Unit title	Information Technology Systems
Guided learning hours	120
Number of lessons	110 (+ assessment)
Duration of lessons	1 hour (unless otherwise stated)
Links to other units	
• Unit 2: Creating Systems to Manage Information • Unit 3: Using Social Media in Business • Unit 4: Programming • Unit 5: Data Modelling • Unit 12: IT Technical Support and Management	

Key to learning opportunities			
AW	Assignment writing	**PA**	Preparation for assessment
GS	Guest speaker	**V**	Visit
IS	Independent study	**GW**	Group work

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
Topic A: Explore how IT infrastructure meets the needs of organisations and their stakeholders				
1, 2	• **A1** Purpose and functions of organisations	GS GW	• **Lead-in:** Introduce the unit, explaining that the content will be assessed using both internally and externally set assignments and that leaners will need to apply all their knowledge in context. • **Note:** Even at the smallest qualification size, there will be an opportunity to study at least one optional unit. If possible, suggest some options which can be delivered and discuss with learners (although they do not need to choose at this stage). • **Guest speaker:** Invite speakers from one or two local businesses to talk about their organisations. These organisations should be in different sectors/of different types. Ask the speakers to answer the following questions: What sector do they operate in? What is their purpose? Are they a service provider or do they produce a product (or are they involved in reselling products)? What are their organisational priorities? What functional areas do they have (e.g. manufacturing, sales, finance etc? What sorts of IT systems do they use to support their activities? • **Small group activity:** Learners discuss their own experiences of organisations they have come into contact with (e.g. medical, educational, retail (online and high street), transport, finance, governmental, political, charitable, etc.). They identify local examples of the organisations and, for each example, define the organisation's purpose, key priorities, and infrastructure requirements to meet its needs. They record their ideas on flipchart paper. • **Note:** You could ask each group to discuss a particular type of organisation, to ensure full coverage.	• Guest speaker(s) • Flipchart paper or similar

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Tutor-led discussion:** Learners share and discuss their ideas.	
3, 4	• **A2** Digital devices, their functions and use • **A3** Peripheral devices and media	GW	• **Lead-in:** Define the terms 'digital device' and 'peripheral device'. • **Small group activity:** Learners list as many IT systems, devices and media as possible, that they have experience of or exposure to. They record their ideas on flipchart paper. • **Tutor-led discussion:** Learners share and discuss their ideas from the small group activity. Facilitate the discussion to highlight the vast range of IT systems, devices and media with which learners interact daily, and to explain how some systems are formed by connecting smaller systems. • **Knowledge quiz:** Hold an informal quiz about common devices, hardware and software to assess learners' understanding of technical vocabulary.	• Tutor presentation • Flipchart paper
5, 6	• **A2** Digital devices, their functions and use • **A3** Peripheral devices and media • **A8** Online systems	IS GW	• **Lead-in:** Introduce the lesson by recapping the previous session. • **Individual activity:** Learners research the IT systems used by education and training organisations and how they meet specific needs. They make notes to record their findings. If possible, allow learners to access YouTube, to find relevant videos (e.g. search 'Top 10 Reasons to Use Technology in Education: iPad, Tablet, Computer, Listening Centers'; there are also many informative videos about the uses of AI and connectivity). • **Extension task:** Ask learners to identify specific systems that have additional functionality to widen participation, such as screen magnifiers for learners with vision difficulties etc. • **Small group discussion:** Learners share and discuss their findings in pairs or small groups.	• Research materials (including internet access) • Access to YouTube

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
7, 8	• **A2** Digital devices, their functions and use • **A3** Peripheral devices and media • **A8** Online systems • **B2** Online communities	IS GW	• **Lead-in:** Introduce the lesson. • **Individual activity:** Learners conduct research and draw on their own experiences to produce notes on IT systems used for personal and social functions. They should expand on their understanding from previous lessons and consider how the identified systems meet particular needs. • **Tutor-led discussion:** Learners share and discuss their findings. • **Individual activity:** Challenge learners to identify an example of IT systems being used in a new, innovative way in one of the areas researched during the last two lessons. • **Small group activity:** Learners create a one-slide presentation which examines how wearable computers (e.g. smartwatches, fitness or activity trackers) can be used to improve personal fitness or sports performance. • **Learner presentations:** Learners present their findings to the class for peer review and feedback.	• Research materials (including internet access) • Presentation software
9–11	• **A2** Digital devices, their functions and use • **A3** Peripheral devices and media	IS GS (V)	• **Lead-in:** Discuss the use of IT in retail, identifying key areas where IT may be used (e.g. customer service, supporting staff or logistics). • **Individual activity 1:** Learners research the use of IT systems in retail. If possible, allow learners to access YouTube, to find relevant videos. You could ask learners to search for the following titles; note the use of local alternatives to Amazon where possible: ○ 'Inside Amazon: Secrets of an Online Mega-Giant' ○ 'Meet Amazon's New Robot Army Shipping Out Your Products' ○ 'CNET News - Meet the robots making Amazon even faster' ○ 'Buying from Souq.com – Good or Bad???' (for the Middle East) ○ 'Aliexpress.com shopping guide for Pakistanis' (for Pakistan)	• Research materials (including internet access) • Access to YouTube • Guest speaker

