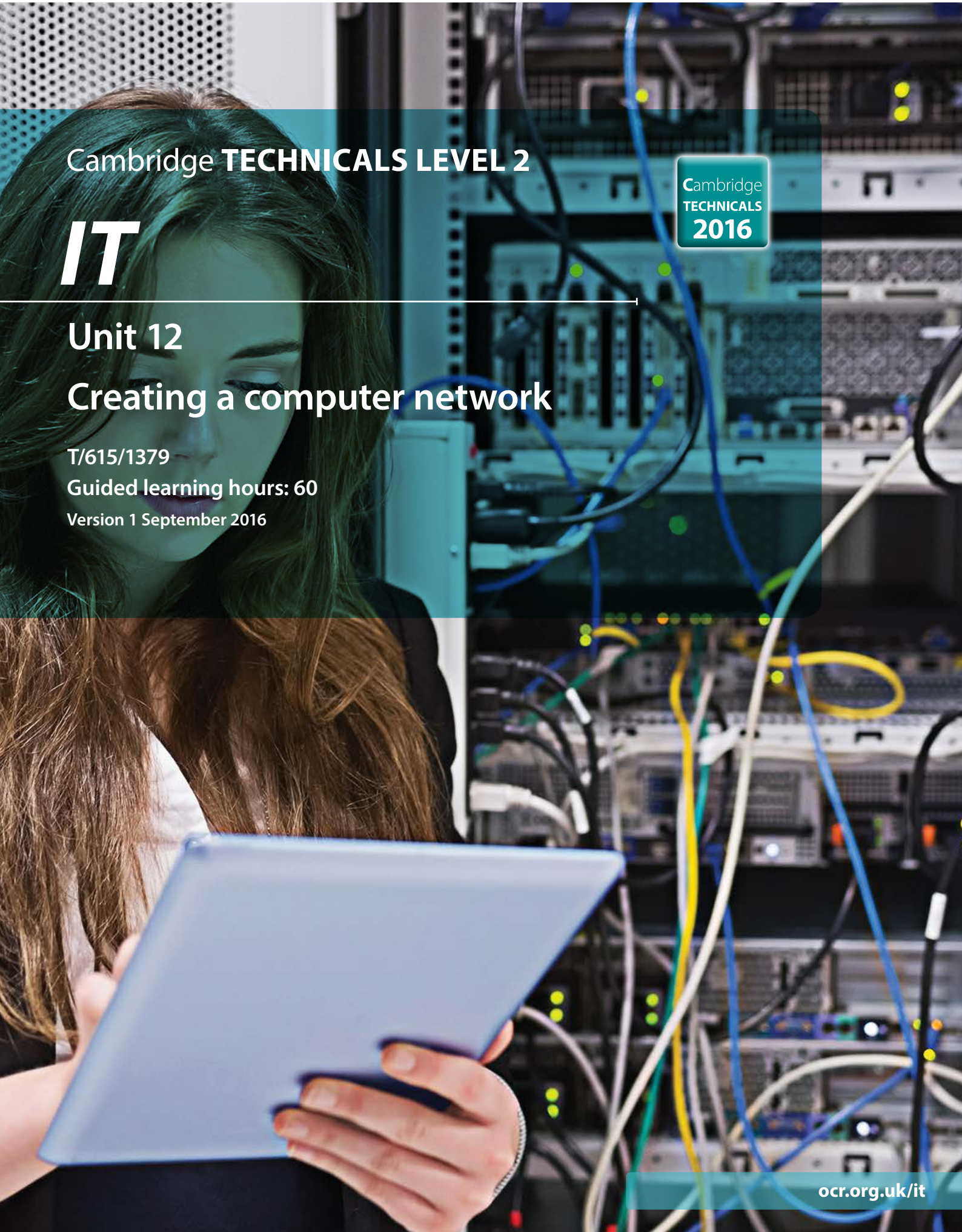
2016 Suite

OCR
Oxford Cambridge and RSA



Cambridge **TECHNICALS LEVEL 2**

Cambridge TECHNICALS 2016

IT

Unit 12

Creating a computer network

T/615/1379

Guided learning hours: 60

Version 1 September 2016

ocr.org.uk/it

LEVEL 2

UNIT 12: Creating a computer network

T/615/1379

Guided learning hours: 60

Essential resources required for this unit: None

This unit is internally assessed and externally moderated by OCR.

