordance with relevant industry guidance and standards • applying correct testing methods • selecting locking devices for securing isolation • placing of warning notices • applying correct sequence for the safe-isolation of an electrical circuit and complete electrical installation 1.3 state the implications of carrying out safe isolations to: <ul style="list-style-type: none"> • other personnel • customers/clients • public • building systems (loss of supply)

1.4	state the implications of not carrying out safe isolations to: <ul style="list-style-type: none"> • self • other personnel • customers/clients • public • building systems (presence of supply)
1.5	identify all health and safety requirements which apply when inspecting, testing and commissioning electrical installations and circuits including those which cover: <ul style="list-style-type: none"> • working in accordance with risk assessments / permits to work / method statements • safe use of tools and equipment • safe and correct use of measuring instruments • provision and use of PPE • reporting of unsafe situations.

Learning outcome	
The learner will:	
2.	be able to confirm safety of the system and equipment prior to completion of inspection, testing and commissioning in accordance with statutory and non statutory regulations
Assessment criteria	
The learner can:	
2.1	carry out safe isolation procedures in accordance with regulatory requirements for electrical installations
2.2	ensure the health and safety of themselves and others within the work location during inspection, testing and commissioning
2.3	check the safety of electrical systems prior to the commencement of inspection, testing and commissioning.

Learning outcome	
The learner will:	
3.	understand the principles and regulatory requirements for inspecting, testing, commissioning and approving electrical installations dwellings
Assessment criteria	
The learner can:	
3.1	state the purpose of and requirements for initial verification and periodic inspection of electrical installations
3.2	identify and interpret the requirements of the relevant documents associated with the inspection, testing and commissioning of an electrical installation, including: <ul style="list-style-type: none"> • Electricity at Work Regulations 1989 • IET wiring Regulations • IET Guidance Note 3 • IET On-Site-Guide

- Electricity Safety, Quality and Continuity Regulations
 - Building Act 1984
 - Building (Amendment) Regulations 2012
- 3.3 specify the information that is required to correctly conduct the initial verification of an electrical installation in accordance with the IET Wiring Regulations and IET Guidance Note 3
- 3.4 specify the requirements for complying with the following:
- Building Regulations for the Installation of Electrotechnical Systems and Equipment in Dwellings:
 - Part A
 - Part B
 - Part C
 - Part E
 - Part F
 - Part L
 - Part M
 - Part P
- 3.5 state the requirements of notification to 'Local Authority Building Control'
- 3.6 specify the applications and limitations of the electrical components listed below when used in electrical installations in dwellings:
- contractors
 - relays
 - solenoids
 - over-current protection devices
 - fuses (HRC, cartridge and re-wireable)
 - circuit-breakers
 - RCDS
 - RCBOS
- 3.7 explain the relationship between resistance, inductance, capacitance and impedance
- 3.8 explain the relationship between kW, kVAr, kVA and Power Factor.

Learning outcome
The learner will: 4. understand the regulatory requirements and procedures for completing the inspection of electrical installations in dwellings
Assessment criteria
The learner can: 4.1 identify the items to be checked during the inspection process for given electrotechnical systems and equipment, and their locations as detailed in the IET Wiring Regulations 4.2 state how human senses (sight, touch etc) can be used during the inspection process 4.3 state the items of an electrical installation that should be inspected in accordance with IET Guidance Note 3 4.4 specify the requirements for the inspection of the following: <ul style="list-style-type: none"> • earthing conductors • circuit protective conductors • protective bonding conductors: <ul style="list-style-type: none"> - main bonding conductors - supplementary bonding conductors • isolation • type and rating of overcurrent protective devices.