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			○ 'Osonol.uz - Онлайн гипермаркет' (for Uzbekistan) ● **Individual activity 2:** Learners prepare questions and identify areas of interest before the guest speaker's visit. ● **Guest speaker:** Invite a manager or technical support specialist from the retail sector to talk about the use of IT systems within their organisation. Learners make notes and ask questions. ● **Visit (optional):** The guest lecture could be substituted or combined with a visit to a large, local retail outlet so learners can examine their use of IT systems.	
12, 13	● **A2** Digital devices, their functions and use ● **A3** Peripheral devices and media ● **A8** Online systems	IS GS (V)	● **Lead-in:** Discuss the use of IT in a vocational/business environment, identifying key areas where IT may be used (e.g. customer service, supporting staff, completing office tasks or collaborative working). ● **Individual activity 1:** Learners research the use of IT systems in business/organisations. If possible, allow learners to access YouTube, to find relevant videos (e.g. search 'Module 12: Supply Chains and Information Technology'). ● **Individual activity 2:** Learners prepare questions and identify areas of interest before the guest speaker's visit. ● **Guest speaker:** Invite a manager or technical support specialist from a local employer to talk about their use of IT systems. Learners make notes and ask questions. ● **Visit (optional):** The guest lecture could be substituted or combined with a visit to a large, local business so learners can examine their use of IT systems.	● Research materials (including internet access) ● Access to YouTube ● Guest speaker
14	● **A2** Digital devices, their functions and use	GW	● **Lead-in:** Introduce the concept of an entertainment system, using images or different system combinations from the internet.	● Tutor presentation

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
	• **A3** Peripheral devices and media		Consider entertainment in different contexts, such as at home or on transport (e.g. car and/or plane entertainment systems). • **Paired activity:** Learners work in pairs to design an entertainment system for the home. Allow them to source images from the internet. Each pair should produce design notes to present to the class. • **Learner presentations:** Learners share their entertainment system designs with the class, for discussion and peer feedback. • **Tutor-led discussion:** Learners share how they use personal mobile devices. In particular, they discuss the features and functionality they use in relation to entertainment.	• Research materials (including internet access)
15–17	• **A2** Digital devices, their functions and use • **A3** Peripheral devices and media • **A8** Online systems	IS GW	• **Tutor presentation:** Introduce different types of image capturing technology. Then outline the basics of sound editing. If possible, give a demonstration using suitable free software (e.g. Audacity). • **Individual activity:** Learners use digital technology to capture sound or images, then edit and/or manipulate the files for a particular purpose. For example: ○ learners could take digital photographs of each other and edit them to appear in their favourite movie posters ○ learners could create and edit a podcast about the use of technology in creative tasks. Allow plenty of time for learners to experiment with the editing software and encourage them to produce a professional product. • **Tutor-led discussion:** Learners share their work and discuss their experiences of the editing software.	• Tutor presentation • Software for editing images and/or sound (e.g. Audacity) • Resources for capturing images and/or sound
18	• **A3** Peripheral devices and media	IS GW	• **Tutor presentation:** Explain the importance of data processing in an IT system and its role in fulfilling key tasks in a range of sectors.	• Tutor presentation

Lesson	Topic	Lesson type	Suggested activities	Classroom resources

			• **Individual activity:** Learners research the devices and peripherals used to aid manual and automatic data processing (e.g. devices that capture, process and output data into systems). Encourage them to search online for relevant key questions, e.g.
			  ○ Is automated data processing or manual data entry the better option?
			  ○ What is the difference between a manual and an automated system?
			• **Small group discussion:** In pairs or small groups, learners share and discuss their research findings.
			• **Individual activity:** Challenge learners to identify an emerging, novel or interesting use of data processing (e.g. RFID or QR codes). They should make notes to share with the class in the next session. (You could set this as a homework task.)
				• Research materials (including internet access)

19	• **A3** Peripheral devices and media	GW	• **Lead-in:** Learners share their findings from the individual activity in the previous session. • **Small group activity:** Put learners in groups of three. Give each group a vocational scenario within one of the identified sectors (i.e. a company/individual and the aims of their vocational context). In their groups, learners identify how specific manual and automatic data processing devices and/or systems would help the company/individual to achieve their aims. If possible, allow learners to access YouTube, to find relevant videos (e.g. search 'Automated Data capture – Advantages 2 Minute Explainer' or 'Automatic Identification & Data Capture (AIDC) with DNP Ribbons'). • **Tutor-led discussion:** Each group presents a summary of their scenario and solution to the rest of the class.	• Learner notes from previous session • Scenarios for research task • Research materials (including internet access) • Access to YouTube

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
20, 21	• **A3** Peripheral devices and media	IS GW	• **Tutor presentation:** Give learners a brief introduction to the definition and purpose of accessibility devices. • **Individual activity 1:** Learners research the types of accessibility device used to improve access to IT systems. They make brief notes. • **Individual activity 2:** Give learners a series of scenarios involving accessibility requirements. In each case, learners should suggest systems and devices that could be used to improve accessibility. This could include any relevant systems or devices, such as touch screens, eye movement trackers, text-to-speech systems or speech-to-text systems. Learners should consider the most appropriate accessibility solution in each case and justify their suggestions. • **Small group discussion:** In pairs or small groups, learners discuss their responses to the research scenarios.	• Tutor presentation • Research materials (including internet access) • Scenarios for research task

22	• **A3** Peripheral devices and media	GW
		IS
			• **Tutor presentation:** Highlight the difference between storage and memory and outline the different roles they play in an IT system.
			• **Small group activity:** Learners research different types of storage media, including internal, external, flash, magnetic and optical. Encourage them to search online for relevant keywords, e.g.
			  ○ What is a storage device?
			  ○ Storage devices and storage media
			  ○ Box cloud storage review
			• **Knowledge quiz:** Hold a brief informal quiz to check learners' understanding of the key characteristics of storage media.
			• **Individual activity:** Give learners a realistic vocational scenario and ask them to analyse the extent to which storage media would meet the requirements of the situation.
				• Tutor presentation
				• Research materials (including internet access)
				• Scenarios for research task

