Cambridge TECHNICALS LEVEL 3

IT

Cambridge TECHNICALS 2016

Unit 10 – Business computing
DELIVERY GUIDE

Version 2

Oxford Cambridge and RSA

CONTENTS

INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the requirements of this unit.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT AND WORK EXPERIENCE

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. We have also identified any potential work experience opportunities within the activities. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

English   123 Maths   Work

Please note

The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

UNIT AIM

Businesses and organisations are driven by the information that they gather, process and provide. Often, this involves computers, networks and databases. In this unit, you will gain an understanding of how information technology and computer-based systems facilitate the needs of business and how businesses use information. You will learn about the skills and attributes needed by people working in data analysis and will gain practical experience of editing and manipulating a variety of different forms of information before applying these skills to solve a specific problem.

This unit is in the Data Analyst specialist pathway due to its relevance to a business and data analytical environment. The unit supports the development of skills, knowledge and understanding relevant to a data analyst role, and can be used as a starting point to further develop their understanding of working with and analysing data, regardless of size and complexity.

Unit 10 Business computing	
LO1	Know the attributes required for data analyst job roles
LO2	Be able to capture and store data for analysis
LO3	Be able to use tools to edit and analyse data
LO4	Be able to present data analysis outcomes

To find out more about this qualification please go to: http://www.ocr.org.uk/qualifications/cambridge-technicals-it-level-3-certificate-extended-certificate-introductory-diploma-foundation-diploma-diploma-05838-05842-2016-suite

The activities within this teaching and learning resource must not be used for summative assessment purposes. As part of our teaching we expect support to be given to your learners; such support is not permissible for summative assessment and is likely to be considered malpractice.

Cambridge TECHNICALS 2016

2016 Suite

- **New suite for first teaching September 2016**
- **Externally assessed content**
- **Eligible for Key Stage 5 performance points from 2018**
- **Designed to meet the DfE technical guidance**

RELATED ACTIVITIES

The Suggested Activities in this Delivery Guide listed below have also been related to other Cambridge Technicals in IT units/Learning Outcomes (LOs). This could help with delivery planning and enable learners to cover multiple parts of units.

This unit (Unit 10)	Title of suggested activity	Other units/LOs	
LO1	Variety of data analyst jobs	Unit 1 Fundamentals of IT	LO4 Understand employability and communication skills used in an IT environment
		Unit 2 Global information	LO3 Understand the use of global information and the benefits to individuals and organisations
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
		Unit 16 Developing a smarter planet	LO1 Understand what is meant by a Smarter Planet
	Specific data analyst roles	Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
	Trends in data analyst jobs	Unit 12 Mobile technologies	LO1 Understand mobile technologies LO2 Be able to investigate how businesses use mobile technologies
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
	Skills and personal attributes required	Unit 1 Fundamentals of IT	LO4 Understand employability and communication skills used in an IT environment
		Unit 2 Global information	LO5 Understand the process flow of information
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
		Unit 8 Project management	LO2 Be able to initiate and plan projects
	Qualifications and career paths for data analysts	Unit 1 Fundamentals of IT	LO4 Understand employability and communication skills used in an IT environment
	Could you be a data analyst?	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
LO2	Suitable data for analysis	Unit 2 Global information	LO1 Understand where information is held globally and how it is transmitted LO2 Understand the styles, classification and the management of global information LO3 Understand the use of global information and the benefits to individuals and organisations
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
	Capturing data	Unit 2 Global information	LO5 Understand the process flow of information
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
	Automated data capture techniques	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 17 Internet of Everything	LO1 Understand what is meant by the Internet of Everything (IoE)
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes

This unit (Unit 10)	Title of suggested activity	Other units/LOs	
LO2	Using manual data capture techniques	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
	Using automated data capture techniques	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 12 Mobile technologies	LO1 Understand mobile technologies LO2 Be able to investigate how businesses use mobile technologies
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
		Unit 17 Internet of Everything	LO2 Be able to repurpose technologies to extend the scope of the IoE
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes
	Types of data storage	Unit 2 Global information	LO1 Understand where information is held globally and how it is transmitted
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 12 Mobile technologies	LO2 Be able to investigate how businesses use mobile technologies
LO3	Types of data and data transformation	Unit 2 Global information	LO1 Understand where information is held globally and how it is transmitted LO2 Understand the styles, classification and the management of global information LO3 Understand the use of global information and the benefits to individuals and organisations LO5 Understand the process flow of information
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
	Exercise in transforming data into other formats	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes
	Correcting and manipulating data	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes
	Core functions of automated processing	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes
	Using core functions to automate the processing of data	Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes
	Analysis of processed data	Unit 2 Global information	LO3 Understand the use of global information and the benefits to individuals and organisations
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design LO2 Be able to investigate client requirements for data analysis
		Unit 22 Big data analytics	LO2 Be able to process Big Data for business purposes