Learning outcome
The learner will: 5. be able to inspect electrical installations in dwellings
Assessment criteria
The learner can: 5.1 assess whether the safe system of work is appropriate to the work activity 5.2 carry out a visual inspection in accordance with the requirements of the installation specification, the IET Wiring Regulations and IET Guidance Note 3, that includes: <ul style="list-style-type: none"> • the installation methods of wiring systems and equipment • the selection of conductors, cables and cords • the selection of protective and isolation devices • routing and identification/labelling of conductors, cables and flexible cords • presence of means of earthing • presence of protective conductors and bonding • isolation • type and rating of overcurrent protective devices 5.3 complete a Schedule of Inspections in accordance with the IET Wiring Regulations and IET Guidance Note 3.

Learning outcome
The learner will: 6. understand the regulatory requirements and procedures for the safe testing and commissioning of electrical installations in dwellings
Assessment criteria
The learner can: 6.1 state the tests to be carried out on an electrical installation in accordance with the IET Wiring Regulations and IET Guidance Note 3 6.2 identify the correct instrument for the test to be carried out in terms of: <ul style="list-style-type: none"> • the instrument is fit for purpose • the right scale/settings of the instrument appropriate to the test to be carried out 6.3 specify the requirements for the safe and correct use of instruments to be used for testing and commissioning, including: <ul style="list-style-type: none"> • checks required to prove that test instruments and leads are safe and functioning correctly • the need for instruments to be regularly checked and calibrated and that this must be done in accordance with the requirements of the IET Wiring Regulations and other relevant guidance documents (HSE guidance document GS38) 6.4 explain why it is necessary for test results to comply with standard values and state the actions to take in the event of unsatisfactory results being obtained 6.5 explain why testing is carried out in the exact order as specified in the IET Wiring Regulations and IET Guidance Note 3 6.6 state the reasons why it is necessary to verify the continuity of circuit protective conductors, earthing conductors, bonding conductors and ring final circuit conductors 6.7 specify and apply the methods for verifying the continuity of circuit protective conductors and ring final circuit conductors and interpreting the obtained results 6.8 state the effects that: <ul style="list-style-type: none"> • cables connected in parallel • variations in cable length can have on insulation resistance values 6.9 interpret the procedures for completing insulation resistance testing, including: <ul style="list-style-type: none"> • precautions to be taken before conducting insulation resistance tests • methods of testing insulation resistance • the required test voltages and minimum insulation resistance values for circuits operating at various voltages 6.10 explain why it is necessary to verify polarity 6.11 interpret the procedures for testing to identify correct polarity 6.12 specify the methods for measuring earth electrode resistance and correctly interpreting the results 6.13 identify the earth fault loop paths for the following systems:

<ul style="list-style-type: none"> • TN-S • TN-C-S • TT • IT
<p>6.14 state the methods for verifying protection by automatic disconnection of the supply, including:</p> <ul style="list-style-type: none"> • The measurement of the earth fault loop impedance (Z_s) and external impedance (Z_e) • establishing Z_e from enquiry • calculate the value of Z_s from given information • comparing Z_s and the maximum tabulated figures as specified in the IEE Wiring Regulations
<p>6.15 specify the methods for determining prospective fault current</p>
<p>6.16 specify the methods for testing the correct operation of Residual Current Devices (RCDs)</p>
<p>6.17 explain why having the correct phase sequence is important</p>
<p>6.18 state the need for functional testing and identify items which need to be checked</p>
<p>6.19 specify the methods used for verification of voltage drop</p>
<p>6.20 state the cause of volt-drop in an electrical installation</p>
<p>6.21 state the appropriate procedures for dealing with customers and clients during the commissioning and certification process, including:</p> <ul style="list-style-type: none"> • ensuring the safety of customers and clients during the completion of work activities • keeping customers and clients informed during the process • labelling electrical circuits, systems and equipment that are yet to be commissioned • providing customers and clients with all appropriate documentation upon work completion.