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
23, 24	• **A4** Computer software in an IT system	GW IS	• **Tutor-led discussion:** Discuss with learners the concept of operating systems in large- and small-scale systems, introducing the main roles of operating systems. • **Small group activity:** Give some examples of different types of operating system on different devices. Encourage learners to search for relevant online articles comparing different mobile operating systems. They should explore these systems and compare Android and iOS. • **Individual activity:** Learners research the features and roles of different operating systems and how their implementation differs on different devices (e.g. a desktop computer operating system compared with a mobile operating system). • **Paired activity:** Learners explore the sources, concepts and implications of open-source operating systems.	• Research materials (including internet access) • Example devices with different operating systems
25	• **A4** Computer software in an IT system	IS GW	• **Tutor presentation:** Discuss the concept of utility software and application software and the distinction between the two. • **Individual activity:** Learners investigate the implementation of utility software and application software on different devices (e.g. how might a mobile version of a productivity suite differ from that on a desktop PC?). If possible, allow learners to access YouTube (e.g. search 'MS Office 365 across devices and operating systems') and to search online for relevant articles (e.g. search keywords such as 'Pros and cons of open source vs proprietary software'). •	• Research materials (including internet access) • Access to YouTube
26, 27	• **A4** Computer software in an IT system	GW	• **Lead-in:** Give learners opportunities to explore different devices, programs and systems that use different types of interface. • **Small group activity:** Split the class into at least four groups. Assign each group one of the following types of interface: graphical,	• Example devices/systems with different interfaces

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			command line, menu based, adapted. In their groups, learners research and prepare a short presentation highlighting the features, potential uses and implications of their assigned interface. • **Learner presentations:** Each group presents their findings to the rest of the class for peer review and feedback.	• Research materials (including internet access) • Flipchart paper or presentation software
28	• **A4** Computer software in an IT system • **A7** Issues relating to transmission of data	GW IS	• **Tutor presentation:** Give an overview of file types and formats, referring in particular to images, video and applications software. • **Paired activity:** Give learners a series of scenarios and access to a range of files in different formats (e.g. common application formats, compressed files, software-specific files, videos that require codecs, etc.). Ask them to explore the properties of each file to identify how the file format and type would affect each scenario. • **Individual activity:** Allow learners to save an original image in different file formats to observe the impact of the different formats on the image quality. Source images online or allow learners to produce or source their own for this task. • **Tutor-led discussion:** Discuss outcomes of the file format task (e.g. how file size affected use, or any requirements to install software).	• Tutor presentation • Scenarios and example files for task • Access to computers and image files
29, 30	• **A9** Emerging technologies	GW	• **Tutor presentation:** Introduce the concept of emerging technologies. Explain how technology and IT systems are constantly evolving and outline the impact of this on individuals and organisations. • **Small group activity:** Allocate each group one of the following categories: developments in digital devices; developments in networks and connectivity; or developments in modelling and data interrogation. In their groups, learners research and prepare a	• Tutor presentation • Research materials (including internet access) • Presentation software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			short presentation about emerging technologies in their category. Encourage learners to search online for relevant articles, e.g. ○ Tech Republic: Top 10 emerging technologies of 2019 ○ Forbes: The 7 biggest technology trends in 2020 everyone must get ready for now ○ Cisco: The 5 technologies that will change networking in 2019 ○ Idean: The new mobile: How emerging network technologies will change the way we connect to our world ○ Gartner: Top 10 data and analytics trends ○ Datapine: Top 10 analytics and business intelligence trends for 2020 • **Learner presentations:** Groups present their work to the rest of the class and answer questions from the audience.	
31	• **A5** Connectivity	GW	• **Tutor-led discussion:** Ask learners to name as many connection types as they can, grouping them into wired and wireless connections. Collate a class list and suggest any connections learners have missed. • **Group activity:** Learners discuss and make notes on what they know about each connection type (e.g. uses, benefits and limitations). • **Tutor-led discussion:** Learners share their ideas from the group activity. Correct any misconceptions or technical inaccuracies. • **Plenary:** Give learners scenarios that require the use of connections to transmit data within and between systems. Ask learners to describe the process of transmitting/transferring data in each situation, with particular reference to the different connection methods that could be used at each stage.	• Flipchart paper • Scenarios for plenary

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
32, 33	• **A5** Connectivity	IS GW	• **Tutor presentation:** Explore how the choice of connection type affects the performance of a larger system. If possible, demonstrate how to conduct a site survey to add users to a wireless network (e.g. search online for 'Wireless site surveys: The secret to great WLAN coverage'). • **Individual activity:** Give learners a vocational scenario that would require the connection of multiple devices and/or systems to meet a range of aims. Ask learners to: o create a diagram showing how the systems will connect o annotate the diagram to explain the connections used, the data being transferred and the direction of data transfer o justify their choice of connections in comparison to other possible connections. • **Paired activity:** Learners create an additional diagram to show how the systems in the classroom connect to the wider systems in the organisation. • **Tutor-led discussion:** Learners share and discuss their diagrams.	• Tutor presentation • Scenarios for task • Research materials (including internet access)
34	• **A6** Networks	IS	• **Tutor presentation:** Introduce the four main types of network: PAN, LAN, WAN and VPN. • **Individual activity:** Learners conduct research and draw on their own experiences to make notes about each of the four network types. They should include the components required to form the network, benefits, drawbacks etc. • **Tutor-led discussion:** Learners share and discuss their ideas. • **Practical activity (optional):** If time and resources allow, extend this lesson with a practical activity allowing learners to create different small-scale networks.	• Tutor presentation • Research materials (including internet access) • Practical networking resources (optional)