This unit (Unit 10)	Title of suggested activity	Other units/LOs	
LO4	Planning a presentation Skills development – delivering a presentation Creating a presentation Delivering a presentation	Unit 6 Application design	LO4 Be able to present application solutions to meet client and user requirements
		Unit 7 Data analysis and design	LO1 Understand the purpose and stages of data analysis and design
		Unit 14 Software engineering	LO4 Be able to propose software solutions to meet business requirements
		Unit 22 Big data analytics	LO3 Be able to provide information resulting from processing Big Data
	Laws applying to data	Unit 2 Global information	LO4 Understand the legal and regulatory framework governing the storage and use of global information
		Unit 3 Cyber security	LO1 Understand what is meant by cyber security
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business
	Organisation policies and procedures to ensure compliance with the law	Unit 1 Fundamentals of IT	LO5 Understand ethical and operational issues and threats to computer systems
		Unit 2 Global information	LO4 Understand the legal and regulatory framework governing the storage and use of global information LO6 Understand the principles of information security
		Unit 3 Cyber security	LO1 Understand what is meant by cyber security LO3 Understand measures used to protect against cyber security incidents LO4 Understand how to manage cyber security incidents.
		Unit 13 Social media and digital marketing	LO2 Understand the use of social media in a business

KEY TERMS

Explanations of the key terms used within this unit, in the context of this unit	
Key term	**Explanation**
Analytics	Analytics looks for patterns and trends in data and uses a wider range of disciplines than analysis to do this. Statistical analysis, computer programs and the use of advanced analytical methods enable a variety of predictive and prescriptive analytics to be used to inform business decision-making to optimise performance. By using computer modelling, statistics and mathematics, analytics is able to analyse large amounts of data. The output is often visualised so that it can be easily understood. An example of analytics is Google Analytics which provides information about website traffic and tracking.
Cloud (storage)	The storage of data on hosted servers at a number of locations so that it can be accessed easily at any time by the client paying for the hosting service. The company owning the servers is responsible for the maintenance and security of the data storage facility. Customers pay for the data storage service based on the amount of storage they actually use. Examples of cloud storage are Microsoft's OneDrive, Google Docs, Dropbox and Apple's iCloud.
Compliance	Measures or actions taken to comply with a rule or law. An organisation puts policies and procedures in place to ensure that it operates within the law. An example of this is ensuring that electrical equipment is PAT tested.
CSV files	Comma separated values. This is where the symbol used to show how the data is split into different columns is indicated by a comma. CSV is a file format that enables tabulated data to be transferred between different applications. An example would be saving a spreadsheet file as a csv file so that it can easily be imported into a database, a word processing file or a different type of spreadsheet software.
Data analyst	A person whose job it is to import or collect, clean, transform, validate and interpret data in a meaningful way so that management can make business decisions. The data analyst might create charts and graphs to present the data to management. Data analysts work in a wide range of specialist areas, e.g. healthcare, media, gaming and airline industries.
Data capture	The collection of data from a source. It could be a manual means of data capture. This can be structured data, for example when completing a form or scanning a bar code, or from unstructured sources like emails, letters and invoices. Automated data capture can be by means of sensors that collect data. Increases in technology have increased the variety of types of data that can be captured and used for data analysis or business analytics. Examples of data capture are when call centres warn callers that calls are recorded and monitored and websites warn users that cookies are being used.
Data logger	A data logger is a small device used for collecting sensory data. Being portable they can be located and relocated in many different locations. The quantitative data they collect provides accurate data on things like temperature, light, vibrations. Because they record continuously they will log very small changes much quicker than a person or other device would be able to do. They are suitable for scientific experiments and manufacturing processes. Data loggers can be linked to a computer interface so that the data is provided in table format.
Data manipulation	This refers to changes made to data. It could be a sort of the data into numerical order on one or more columns/fields to organise it and make it easier to interpret. For example an alphabetical sort on a text field/column would make it easier to locate a particular name or word.
Data virtualization	This uses specialist software to retrieve and manipulate data in real time across different data storage sites. This means that all the data for a business can be easily accessed and manipulated in one piece of software and the data is up-to-date. The data is not moved but accessed where it is, saving time on extracting, transforming and loading the data into datasets and time is also saved on writing updates back to the data source. The software uses a variety of techniques to be able to access data from different sources. Data virtualization is frequently used for cloud and big data but is not suitable for all businesses. An example of the software is the Cisco Data Virtualization Platform and companies that use data virtualization might be multinational companies that have a lot of data in different formats that they need to integrate.