<p>Learning outcome</p>
<p>The learner will:</p> <p>7. understand the procedures and requirements for the completion of electrical installation certificates and related documentation for electrical installations in dwellings.</p>
<p>Assessment criteria</p>
<p>The learner can:</p> <p>7.1 explain the purpose of and relationship between:</p> <ul style="list-style-type: none"> • an Electrical Installation Certificate • a Minor Electrical Installation Works Certificate • Schedule of Inspections • Schedule of Test results <p>7.2 state the information that must be contained within:</p> <ul style="list-style-type: none"> • an Electrical Installation Certificate • a Minor Electrical Installation Works Certificate • Schedule of Inspections • Schedule of Test results

7.3	describe the certification process for a completed installation and identify the responsibilities of different relevant personnel in relation to the completion of the certification process
7.4	explain the procedures and requirements, in accordance with the IET Wiring Regulations, IET Guidance Note 3 and where appropriate customer/client requirements for the recording and retention of completed: <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test Results.

Learning outcome	
The learner will:	
8.	be able to test electrical installations in dwellings
Assessment criteria	
The learner can:	
8.1	select the test instruments and their accessories for the following tests: <ul style="list-style-type: none"> • continuity • insulation resistance • polarity • earth fault loop impedance • prospective fault current • RCD operation • functional testing
8.2	carry out the following tests in accordance with the installation specification and the IET Wiring Regulations and manufacturer's instructions: <ul style="list-style-type: none"> • continuity (eg CPC, ring final circuit) • insulation resistance • polarity • earth fault loop impedance • prospective fault current • RCD operation • functional testing
8.3	verify test results and report all findings to relevant persons, as appropriate, including: <ul style="list-style-type: none"> • representatives of other services/colleagues • customers/clients
8.4	complete in accordance with the IET Wiring Regulations and IET Guidance Note 3: <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test results

- 8.5 conform in accordance with the IET Wiring Regulations and IET Guidance Note 3, and where appropriate, customer/client requirements, to the procedures and requirements for the recording and retention of completed:
- Electrical Installation Certificates
 - Minor Electrical Installation Works Certificates
 - Schedules of Inspections
 - Schedules of Test results.

Learning outcome

The learner will:

9. be able to commission and approve electrical installations in dwellings in accordance with statutory and non-statutory regulations

Assessment criteria

The learner can:

- 9.1 clarify the commissioning procedures with relevant persons on site, including:
- representatives of other services/colleagues
 - customers/clients
- 9.2 carry out the commissioning of circuits, equipment and components to confirm functionality, fit for purpose and safety in accordance with:
- the installation specification
 - IET Wiring Regulations
 - manufacturer's instructions
 - maintenance schedules
 - health and safety requirements
- 9.3 demonstrate to the customer/client that the operation of the circuits, equipment and components are in accordance with the installation specification and customer/client requirements.
- 9.4 complete the handover of electrotechnical systems and equipment to relevant persons including the provision of accurate and complete documentation regarding the completed inspection, testing, commissioning and customer satisfaction
- 9.5 carry out the approval of electrical installations in dwellings in accordance with the procedures for notifying 'Local Authority Building Control'.

Unit 308/508 Understand and apply the principles, practices and legislation for the inspection, testing, commissioning, approving and certification of electrical installations in dwellings

Supporting information

Evidence requirements

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,- SummitSkills, Apr 2010v2.1a (06.10).

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Unit 309

Approval and certification of electrical installations in dwellings

UAN:	A/504/5473
Level:	Level 3
Credit value:	4
GLH:	34

Learning outcome

The learner will:

1. understand the procedures and regulatory requirements for completing the safe isolation of an electrical circuit and complete electrical installations in preparation for inspection, testing and commissioning.