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
35	• **A6** Networks	IS	• **Lead-in:** Use Q&A to check learners' understanding of the content from the last lesson. • **Tutor-led discussion:** Explore the factors affecting the choice of network. Ensure learners identify all factors listed in section A6 of the specification. • **Individual activity:** Give learners a vocational scenario involving the use of different networks (the scenario should contain examples of good and less good practice). Learners evaluate the choice of network(s), suggesting improvements and alternatives as appropriate.	• Scenario(s) for task
36	• **A7** Issues relating to transmission of data	IS	• **Tutor presentation:** Explain the concept of protocols – what they are used for and why. • **Individual activity:** Learners research the protocols used for common IT tasks. If possible, allow them to access YouTube (e.g. search 'UDP and TCP: Comparison of Transport Protocols'). Remind learners to consider a range of protocols from this list: HTTP, HTTPS, POP3, IMAP4, SMTP, VoIP, FTP, TCP/IP. • **Tutor-led discussion:** Learners share and discuss their findings.	• Tutor presentation • Research materials (including internet access) • Access to YouTube
37, 38	• **A7** Issues relating to transmission of data	GW	• **Tutor presentation:** Explore the concepts of bandwidth and latency and some of the factors that may affect them. • **Small group activity:** Give each group a different scenario involving a series of connected devices and systems. The scenario should give details of a range of connection types and the type of data to be transferred. In their groups, learners identify: areas of the system that would have more/less bandwidth; where latency might occur; and ways in which the system might be improved.	• Tutor presentation • Scenarios for task

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Tutor-led discussion:** One person from each group shares the outcomes of the group task with the rest of the class.	
39	• **A7** Issues relating to transmission of data	IS	• **Tutor presentation:** Explain the concept of compression: what it is used for and why and how it works. • **Individual activity:** Learners conduct research and produce a technical 'help manual' explaining the concept of compression, different types of compression (including codecs), and the applications and implications of compression for individuals and organisations. If possible, allow learners to access YouTube, e.g. search for: ○ 'Compression types Lossy Lossless' • 'Better Dialogue Audio: Compression and Normalization'	• Tutor presentation • Research materials (including internet access) • Access to YouTube
40	• **A8** Online systems	GW	• **Lead-in:** Use Q&A to establish learners' baseline understanding of 'cloud storage'. It is likely that their knowledge and examples will relate to personal rather than professional use. • **Group activity:** Learners discuss and research the uses and implications of cloud storage. Instruct them to distinguish between personal and professional uses of the technology. • **Tutor-led discussion:** Groups share and discuss their findings.	• Research materials (including internet access) • Flipchart paper
41	• **A8** Online systems	IS GW	• **Lead-in:** Use Q&A to check learners' understanding of the content from the previous lesson. • **Tutor presentation:** Introduce the concept of cloud computing, highlighting differences between cloud computing and cloud storage. • **Individual activity:** Give learners a task that requires the use of application software to meet a range of success criteria (e.g. creating, editing and exporting an image). Ask half the learners to	• Tutor presentation • Task sheets and success criteria • Access to a cloud-based service

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			perform the task using a cloud service, while the rest use locally installed software. • **Paired activity:** Organise learners into pairs with one learner who used the cloud service and one who used locally installed software. Learners discuss the benefits and drawbacks of the platforms. • **Tutor-led discussion:** Learners share their discussions with the wider group.	• Access to suitable locally installed software
42, 43	• **A8** Online systems	GW	• **Tutor presentation:** Introduce the potential benefits and pitfalls of using cloud computing and storage in a business context. • **Paired activity:** Give each pair a brief scenario (see ideas below) and ask them to design a top level system (including key components) and prepare a sales pitch to a 'client', to show the impact of cloud computing and storage on the operation of the organisation. Possible scenarios include: o A sales team working in remote areas, often without any internet connectivity. o An auction site buying and selling used CDs, DVDs and vinyl records. o A local metro or underground network system, selling tickets and monitoring passenger numbers. • **Learner presentations:** Learners present their solutions to the class and answer questions.	• Tutor presentation • Research materials (including internet access.
Topic B: Understand how organisations make use of data and information				
44, 45	• **B3** Using and manipulating data	GW	• **Note:** In lessons 57–59, learners will need to work with primary and secondary data. This session will be used to collect primary data, which should be retained for use as secondary data in later	• Word processing and spreadsheet software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources

			activities. You may use alternatives to the ideas suggested below, but this research will be needed later in the course.
			• **Small group activity:** Learners work in small groups to create a questionnaire about one of the following.
			  ○ Clothing: Identify 12 clothing items (e.g. shoes, trainers, coats, jackets, jeans, skirts, trousers, hats, scarves etc.) which are being worn in the classroom on the day of the activity.
			  ○ Food: Identify 10 typical local foods and drinks and research how much/many of each food type is eaten by members of the class for lunch on the day of the activity.
			Learners use their questionnaires to capture data, record and present their data using suitable formats (e.g. tables, graphs), then analyse their findings. Learners should also draw conclusions about the data based on the weather on the day of the activity.
			• **Plenary:** Learners hand all work from this lesson to the tutor, to be kept for use in later activities.
				• Research materials (including internet access)
				Electronic folder, inaccessible to learners, to store activity files until later in the course