UNIT AIM

Computer networks have changed the way we live our lives, from streaming a movie, browsing the internet, uploading a photo, to file sharing and remote working.

In any IT technical role, you will benefit from having a good grasp of the fundamentals of networking and its application. This unit has been developed to help you gain these skills and put them into practice by installing and securing a network.

This is an optional unit within the Award in Digital Business and is mandatory within the IT Technical Practitioner pathway in the Diploma.

The teaching content supports the delivery the Cisco networking certification (CCNA), CompTIA A+, and CompTIA IT Fundamentals

TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

Learning outcomes The Learner will:	Teaching content Learners must be taught:
1. Know the components of computer networks	1.1. Network components and their purpose, i.e.: • switch (e.g. managed, unmanaged, POE) • router • extender • server • network Interface Cards • NAS • IP Camera • Powerline • cable and connectors (e.g. twisted par, coaxial, fibre-optic) 1.2. Network software and their purpose i.e.: • network operating systems • desktop operating systems • remote administration • software deployment • file sharing
2. Be able to prepare for the installation of computer networks to meet business needs	2.1. Benefits and limitations of different methods of connection, i.e.: • cable connection (e.g. fibre, twisted pair, coaxial) • wireless (e.g. Bluetooth, 802.11 (a,b,g,n,ac)) 2.2. Network diagram, i.e.: • network topology • positioning of components • connection medium • IP addresses 2.3. Physical infrastructure installation, i.e.: • trunking • patch panels • faceplates • back box • justify choices 2.4. Types of internet access, e.g.: • ADSL • DSL

Learning outcomes The Learner will:	Teaching content Learners must be taught:
	• ISDN • mobile internet access • justify choices 2.5. Types of network security threats, i.e.: • environmental (e.g. fire, flood, earthquake, power surges) • human threats (e.g. hacking, key logging, viruses, DoS (denial of service attack), theft) 2.6. Types of physical network security and their function, e.g.: • CCTV • keypad/card swipe secure server access • disconnecting unused network ports • remove unused desktops • secure network cabinets • secure backup media 2.7. Types of software based network security and their function, e.g.: • firewall • encryption • virus checker • backup and recovery • passwords • wireless encryption (e.g. WEP, WPA, WPA2, TKIP, AES) • user accounts (e.g. password, folder permissions) • level of account (e.g. administrator, standard, guest) • password policy (e.g. strong passwords, password duration) • deleting old user accounts
3. Be able to create computer networks to meet business needs	3.1. Install and configure network hardware components, i.e.: • network interface card (e.g. PCI, USB Dongle) • network infrastructure (e.g. switch, router, cables, access points) • network devices (e.g. network printer, network attached storage, IP cameras, media senders) 3.2. Configure operating systems to support network communication, i.e.: • operating system settings (e.g. device name, IP addresses, DNS, default gateway, DHCP) • user accounts (e.g. administrator, standard, guest) • file sharing (e.g. setting file and folder access permissions, file shares, mapped drives) 3.3. Test plan to test functionality of computer network, i.e.: • test number • test description • expected results • actual results • error description • error resolution • re-test number

Learning outcomes The Learner will:	Teaching content Learners must be taught:
4. Be able to secure computer networks to meet business needs	4.1. Apply software based security settings to computer network, e.g.: • encryption • change default passwords • mac address management • managed switch settings • firewall • virus checker • backup and recovery • passwords • user accounts (e.g. password, folder permissions) • level of account (e.g. administrator, standard, guest) • password policy (e.g. strong passwords, password duration) • deleting old user accounts 4.2. Test plan to test security of computer network, i.e. • security test number • security test description • expected results • actual results • security breach description • security breach resolution • re-test number 4.3. Evaluation of network installation, i.e. • does it meet the original business needs? • does it reflect the requirements as per the network diagram? • is the network secure to the level required? • could the network be improved? • can the network be extended if required?