Explanations of the key terms used within this unit, in the context of this unit	
Key term	**Explanation**
Legacy data	Sometimes old data stored in a different format by older technology needs to be used by the data analyst. The old data is referred to as legacy data. It may not be easy to access this data and the format and the conditions it was collected under might not meet the same criteria as current data. This could be archived data, but legacy can refer to any data that is older than the current data.
Machine-readable media and codes	These have been in existence for some time as punch cards, barcodes, optical character readers and hole-punched telex tape. Magnetic media enables a wider variety of data to be stored in a machine-readable format, e.g. swipe cards, magnetic tape and disc, and the magnetic ink on cheques that enables them to be processed quickly. Optical storage of data such as on a CD is another area of machine-readable media. Apps on smartphones enable some codes to be read, e.g. QR codes.
Macros	Macros are computer code that can be accessed with a short instruction, e.g. a button or keyboard shortcut to make the code run and a sequence of tasks performed. Macros enable repetitive tasks to be completed quickly and accurately. Embedded macros in Microsoft Office applications enable users to record the steps in a process, e.g. creating a chart, printing a document, calling data from a website. These macros record the sequence of instructions for the macro in Visual Basic Applications. The VBA code can be edited.
Noise reduction (audio)	Specialist software enables high frequency noises and hiss to be removed from audio recordings to improve the quality of the sound. It uses filters to remove high frequencies. Spectral editing allows a spectral display of the sound to be viewed. Sounds in the required range can be selected and used to edit out the sounds that are not wanted.
Noise reduction (images)	Noise can be reduced in images by applying filters to sharpen the image and enhance the colours and light. Noise can be caused by the colours of the pixels that make up the image not being well matched, random pixels being of different colours than the surrounding ones or the pixel colour numbers being incorrect.
Optical character recognition	Optical character recognition has existed for some time. Software enables typed text, handwritten (in block capitals) text, scanned documents or images of documents to be read, searched and edited by a computer.
Server-side processing	Server-side scripting is used to enable dynamic content to be displayed on web pages, so that when a customer wants to see a particular product it can be displayed using server-side processing. Server-side processing is performed on the server which the client can access through their computer network. The server-side is where data is stored and processed. An example of server-side processing would be creating or editing a database in SQL.
Speech synthesis	This enables text to be input and audio to be played of it as output. The text is analysed and then the audio is played. An example of this would be programs that have a reader facility, e.g. Adobe Reader which can read the text from the screen. It is easier to do in some languages than others because of the characters used. Language translation tools can sometimes play a recording of the words the user has input for translation so that the user can hear what they sound like in the foreign language. Later versions of Windows include speech synthesis which enables it to be used more widely.
SQL	Structured Query Language is a standard language used to access and manipulate databases, e.g. create queries. The user might not always be aware that they are using it in an application. In Access you can view and edit the SQL used in the queries if you go to SQL view on a query. SQL can be used across several databases such as MySQL, Access, Oracle, etc.
Transformation	This is part of the process of extracting, transforming and loading (ETL) of data which might come from a variety of sources so that it can be analysed by the data analyst in another type of software. It might involve converting data from a database format into spreadsheet format, but it could also involve making sure the format of the data is the same from different sources, e.g. the dates are all displayed in the same short date format, or product codes are in the same format, or the data fields are in the same order. There are a variety of data integration tools available that automate the process.
Visualisation	This can take the form of graphs, charts or pictures and enables the data to be quickly understood by management. By making the representation of the data visual it enables patterns and trends to be more easily identified and concepts to be grasped more quickly.

Explanations of the key terms used within this unit, in the context of this unit	
Key term	**Explanation**
Wearable technology	These are gadgets that can be worn by an animal or person either as clothing or accessories so that their health or fitness can be tracked by sensors and sent by Bluetooth to a smartphone. Wearable technology is often worn as wristbands or around the neck like a pendant. An example would be a smart watch. Many fitness monitors use wristbands. Virtual reality headsets are another example of wearable technology, and smart glasses which are used in augmented reality. Wearable technology has been in existence for some time but it is now expanding with a wider variety of smart clothing.