46–48	• **B1** Data and information in an organisation	GW GS	• **Lead-in:** Ask learners to define the difference between data and information. Work with learners to produce a definitive definition. You may wish to show a relevant video (e.g. search YouTube for 'Difference between data and information (With Example & Comparison Chart)' (English) or 'Data vs. Information (Urdu/Hindi)'). Give some examples of situations where the right information might have benefitted an organisation. • **Tutor presentation:** Outline levels of information and introduce strategic, management and operational data and information. • **Paired activity:** Learners prepare questions for a visiting speaker about data and information and how the visitor uses different types of information to support his/her activities.	• Access to YouTube • Tutor presentation Guest speaker

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Guest speaker:** Invite a local businessperson to give specific examples of the different levels of information and to explain what can happen if the correct information is not used at the right time. Ask the speaker to give a top-level description of the information IT systems he/she uses for business (e.g. accounting software, manufacturing CAD/CAM software, a CRM system, a simple database etc.), focusing on the information and data rather than on the systems. They should explain what data is stored in these systems, what information it produces and why this information is needed. Ensure the speaker considers data/information at strategic, management and operational levels for completeness. Learners take notes and ask questions to improve their understanding.	
49, 50	• **B1** Data and information in an organisation	GW	• **Lead-in:** Talk briefly about *Unit 14: Customising and Integrating Applications* and give a top-level example of a CRM which uses database functionality, with a spreadsheet and email client to manage the activities of a marketing company. Encourage learners to think about how this might work. • **Small group activity:** Allocate each group a different scenario (perhaps one of those listed below). Ask them to identify the data and information needs of the individual/organisation and suggest how they might use applications to meet these needs. Possible scenarios: ○ A self-employed domestic plumber who needs to manage his purchases and sales electronically. ○ A manufacturing organisation receiving orders from wholesalers and managing invoicing and payments.	• Scenarios for research task Research materials (including internet access)

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			○ An auction site buying/selling used CDs, DVDs and vinyl records. ● **Learner presentations:** Learners present their analysis and top-level solution designs to the class.	
51	● **B1** Data and information in an organisation	GW	● **Lead-in:** Ask learners to define the difference between a data source and a data set. Explain the concept of 'big data' and the volumes of data in the real world that can be accessed, manipulated and used. Explain the 5 Vs associated with data processing: volume, velocity, variety, veracity, value. ● **Class activity:** Watch and discuss one or more relevant videos, e.g. search YouTube for: ○ 'Top Big Data Technologies' (English) ○ 'Big data introduction in Arabic' (Arabic) ○ '4 Vs of Big Data (Explained in Hindi)' (Hindi) ○ 'Wat is er 'Big' aan 'Big Data'?' (Dutch) ● **Tutor-led discussion:** Watch and discuss the video 'Big data is better data' (available on YouTube); this gives an introduction to machine learning and human knowledge in different contexts.	Access to YouTube or other relevant videos
52	● **B2** Online communities	GW IS	● **Tutor-led discussion:** Learners identify and discuss types of 'online community' and the communication tools they offer. Ensure learners are aware of, and use, specific terms rather than brand names. ● **Group activity:** Learners research and discuss the uses and implications of online communities for individuals. ● **Tutor-led discussion:** Learners discuss and share their findings. ● **Individual activity:** Homework task: Learners prepare questions to ask the guest speaker in the next session.	● Research materials (including internet access) Flipchart paper

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
53, 54	• **B2** Online communities	GS	• **Lead-in:** Introduce the guest speaker and explain to learners that this lesson will focus on online communities used by organisations. • **Guest speaker:** Invite a manager, social media manager or technical support specialist from a local employer to talk about the use of online communities by their organisation. Learners should make notes. • **Tutor-led discussion:** Learners ask the speaker prepared questions. • **Paired activity:** Learners design an online community for learners on their course. They should consider the purpose of the community, the content to be included and how it will benefit the class. • **Tutor-led discussion:** Learners share and discuss their designs.	• Guest speaker • Research materials (including internet access) Flipchart paper
55, 56	• **A8** Online systems • **B2** Online communities	IS	• **Lead-in:** Introduce the task for this lesson. • **Individual activity:** Give learners a vocational scenario that requires them to analyse the ways in which online systems and online communities could be used to meet the needs of a given organisation, and assess the implications of these technologies. • **Tutor-led discussion:** Learners share their solutions/ideas with the class for peer review and feedback.	• Scenario(s) for task Research materials (including internet access)
57–59	• **B3** Using and manipulating data	GW	• **Lead-in:** Ask learners to define and give examples of primary and secondary data. You may wish to show a relevant video (e.g. search YouTube for 'Understanding Primary & Secondary Sources'). • **Small group activity 1:** Learners work in small groups to create a questionnaire about one of the following. (Groups should **not** work on the same question as in sessions 44–45. If you supplied alternative questions in sessions 44–45, use the same questions	• Word processing and spreadsheet software • Flipchart paper • Research materials

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			here but, again, make sure each group works on a different question to last time.) ○ Clothing: Identify 12 clothing items (e.g. shoes, trainers, coats, jackets, jeans, skirts, trousers, hats, scarves etc.) which are being worn in the classroom on the day of the activity. ○ Food: Identify 10 typical local foods and drinks and research how much/many of each food type is eaten by members of the class for lunch on the day of the activity. Learners use their questionnaires to capture data, record and present their data using suitable formats (e.g. tables, graphs), then analyse their findings. • **Small group activity 2:** Give learners the previously-analysed data relating to these questions (from sessions 44–45) and ask them to compare the results of today's study with the secondary data gathered earlier. • **Tutor-led discussion:** How similar are the outcomes of the primary data (today's research) compared with the secondary data gathered earlier in the course? Are there differences? What are the possible reasons for these differences? Encourage learners to discuss the reliability of the data and to judge the appropriateness of the results of data gathering and analysis. • **Plenary:** Guide learners to draw conclusions about primary and secondary data and the importance of valid data sources.	(including internet access) Data from research activities in sessions 44–45
60	• **B3** Using and manipulating data	IS	• **Tutor presentation:** Give a brief overview of methods of collecting data, as listed in the specification. • **Individual activity:** Learners research the features and implications of each collection method. If possible, allow learners to	• Tutor presentation • Research materials