Assessment criteria

The learner can:

- 1.1 state the requirements of the Electricity at Work Regulations 1989 for the safe inspection of electrical systems and equipment, in terms of those carrying out the work and those using the building during the inspection
- 1.2 specify the correct procedure for completing safe isolation with regard to:
 - carrying out safe working practices
 - correctly identifying circuit (s) to be isolated
 - identifying suitable points of isolation
 - selecting correct test and proving instruments in accordance with relevant industry guidance and standards
 - applying correct testing methods
 - selecting locking devices for securing isolation
 - placing of warning notices
 - applying correct sequence for the safe-isolation of an electrical circuit and complete electrical installation
- 1.3 state the implications of carrying out safe isolations to:
 - other personnel
 - customers/clients
 - public
 - building systems (loss of supply)
- 1.4 state the implications of not carrying out safe isolations to:
 - self
 - other personnel

<ul style="list-style-type: none"> • customers/clients • public • building systems (presence of supply) <p>1.5 identify all Health and Safety requirements which apply when inspecting, testing and commissioning electrical installations and circuits including those which cover:</p> <ul style="list-style-type: none"> • working in accordance with risk assessments/permits to work/ method statements • safe use of tools and equipment • safe and correct use of measuring instruments • provision and use of PPE • reporting of unsafe situations.

<p>Learning outcome</p> <p>The learner will:</p> <p>2. be able to confirm the safety of the electrotechnical system and equipment prior to completion of inspection, testing and commissioning in accordance with statutory and non statutory regulations.</p>
<p>Assessment criteria</p> <p>The learner can:</p> <p>2.1 carry out safe isolation procedures in accordance with regulatory requirements for electrical installations</p> <p>2.2 ensure the health and safety of themselves and others within the work location during inspection, testing and commissioning</p> <p>2.3 check the safety of electrical systems prior to the commencement of inspection, testing and commissioning.</p>

<p>Learning outcome</p> <p>The learner will:</p> <p>3. understand the principles and regulatory requirements for inspecting, testing, commissioning and approving electrical installations dwellings.</p>
<p>Assessment criteria</p> <p>The learner can:</p> <p>3.1 state the purpose of and requirements for initial verification and periodic inspection of electrical installations</p> <p>3.2 identify and interpret the requirements of the relevant documents associated with the inspection, testing and commissioning of electrical installations in dwellings, including current editions of:</p> <ul style="list-style-type: none"> • Electricity at Work Regulations 1989 • IET Wiring Regulations • IET Guidance Note 3 • IET On-Site-Guide • Electricity Safety, Quality and Continuity Regulations • Building Act 1984

<ul style="list-style-type: none"> • Building (Amendment) Regulations 2012 <p>3.3 specify the information that is required to correctly conduct the initial verification of an electrical installation in accordance with the IET Wiring Regulations and IET Guidance Note 3</p> <p>3.4 specify the requirements for complying with the following:</p> <ul style="list-style-type: none"> • Building Regulations for the installation of electrotechnical systems and equipment in dwellings: <ul style="list-style-type: none"> - Part A - Part B - Part C - Part E - Part F - Part L - Part M - Part P <p>3.5 state the requirements of notification to 'Local Authority Building Control'.</p>
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Learning outcome
<p>The learner will:</p> <p>4. understand the regulatory requirements and procedures for completing the inspection of electrical installations in dwellings.</p>
Assessment criteria
<p>The learner can:</p> <p>4.1 identify the items to be checked during the inspection process for given electrotechnical systems and equipment, and their locations as detailed in the installation specification and in accordance with the IET Wiring Regulations</p> <p>4.2 state how human senses (sight, touch etc) can be used during the inspection process</p> <p>4.3 state the items of an electrical installation that should be inspected in accordance with IET Guidance Note 3</p> <p>4.4 specify the requirements for the inspection of the following:</p> <ul style="list-style-type: none"> • earthing conductors • circuit protective conductors • protective bonding conductors <ul style="list-style-type: none"> - main bonding conductors - supplementary bonding conductors • isolation • type and rating of overcurrent protective devices.