MISCONCEPTIONS

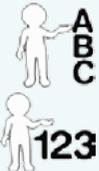| Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	**How can this be overcome?**	**Resources which could help**
Analytics can be thought to mean the same as analysis	Learners might think that analysis and analytics are interchangeable terms that mean the same thing. Learners need to be able to distinguish between the more comprehensive, multi-disciplinary analytics and the processes involved in data analysis.	Organisation: Wikipedia Resource Title: Analytics Website Link: https://en.wikipedia.org/wiki/Analytics Description: A description with examples of analytics and a paragraph on the difference between analytics and analysis. Organisation: Wikipedia Resource Title: Data analysis Website Link: https://en.wikipedia.org/wiki/Data_analysis Description: A description of data analysis with some reference to analytics. Organisation: 1to1 Media Resource Title: Analysis vs. Analytics: What's the Difference? Website Link: http://www.1to1media.com/view.aspx?docid=32968 Description: Describes analysis as looking at what has happened previously and analytics as using algorithms and statistics to predict what will happen next. Examples are related to marketing.
Data and information	Learners are likely to hear the terms data and information and to use them themselves but might not appreciate the difference between them. Data is raw data without any interpretation or analysis. Information is data that has been analysed and manipulated to show results in answer to questions that will influence business decision-making.	Organisation: Diffen Resource Title: Data vs. Information Website Link: http://www.diffen.com/difference/Data_vs_Information Description: Brief definitions, examples and etymology of both words followed by longer article.

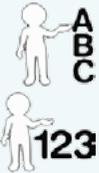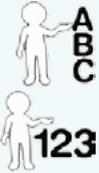| Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	**How can this be overcome?**	**Resources which could help**
Data virtualisation and data visualisation	Learners might confuse the similar sounding terms data virtualisation and data visualisation. The resources should enable learners to understand that data virtualisation is about manipulating and transforming data in a virtual environment accessed through specialist software, and that data visualisation is concerned with the presentation of data or the results of analysis in a visual form like charts and graphs for quick and easy interpretation and understanding by management, stakeholders and decision-makers.	Organisation: Wikipedia Resource Title: Data virtualization Website Link: https://en.wikipedia.org/wiki/Data_virtualization Description: Describes data virtualization with examples Organisation: Cisco Resource Title: Data Virtualization Website Link: http://www.compositesw.com/data-virtualization/ Description: Explanation of what data virtualization is and when and when not to use it. Organisation: Centre for Teaching, Learning and Technology, University of British Columbia Resource Title: What is Data Visualization? Website Link: https://www.youtube.com/watch?v=YaGqOPxHFkc Description: A 3-minute video that briefly shows how data can be visualised and mentions free tools that can be used. Organisation: VMware Resource Title: Virtualization Website Link: http://www.vmware.com/uk/virtualization/overview.html Description: Information about VMware and also a training area with free self-paced learning resources covering: Data Center Virtualization Infrastructure; Desktop Virtualization; and Network Virtualization.