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			access YouTube to search for relevant videos (e.g. 'Primary and secondary data'). • **Knowledge quiz:** Hold an informal quiz about features, benefits and drawbacks of different data collection methods.	(including internet access) Access to YouTube
61, 62	• **B3** Using and manipulating data	IS GW	• **Practical activity:** Give learners a spreadsheet or simple flat file database containing a series of different fields. Ensure some fields have validation and others do not; some validation should have appropriate error messages. Ask learners to enter data from a test plan or list and record what happens. Give learners tips about how to avoid data entry errors in Excel (e.g. search online for the Tech Republic article, 'Five tips for avoiding data entry errors in Excel'). • **Tutor-led discussion:** Discuss what happened when the data was entered. Explore why only some fields behaved as expected. Discuss the implications of using or not using data validation. • **Small group task:** Learners analyse a series of common vocational scenarios to explore how data validation could be used and assess the possible implications. • **Tutor presentation:** Introduce and explain the concept of data verification. • **Individual activity:** Learners research and make notes on methods and implications of data verification.	• Spreadsheet/data base • Test data/test plan • Scenarios for research task Research materials (including internet access)
63–66	• **B3** Using and manipulating data	IS GW	• **Tutor presentation:** Introduce data modelling, explaining why it is used. Give real-world examples, such as: o the way supermarkets use historical trends in sales and weather to predict sales and required stock levels of products	• Spreadsheet software Scenarios and task sheets

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			○ the way governments and health services around the world will use data from the Covid-19 epidemic in 2019/2020 to develop future strategic plans for managing world pandemics ○ the way data from breast cancer screening could be manipulated and used to predict tumours, thereby improving the speed and accuracy of cancer diagnoses. ● **Individual activity:** Learners explore the use of spreadsheets for data modelling. They should complete a series of practical tasks, using a spreadsheet to: ○ sort and extract data ○ model 'what if' scenarios ○ present data and results. ● **Tutor-led discussion:** Use class and small group discussions to explore the use of these tools by individuals and organisations and to consider the implications of their use.	
67–70	● **B3** Using and manipulating data	IS GW	● **Lead-in:** Introduce the concept of using databases as a numerical data modelling tool. ● **Individual activity:** Learners explore the use of databases for data modelling. They should complete a series of practical tasks, using a database to: ○ sort and extract data ○ model 'what if' scenarios ○ present data and results. ● **Tutor-led discussion:** Use class and small group discussions to explore the use of these tools by individuals and organisations and to consider the implications of their use.	● Database software Scenarios and task sheets

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
71, 72	• **B3** Using and manipulating data	IS GW	• **Lead-in:** Give examples of user interfaces (UIs) used to capture data (database forms, questionnaires, surveys, etc). Ask learners to identify uses of the characteristics listed in the specification (ease of use, accessibility, error reduction and intuitiveness). • **Individual activity 1:** Learners research accessibility features and their application in UIs for data collection systems. • **Individual activity 2:** Learners design and create UIs for data capture systems using a range of tools (e.g. database and spreadsheet forms and online survey tools). • **Tutor-led discussion:** Use class and small group discussions to explore the use of these tools by individuals and organisations and to consider the implications of their use.	Research materials (including internet access)
73, 74	• **B3** Using and manipulating data	IS	• **Individual activity:** Give learners vocational scenarios that require them to analyse how data manipulation and capture tools could be used to meet the needs of a given organisation or individual and to assess the implications of these systems.	• Scenarios for task Research materials (including internet access)
Topic C: Develop policies for the use of IT within an organisation				
75	• **C1** Threats to data, information and systems • **A7** Issues relating to transmission of data	IS GW	• **Lead-in:** Ask learners to identify potential threats to data, guiding them to ensure full coverage of the specification content. Use Q&A to establish learners' current knowledge of how, where and why these threats occur. • **Individual activity:** Learners research the characteristics of different threats to data and their impact on individuals. • **Tutor-led discussion:** Learners share and discuss their findings.	• Research materials (including internet access for research