Learning outcome
The learner will: 5. be able to inspect electrical installations in dwellings.
Assessment criteria
The learner can: 5.1 assess whether the safe system of work is appropriate to the work activity 5.2 carry out a visual inspection in accordance with the requirements of the installation specification, the IET wiring regulations and IET Guidance Note 3, that includes: <ul style="list-style-type: none"> • the installation methods of wiring systems and equipment • the selection of conductors, cables and cords • the selection of protective and isolation devices • routing and identification/labelling of conductors, cables and flexible cords • presence of means of earthing • presence of protective conductors and bonding • isolation • type and rating of overcurrent protective devices 5.3 complete a Schedule of Inspections in accordance with the IET Wiring Regulations and IET Guidance Note 3.

Learning outcome
The learner will: 6. understand the regulatory requirements and procedures for the safe testing and commissioning of electrical installations in dwellings.
Assessment criteria
The learner can: 6.1 state the tests to be carried out on an electrical installation in accordance with the IET Wiring Regulations and IET Guidance Note 3 6.2 identify the correct instrument for the test to be carried out in terms of: <ul style="list-style-type: none"> • the instrument is fit for purpose • identifying the right scale/settings of the instrument appropriate to the test to be carried out 6.3 specify the requirements for the safe and correct use of instruments to be used for testing and commissioning, including: <ul style="list-style-type: none"> • checks required to prove that test instruments and leads are safe and functioning correctly • the need for instruments to be regularly checked and calibrated and that this be done in accordance with the requirements of the IET Wiring Regulations and other relevant guidance documents (HSE guidance document GS38) 6.4 explain why it is necessary for test results to comply with standard values and state the actions to take in the event of unsatisfactory results being obtained 6.5 explain why testing is carried out in the exact order as specified in the IET Wiring Regulations and IET Guidance Note 3

- 6.6 state the reasons why it is necessary to verify the continuity of circuit protective conductors, earthing conductors, bonding conductors and ring final circuit conductors
- 6.7 specify the methods for verifying the continuity of circuit protective conductors and ring final circuit conductors and interpreting the obtained results
- 6.8 state the effects that:
- cables connected in parallel
 - variations in cable length
- can have on insulation resistance values
- 6.9 interpret the procedures for completing insulation resistance testing, including:
- precautions to be taken before conducting insulation resistance tests
 - methods of testing insulation resistance
 - the required test voltages and minimum insulation resistance values for circuits operating at various voltages
- 6.10 explain why it is necessary to verify polarity
- 6.11 Interpret the procedures for testing to identify correct polarity
- 6.12 specify the methods for measuring earth electrode resistance and correctly interpreting the results
- 6.13 identify the earth fault loop paths for the following systems:
- TN-S
 - TN-C-S
 - TT
 - IT
- 6.14 state the methods for verifying protection by automatic disconnection of the supply, including:
- the measurement of the earth fault loop impedance (Z_s) and external impedance (Z_e)
 - establishing Z_e from enquiry
 - calculate the value of Z_s from given information
 - comparing Z_s and the maximum tabulated figures as specified in the IEE Wiring Regulations
- 6.15 specify the methods for determining prospective fault current
- 6.16 specify the methods for testing the correct operation of Residual Current Devices (RCDs)
- 6.17 explain why having the correct phase sequence is important
- 6.18 state the need for functional testing and identify items which need to be checked
- 6.19 specify the methods used for verification of voltage drop
- 6.20 state the cause of volt-drop in an electrical installation
- 6.21 state the appropriate procedures for dealing with customers and clients during the commissioning and certification process, including:
- ensuring the safety of customers and clients during the completion of work activities
 - keeping customers and clients informed during the process
 - labelling electrical circuits, systems and equipment that is yet to be commissioned
 - providing customers and clients with all appropriate documentation upon work completion.