GRADING CRITERIA

LO	Pass	Merit	Distinction
	The assessment criteria are the Pass requirements for this unit.	To achieve a Merit the evidence must show that, in addition to the Pass criteria, the candidate is able to:	To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to:
1. Know the components of computer networks	P1: Outline the components of a computer network		
2. Be able to prepare for the installation of computer networks to meet business needs	P2: Review a given computer network diagram and outline requirements		D1: Justify choice of components and equipment in relation to the computer network installation
	P3: Select components and equipment to support the computer network installation	M1: Select security measures to support the computer network installation	
3. Be able to create computer networks to meet business needs	P4: Install and configure hardware for the computer network	M2: Test the installation and configuration of the computer network to confirm functionality	
	P5: Configure the operating systems to allow file and resource sharing		
4. Be able to secure computer networks to meet business needs	P6: Apply security settings to the computer network	M3: Test the security of the computer network	D2: Evaluate the network installation based on the business requirements

SYNOPTIC ASSESSMENT AND LINKS BETWEEN UNITS

When learners are taking an assessment task, or series of tasks, for this unit they will have opportunities to draw on relevant, appropriate knowledge, understanding and skills that they will have developed through other units. See section 6 of the Centre Handbook for more information on synoptic assessment.

This unit and specific LO	Name of other unit and related LO
LO1: Know the components of computer networks	**Unit 1: Essentials of IT** LO1: Know about hardware components LO2: Know about software components LO3: Know how to install and upgrade hardware and software LO4: Know about the Internet and related technologies **Unit 3: Building IT systems** LO2: Be able to design IT systems to meet business needs **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 8: Using emerging technologies** LO1: Know about the technologies currently emerging LO2: Be able to explore how emerging technologies can support business needs LO3: Be able to reflect on future impacts of emerging technologies **Unit 10: IT software installation and upgrade** – LO1: Know the reasons for installing and upgrading IT software **Unit 11: IT hardware installation and upgrade** – LO1: Know the reasons for installing and upgrading IT hardware
LO2: Be able to prepare for the installation of computer networks to meet business needs	**Unit 1: Essentials of IT** LO2: Know about software components LO3: Know how to install and upgrade hardware and software **Unit 2: Essentials of cyber security** LO1: Know about aspects of cyber security LO2: Understand the threats and vulnerabilities they can make LO3: Understand how organisations/individuals can minimise impacts from cyber security incidents **Unit 3: Building IT systems** LO3: Be able to select the components for designed IT systems **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 9: Supporting IT functions** LO2: Be able to diagnose hardware faults LO3: Be able to diagnose software faults

This unit and specific LO	Name of other unit and related LO
	Unit 10: IT software installation and upgrade LO2: Be able to prepare for IT software installation and upgrade **Unit 11: IT hardware installation and upgrade** LO2: Be able to prepare for IT hardware installation and upgrade
LO3: Be able to create computer networks to meet business needs	**Unit 1: Essentials of IT** LO3: Know how to install and upgrade hardware and software LO4: Know about the Internet and related technologies LO5: Know about the benefits of using IT in business **Unit 2: Essentials of cyber security** LO1: Know about aspects of cyber security LO2: Understand the threats and vulnerabilities they can make LO3: Understand how organisations/individuals can minimise impacts from cyber security incidents **Unit 3: Building IT systems** LO4: Be able to configure IT systems to meet business needs **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 9: Supporting IT functions** LO2: Be able to diagnose hardware faults LO3: Be able to diagnose software faults **Unit 10: IT software installation and upgrade** LO3: Be able to install and upgrade IT software **Unit 11: IT hardware installation and upgrade** LO3: Be able to install and upgrade IT Hardware
LO4: Be able to secure computer networks to meet business needs	**Unit 1: Essentials of IT** LO2: Know about software components LO3: Know how to install and upgrade hardware and software LO4: Know about the Internet and related technologies **Unit 2: Essentials of cyber security** LO1: Know about aspects of cyber security LO2: Understand the threats and vulnerabilities they can make LO3: Understand how organisations/individuals can minimise impacts from cyber security incidents **Unit 3: Building IT systems** LO4: Be able to configure IT systems to meet business needs **Unit 6: Participating in a project** LO2: Be able to contribute to a project **Unit 9: Supporting IT functions**

This unit and specific LO	Name of other unit and related LO
	LO4: Be able to recommend maintenance activities **Unit 10: IT software installation and upgrade** LO3: Be able to install and upgrade IT software **Unit 11: IT hardware installation and upgrade** LO3: Be able to install and upgrade IT Hardware

ASSESSMENT GUIDANCE

LO1 - Know the components of computer networks

P1: Learners need to be able to outline the networking components by describing each component, setting out its main characteristics, Learners could provide an information guide for use by trainee network technicians, prepare a presentation (with speaker notes), provide an audio recording to support photographs of the different components.