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
76, 77	• **C1** Threats to data, information and systems • **A7** Issues relating to transmission of data	IS GS GW	• **Lead-in:** Use Q&A to remind learners of the previous lesson content. • **Individual activity:** Learners research the impact on organisations of threats to data. • **Tutor-led discussion:** Learners share and discuss their findings. • **Guest speaker:** Invite a guest speaker to explain how he/she is proactive in reducing cyber threats. Learners make notes and ask questions. • **Individual activity:** Learners write ten key points learned in this lesson. • **Paired activity:** Learners create a checklist of things they can do to make themselves safe online.	• Research materials (including internet access) • Guest speaker •
78–80	• **C1** Threats to data, information and systems • **C2** Protecting data	IS GW	• **Lead-in:** Use Q&A to test learners' understanding of threats to data. • **Individual activity:** Challenge learners to each find one feature, one characteristic and one implication of using antivirus software and/or firewalls. • **Tutor-led discussion:** Learners share and discuss their findings. Guide the discussion to ensure learners are aware of a range of features, characteristics and implications. • **Small group activity:** Assign each group one of the techniques listed in outcome C2 of the specification. Each group should prepare a short presentation highlighting the features and implications of their assigned technique. • **Learner presentations:** Groups present their findings to the rest of the class for peer review and feedback.	• Research materials (including internet access) • Presentation software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
81	• **C2** Protecting data	IS	• **Lead-in:** Give learners a message scrambled using a simple substitution cipher. Ask them to decode the message using the key given to them. Use this activity to introduce the concept of encryption. • **Individual activity:** Learners research data encryption methods that can be used to protect stored and transmitted data. If possible, allow learners to access YouTube (e.g. search 'Encryption Part 1: Introduction to Encryption' (1, 2 and 3)). • **Tutor-led discussion:** Learners share and discuss their findings.	• Scrambled message and substitution key • Research materials (including internet access) • Access to YouTube
82, 83	• **C1** Threats to data, information and systems • **C2** Protecting data	IS GS	• **Tutor presentation:** Give an introduction to and overview of the legislation and codes of practice for the protection of data. • **Individual activity:** Learners research and make notes on legislation and codes of practice (applicable to their home region). They also prepare questions for the guest speaker. • **Guest speaker:** Invite a manager or technical support specialist from a local employer to talk about the protection of data and the implications of threats. • **Tutor-led discussion:** Learners ask the speaker their prepared questions and take notes, as appropriate.	• Tutor presentation • Research materials (including internet access) • Guest speaker
84, 85	• **C3** Moral and ethical issues	GW IS	• **Small group activity:** Learners list factors to consider relating to privacy for individuals and organisations. • **Tutor-led discussion:** Learners share their lists. Correct and misconceptions and collate their ideas to ensure full coverage of the specification content. • **Individual activity:** Learners produce a written response explaining the importance and implications of privacy for individual and organisational use of IT systems.	• Flipchart paper • Research materials (including internet access)

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Tutor-led discussion:** Explore freedom of speech and censorship.	
86, 87	• **C3** Moral and ethical issues	GW IS	• **Small group activity:** Learners list environmental factors to consider relating to use of IT systems. • **Individual activity:** Learners research environmental factors related to the use of IT systems (e.g. effects or ways of reducing the impact). • **Tutor-led discussion:** Learners share their research findings.	• Flipchart paper • Research materials (including internet access)
88	• **C3** Moral and ethical issues	GW	• **Lead-in:** Introduce the concept of unequal access. Use Q&A and class discussion to explore some of the causes of unequal access. • **Small group activity:** In pairs or small groups, learners research and discuss the impacts (local and global) of unequal access to IT systems. • **Tutor-led discussion:** Learners share and discuss their findings.	• Research materials (including internet access for research
89	• **C3** Moral and ethical issues	GW	• **Lead-in:** Use Q&A and class discussion to explore learners' ideas and experiences of unequal access. • **Small group activity:** In pairs or small groups, learners research, discuss and make notes on the implications (for individuals and organisations) of issues relating to online behaviour. If possible, allow learners to access YouTube (e.g. search for 'Bad behaviour online: Bullying, Trolling & Free Speech'). • **Tutor-led discussion:** Learners share and discuss their findings and ideas.	• Research materials (including internet access) • Access to YouTube • Flipchart paper
90	• **C3** Moral and ethical issues	IS	• **Lead-in:** Introduce the concept of globalisation, using Q&A and class discussion to explore learners' ideas and experiences. • **Individual activity:** Learners investigate the implications (for individuals and organisations) of issues relating to globalisation.	• Research materials (including internet access)

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
91	• **C3** Moral and ethical issues	GW	• **Lead-in:** Share examples of acceptable use policies from a range of organisations. Ask learners to work in small groups to explore commonalities between the examples. • **Group activity:** Learners explore how and why acceptable use policies are used and the implications for individuals and organisations of using them (or not). Example policies are available online (e.g. search 'Sample Acceptable Usage Policy'). • **Tutor-led discussion:** Learner share and discuss their findings and ideas.	• Examples of acceptable use policies • Flipchart paper
92, 93	• **C4** Legal issues	GW	• **Lead-in:** List the typical areas, in relation to computing and data management, where countries of the world may have legislation (as listed in the specification). Ensure learners understand that only some legislation is enforceable with criminal repercussions; other aspects may only apply and be enforceable at organisation level. • **Small group activity:** Learners identify which of the listed categories of legislation (from the specification, section C4) apply in their native country. For example, many countries have laws concerning data protection or legislation to protect consumers' rights. You could direct learners to search for 'Data Protection Laws of the World' (DLA Piper), which provides a lot of useful information. You could also prepare and distribute a gapped handout for learners to complete, to guide their research and ensure they examine all the areas listed in the specification. • **Tutor-led discussion:** Learners share and discuss their findings.	• Research materials (including internet access) • Flipchart paper • Research handout (optional)
94, 95	• **C4** Legal issues (international)	GS/GW	• **Lead-in:** Recap the previous session and ensure learners understand why businesses need to know the legislation in the location of a future trading partner.	• Guest speaker • Research materials