Learning outcome
The learner will: 7. understand the procedures and requirements for the completion of certificates and related documentation for electrical installations in dwellings.
Assessment criteria
The learner can: 7.1 explain the purpose of and relationship between: <ul style="list-style-type: none"> • an Electrical Installation Certificate • a Minor Electrical Installation Works Certificate • Schedule of Inspections • Schedule of Test results 7.2 state the information that must be contained within: <ul style="list-style-type: none"> • an Electrical Installation Certificate • a Minor Electrical Installation Works Certificate • Schedule of Inspection • Schedule of Test results 7.3 describe the certification process for a completed installation and identify the responsibilities of different relevant personnel in relation to the completion of the certification process 7.4 explain the procedures and requirements, in accordance with the IET Wiring Regulations, IET Guidance Note 3 and where appropriate customer /client requirements for the recording and retention of completed: <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test Results.

Learning outcome
The learner will: 8. be able to test electrical installations in dwellings.
Assessment criteria
The learner can: 8.1 select the test instruments and their accessories for the following tests: <ul style="list-style-type: none"> • continuity • insulation resistance • polarity • earth fault loop impedance • prospective fault current • RCD operation • functional testing

8.2	<p>carry out the following tests in accordance with the installation specification and the IET Wiring Regulations and manufacturer's instructions:</p> <ul style="list-style-type: none"> • continuity (eg CPC, ring final circuit) • insulation resistance • polarity • earth fault loop impedance • prospective fault current • RCD operation • functional testing
8.3	<p>verify test results and report all findings to relevant persons, as appropriate, including:</p> <ul style="list-style-type: none"> • representatives of other services/colleagues • customers/clients
8.4	<p>complete in accordance with the IET Wiring Regulations and IET Guidance Note 3:</p> <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test results
8.5	<p>confirm in accordance with the IET Wiring Regulations and IET Guidance Note 3, and where appropriate customer/client requirements, the procedures and requirements for the recording and retention of completed:</p> <ul style="list-style-type: none"> • Electrical Installation Certificates • Minor Electrical Installation Works Certificates • Schedules of Inspections • Schedules of Test results .

Learning outcome	
The learner will:	
9.	be able to commission and approve electrical installations in dwellings in accordance with statutory and non-statutory regulations
Assessment criteria	
The learner can:	
9.1	<p>clarify the commissioning procedures with relevant persons on site, including:</p> <ul style="list-style-type: none"> • representatives of other services/colleagues • customers/clients
9.2	<p>carry out the commissioning of circuits, equipment and components to confirm functionality, that they are fit for purpose and safety in accordance with:</p> <ul style="list-style-type: none"> • the installation specification • IET Wiring Regulations • manufacturer's instructions • health and safety requirements • electricity safety, quality and continuity regulations

- 9.3 carry out the approval of electrical installations in dwellings in accordance with the procedures for notifying 'Local Authority Building Control'
- 9.4 demonstrate to the customer/client that the operation of the circuits, equipment and components are in accordance with the installation specification and customer/client requirements
- 9.5 complete the handover of electrotechnical systems and equipment to relevant persons including the provision of accurate and complete documentation regarding the completed inspection, testing, commissioning, approval and customer satisfaction of the installation.

Unit 309 Approval and certification of electrical installations in dwellings

Supporting information

Evidence requirements

The assessment methodology, assessment instruments, the principles and processes of assessment must be determined by the Awarding Organisation in accordance with the 'Consolidated Assessment Strategy for Units and Qualifications in the QCF for the BSE Sector,-Summit Skills, Apr 2010v2.1a (06.10).

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed on our website at:

Details of auditable evidence, assessment requirements and guidance for each learning outcome can be accessed via the SummitSkills website.



Appendix 1 Relationships to other qualifications

Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see www.cityandguilds.com/functionalskills
- Essential Skills (Northern Ireland) – see www.cityandguilds.com/essentialskillsni
- Essential Skills Wales – see www.cityandguilds.com/esw



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 and Training Providers homepage** on www.cityandguilds.com.

Centre Manual - Supporting Customer Excellence 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, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

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

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Useful contacts

UK learners General qualification information	T: +44 (0)844 543 0033 E: learnersupport@cityandguilds.com
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, 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
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
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
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: walledgarden@cityandguilds.com
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: business@cityandguilds.com
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

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As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Land Based Services (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

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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

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