LO2 - Be able to prepare for the installation of computer networks to meet business needs

Learners should be provided with an initial network diagram of either a new or existing network and a case study or alternative document for learners to identify a set of business requirements for a customer. These requirements should provide the opportunity for the learners to develop alternative approaches and configurations.

P2: Learners are required to study the given network diagram and provide an outline of the requirements in order to prepare for the installation of the network as per the diagram.

P3: Using the evidence from P2 and the network diagram they were given, learners are required to select the components and equipment to support the computer network installation. The evidence could be in the form of a completed job sheet, or a list of selected components and equipment.

M1: Select security measures to support computer network installation.
Learners should select security measures that should be implemented into the network. These security measures should meet the needs of the business.

D1: Learners should provide justification of the components and equipment selected in relation to the computer network installation. This could be evidenced through a report but learners could be encouraged to provide a video recorded presentation where questions could be asked if evidence presented is not detailed enough.

LO3 - Be able to create computer networks to meet business needs

P4:. Learners should provide evidence of the network hardware being installed and configured. Evidence could be a range of annotated photographs showing the items of hardware being installed and configured, e.g. connecting switches, device driver installation. The evidence should be easy to follow and not excessive. Video evidence could be used of the actual installation and configuration.

P5: Learners are required to undertake some software based configuration to setup file and resource sharing on the network. Evidence for this could be a screen captured video or print screen-based evidence suitably annotated. This should not be excessive but should provide enough detail to confirm that the network has been implemented successfully.

M2: Learners will need to provide evidence that the network is functioning correctly for M2. Good practice would involve the development of a test plan during the design phase. The testing should verify that the users are able to connect to the internet, share network resources and that users only have direct access to the correct shared files. The evidence for the testing will include the fully completed test plan and could be supported by print screens although other creative approaches are also welcome.

LO4 - Be able to secure computer networks to meet business needs

P6: Learners are required to apply the different security measures taken to secure the network. The measures should include both hardware and software-based, security based on the decisions made for M1. The evidence could be in the form of a report explaining the security measures implemented supported by photographs of the learner carrying out the tasks

M3: Learners should create a test plan for the security implemented. The evidence of the testing should prove that the network is secure as per the requirements of the business. Evidence will include the fully completed test plan and can be supported by screen shots and/or printouts. It is also be possible for learners to try and ethically hack another student's network to test the implemented security for them.

D2: Learners should be encouraged to consider the solution; how effective the final solution is at meeting the business needs. Learners should also reflect on how the network mirrors the network diagram as well as whether it meets the security level required. Alternative approaches could also be considered at this point to consider whether the network could be improved and/or extended.

Feedback to learners: you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it,

and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced to inform their thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR Guide to Referencing available on our website: http://www.ocr.org.uk/i-want-to/skills-guides/

MEANINGFUL EMPLOYER INVOLVEMENT - a requirement for the Technical certificate qualifications

These qualifications have been designed to be recognised as Technical certificates in performance tables in England. It is a requirement of these qualifications for centres to secure for every learner employer involvement through delivery and/or assessment of these qualifications.

The minimum amount of employer involvement must relate to at least one or more of the elements of the mandatory content. This unit is mandatory in the IT Technical Practitioner pathway.

Eligible activities and suggestions/ideas that may help you in securing meaningful employer involvement for this unit are given in the table below.

Please refer to the *Qualification Handbook* for further information including a list of activities that are not considered to meet this requirement.

Meaningful employer engagement	Suggestion/ideas for centres when delivering this unit
1. Learners undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification.	Learners could undertake work-experience with a local IT company or within the IT department of the school or college where they would gain experience of working with networks.
2. Learners undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s).	The business requirements for this unit could be derived from an assignment developed in collaboration with an industry practitioner.
3. Learners take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures.	The learners could be taught on how to install networks, create network patch cables, secure networks etc. by an industry practitioner.
4. Industry practitioners operating as 'expert witnesses' that contribute to the assessment of a learner's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.	Industry practitioners could assist in the assessment of the networks by testing the security of the network.

You can find further information on employer involvement in the delivery of qualifications in the following documents:

- Employer involvement in the delivery and assessment of vocational qualifications
- DfE work experience guidance

To find out more
ocr.org.uk/it
or call our Customer Contact Centre on **02476 851509**

Alternatively, you can email us on **vocational.qualifications@ocr.org.uk**

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