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Guest speaker:** Invite a guest speaker who trades internationally to talk about adaptations they need to make to products, services or data handling, to trade legally with other countries. They should give specific examples. • **Paired activity:** Learners compare the data protection laws of their own country with those of a neighbouring country, the USA and China. For each other country, they should list five key similarities and five key differences. As in the previous lesion, you could direct learners to search for 'Data Protection Laws of the World' (DLA Piper). • **Tutor-led discussion:** Learners share and discuss their findings.	(including internet access)
96, 97	• **C4** Legal issues (international)	GW	• **Lead-in:** Discuss the introduction of Europe's GDPR (General Data Protection Regulations) in May 2018 and its impact (e.g. some businesses in countries such as the USA stopped trading with EU consumers due to the requirements of the new legislation and its limitations on how businesses would have to deal with organisational and personal data). • **Small group activity:** Learners create and present to the class an information leaflet for businesses that explains: o the basic requirements under the GDPR • the penalties for failure to comply.	• Research materials (including internet access) • Word processing software
98	• **C5** Professional guidelines and codes of practice	GW	• **Lead-in:** Define the concept of professional guidelines and codes of practice. Explain that, although some guidelines and codes have no criminal penalties, breaking agreed guidelines and codes can damage organisations in other ways (such as loss of reputation). • **Tutor presentation:** Discuss relevant sector bodies, such as the British Computer Society (the Chartered Institute for IT). Explain	• Research materials (including internet access) • Word processing software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			that they publish codes members must follow, focusing on issues such as professional competence, integrity, duty and reputation. • **Small group activity:** Learners examine professional guidelines and codes of practice in their native country. If no relevant organisation exists, encourage them to explore BCS codes of practice (e.g. search online for 'BCS Code of Conduct') and write a set of professional guidelines for those working in the sector in their own country. • **Tutor-led discussion:** Learners share their ideas with the class.	
99	• **C5** Professional guidelines and codes of practice	IS	• **Lead-in:** Ask learners: What is ISO? Discuss their ideas and perhaps show a relevant video (e.g. search YouTube for 'The ISO 9001 family – Global Management Standards' or 'What is ISO 9001 in Hindi'). • **Tutor-led discussion:** Discuss the concept of ISO and why it is important to have global standards. • **Individual activity:** Learners examine ISO requirements in their own country and create a short presentation to summarise the key points. • **Learner presentations:** Learners share their presentations for peer review and feedback. They answer any questions from other learners.	• Research materials (including internet access) • Presentation software
100, 101	• **C5** Professional guidelines and codes of practice	IS GS	• **Lead-in:** Ask learners: What is WCAG? And what is WS3C®? Discuss their ideas and perhaps show a relevant video (e.g. search YouTube for 'Introduction to Web accessibility and W3C Standards'). • **Guest speaker:** Invite a guest speaker who has a business website to explain how he/she applied WCAG guidance. • **Individual activity:** Ask learners to download a copy of the WCAG Checklist Appendix B. They then examine three native websites and record how well each website complies with WCAG guidelines. (You	• Research materials (including internet access) • Guest speaker • Word processing software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			could producing a checklist to ensure all learners use the same proforma for this activity.) • **Tutor-led discussion:** Learners share and discuss their findings.	
102, 103	• **C6** Managing information technology within organisations	GW	• **Lead-in:** If your organisation uses an acceptable use policy with learners, begin by asking them to recall the requirements of the policy. If your organisation does not use such a policy, find one or two examples on the internet (e.g. search for 'Acceptable use policy template'). Examine the range of items included. • **Small group activity:** Learners create an AUP (Acceptable Use Policy) for the classroom or the organisation. (Note: In subsequent years, learners could also review previous groups' AUPs and decide whether they are still relevant and adequate.) • **Tutor-led discussion:** Groups share their AUPs. As a class, learners collate a list of all components and decide what should be included in a final, definitive version.	• Example AUPs • Research materials (including internet access) • Word processing software • Flipchart paper
104–106	• **C6** Managing information technology within organisations	GW GS	• In preparation for these sessions, source a range of policies for learners to examine; most of the policies listed in the specification should be available, at least in part, in most educational organisations. • **Lead-in:** Introduce the topic and the guest speaker. • **Guest speaker:** Invite the Head of IT Services at your organisation to discuss how the organisation manages issues such as security, acceptable use, customer support, asset management, incidents (including backup and recovery) and performance metrics (including how they are used to plan IT support activities). The speaker should be prepared to share a range of policies and approaches with learners.	• Range of policies • Guest speaker • Research materials (including internet access) • Presentation software

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Small group activity:** At the end of their presentation, the speaker should challenge learners to suggest improvements to at least two policies currently in use in the organisation. Learners should use the internet to generate ideas. • **Tutor-led discussion:** Groups present their ideas to the guest speaker for feedback.	
107	• **C6** Managing information technology within organisations	IS	• **Lead-in:** Introduce the concept of outsourcing, using suitable videos (e.g. search YouTube for 'Types of IT Outsourcing'). • **Individual activity:** Learners use the internet to explore the use and availability of outsourcing organisations in their native country. They identify at least two services in any aspect of IT systems management and list details of the service provided. • **Tutor-led discussion:** Learners share their research findings.	• Research materials (including internet access)
108, 109	• **C6** Managing information technology within organisations	GW	• **Lead-in:** Show a relevant video (e.g. search YouTube for 'Outsourcing: Is it good or bad?' or 'Why outsourcing is bad for business'). • **Small group activity:** Learners research the pros and cons of outsourcing. If possible, allow them to access YouTube (e.g. search for 'Pros and cons of outsourcing'). They then design the content for a series of three linked webpages, to advise small local businesses on outsourcing. • **Tutor-led discussion:** Learners share their webpage designs.	• Research materials (including internet access) • Word processing or presentation software
110	• **C6** Managing information technology within organisations	GW	• **Tutor-led discussion:** Explore the problems encountered in relation to data and processing in regions that may not have appropriate laws covering protection and use of data. • **Small group activity:** Learners create a 20-question quiz (including answers) based on content from the whole unit.	• Learner notes • Research materials (including internet access)

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
			• **Whole class activity:** Choose a random selection of questions from the group quizzes to use as an end-of-unit class quiz.	
111–120	These sessions have been set aside to allow tutors to prepare learners for external assessment and to ensure there is time available to undertake the assessment activity. Assessment is internal, using externally set assignment briefs.			

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.