SUGGESTED ACTIVITIES

LO No:	1		
LO Title:	**Know the attributes required for data analyst job roles**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Variety of data analyst jobs	Tutors could introduce the different data analyst jobs by describing a data analyst role in a particular field, e.g. HR data analyst. Alternatively, tutors could invite a data analyst from their organisation to give a talk about their work to the learners, or tutors could play a recording or video of a data analyst describing their role. Tutors could then ask learners to research different data analyst jobs to see how many the learners can find from different business areas. The learners' findings could be fed back to the whole group by each learner contributing a different data analyst role to a list of the ones found.	45 minutes	Unit 1 LO4 Unit 2 LO3 Unit 13 LO2 Unit 16 LO1
Specific data analyst roles	Tutors could ask learners to each select a different data analyst job and carry out research to find out what that particular job involves. Tutors could ask learners to work in small groups for a role play activity. One learner is the interviewer and the other plays the role of the data analyst for the job the learner has been researching. The roles would then be reversed. The interviews could be recorded and made available to the wider group as podcasts.	1.5 hours	Unit 13 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Trends in data analyst jobs	Tutors could begin by asking learners open questions to find out if learners are aware of any trends in data analyst jobs. Tutors could point out that if the learners chose data analysis as a career it would be a good idea to know whether jobs were increasing or decreasing across the roles and whether learners might need to relocate to find a job as a particular data analyst as well as giving them some idea of the salary the learners could earn. Tutors could provide learners with questions to answer when carrying out their research into trends in data analyst jobs. Useful resources: Organisation: ITJobsWatch Website Link: http://www.itjobswatch.co.uk/default.aspx?q=Data+Analyst Description: Details on current trends in data analysis jobs. Organisation: ITJobsWatch Website Link: http://www.itjobswatch.co.uk/jobs/uk/data%20analysis.do Description: Details of current trends in data analysis jobs, statistics and graphs covering a wide range of information.	45 minutes	Unit 12 LO1, LO2 Unit 13 LO2
Skills and personal attributes required	Tutors could begin with a group brainstorming session on what interpersonal skills and personal attributes data analysts are likely to need. The answers could be recorded on a whiteboard, smart board or a flipchart. Tutors could provide learners with a selection of personal and job specifications for data analyst jobs. Tutors could ask learners to form into groups of 5 or 6 to discuss these. Each group could list the soft and technical skills required by data analysts and why those skills are needed.	45 minutes	Unit 1 LO4 Unit 2 LO5 Unit 7 LO1, LO2 Unit 8 LO2
Qualifications and career paths for data analysts	Tutors could introduce this by handing out labels to learners around the group that have a variety of qualifications or experience on them. Tutors could then ask learners to form a line to suggest the hierarchy of qualifications, experience and skills required for different levels in the career path of a data analyst from entry level through practitioner and professional level to consultant level. Tutors could lead a discussion on what it takes to progress to each level of a career in data analysis.	20 minutes	Unit 1 LO4

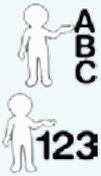| Title of suggested activity	Suggested activities	Suggested timings	Also related to
Could you be a data analyst?	Tutors could ask learners to reflect on what skills or aptitudes the learners think data analysts need to have and to make their own list. Tutors could introduce this in a light-hearted way by referring to short surveys as seen on social media to see if people have what it takes to be a pilot. Tutors could ask learners to form groups of 5–10 and devise a short test/survey which is suitable to select people with an aptitude to become data analysts. Useful resources: Organisation: Delphic Digital Resource Title: What it Takes to Be a Great Data Analyst Web Link: https://www.youtube.com/watch?v=NSflH8wW8Ak Description: Erin Simmons talks about what she thinks it takes to be a great data analyst. Organisation: National Careers Service Resource Title: Data analyst-statistician Web Link: https://nationalcareersservice.direct.gov.uk/advice/planning/jobprofiles/Pages/dataanalyst-statistician.aspx Description: Job profile for data analyst-statistician. Organisation: PwC Resource Title: Careers in Data and Analytics Web Link: http://www.pwc.co.uk/careers/experienced/jobs/data-analytics.html Description: Details of types of data analytic roles within the company. Organisation: KD nuggets Resource Title: Is Data Scientist the right career path for you? Candid advice Web Link: http://www.kdnuggets.com/2014/03/data-scientist-right-career-path-candid-advice.html Description: Advice from experienced data scientist about taking up a career as a data scientist. If time allows, learners from a different group could complete the test/survey another group has created.	1 hour	Unit 7 LO1

SUGGESTED ACTIVITIES

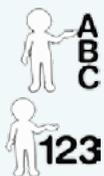| LO No:	2		
LO Title:	**Be able to capture and store data for analysis**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Suitable data for analysis	Tutors could start the session by beginning a list on the whiteboard or flip chart headed 'data suitable for analysis' and putting one item that is a characteristic of data suitable for analysis. Tutors could ask learners to suggest further characteristics for the list together with an explanation of why they think the data is suitable. Learners could then write the item on the list. Tutors could provide five or six descriptions of data and the purposes the data is intended for. Learners could work in small groups to decide whether the data would be suitable for that purpose. Tutors could ask for feedback from the groups and learners should be able to see if they have correctly identified the data as fit for purpose or not.	45 minutes	Unit 2 LO1, LO2, LO3 Unit 7 LO1, LO2 Unit 13 LO2
Capturing data	Data capture can be an interesting topic if linked to data capture for scientific purposes. Tutors could collaborate with sports, health, geography, science or engineering subject tutors to see if there are projects their learners are doing that require them to capture data. Tutors could ask learners to work in small groups to research a variety of data capture techniques (see Teaching Content for examples). Learners could record what business sector each technique is used in, what type of data is captured, what equipment is required, and what the data is used for. The groups could summarise their findings in a presentation to share with the wider group.	1 hour	Unit 2 LO5 Unit 7 LO1, LO2
Automated data capture techniques	Tutors could introduce the topic of automated data capture by starting a list on a whiteboard or flip chart and providing an example, such as car number plate recognition, and then asking learners to contribute examples to the list. Tutors could ask learners to form small groups and each group could take one of the examples to discuss, and research if necessary, how that particular automated data capture technique works in principle: how data is input; what processes it is likely to go through; how the data could be stored; and what output is likely to be required.	1 hour	Unit 7 LO1 Unit 17 LO1 Unit 22 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Using manual data capture techniques	Tutors could introduce the use of manual data capture techniques by pointing out to learners that they are probably already familiar with a number of data capture techniques, e.g. completion of forms. Tutors could provide learners with problem-solving tasks that require a range of ability to solve. Tutors could ask learners to provide a manual means of capturing the data for each task. Useful resource: Organisation: ProcessFlows Resource Title: Methods of Data Capture Website Link: https://processflows.co.uk/data-capture/methods-of-data-capture/ Description: Descriptions of different types of data capture both manual and automated, and includes voice capture. Case studies of how the company has provided solutions to data capture problems are provided.	1 hour	Unit 7 LO1, LO2
Using automated data capture techniques	Tutors could introduce the use of automated data capture techniques by pointing out to learners that they are probably already familiar with a number of automated data capture techniques, e.g. swipe cards, GPS on mobile phone. Tutors could provide learners with problem-solving tasks that require a range of ability to solve. Tutors could ask learners to suggest an automated means of capturing the data for each task and to produce at least one of these. Useful resources: Organisation: MathsWorks United Kingdom Resource Title: Internet of Things Web Link: http://uk.mathworks.com/solutions/internet-of-things/ Description: How the internet works to use embedded devices to capture and process data. Has links to examples of and articles on a range of topics from analyzing weather station data to real-time tide gauge to tweet tidal alerts. Organisation: Google Resource Title: Google Analytics Web Link: https://www.google.co.uk/analytics/ Description: Free tracking and reporting of website traffic. Premium versions allow more advanced features across different platforms and an SDK (Software Development Kit) allows tracking of usage of apps.	1 hour	Unit 7 LO1 Unit 12 LO1, LO2 Unit 13 LO2 Unit 17 LO2 Unit 22 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Types of data storage	Tutors could introduce the subject of data storage by asking learners to reflect on what the principles (qualities) are of data storage, e.g. accessibility by data analysts. Tutors could ask learners to put the ideas produced onto sticky notes and these could be displayed for the wider group to see. Tutors could select the most relevant responses from those provided to expand on for the group. Tutors could lead a group discussion on storage considerations: volume of data; access requirements; and location of storage.	45 minutes	Unit 2 LO1 Unit 7 LO1 Unit 12 LO2

SUGGESTED ACTIVITIES

LO No:	3
LO Title:	**Be able to use tools to edit and analyse data**

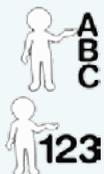| Title of suggested activity	Suggested activities	Suggested timings	Also related to
Types of data and data transformation	Tutors could introduce the topic by writing a heading 'types of data' on a flip chart or whiteboard and asking learners to state the types of data they already know e.g. numbers. Tutors could add a second heading 'format for compatibility' and invite learners to suggest what this is for the original list, e.g. csv. Once the learners have provided as many answers as possible, tutors could explain and complete any remaining unanswered by learners. Tutors could lead a group discussion about how to transform the data files into a compatible cross-platform format, e.g. video format.	30 minutes	Unit 2 LO1, LO2, LO3, LO5 Unit 7 LO1
Exercise in transforming data into other formats	Tutors could introduce the exercise by asking a question about what learners are likely to know about different file formats, e.g. How can you save a Word file so that it can be opened in any word or text processing application? Tutors could provide learners with at least five tasks that involve saving files in different formats for exporting into other applications for analysis. The tasks could include: exporting files from within one application so that the data can be used in another; transforming files into a compressed or flattened format; importing text files into applications for analysis, e.g. text file into database; and transforming music and video files into formats suitable for playing on different platforms.	45 minutes	Unit 7 LO1 Unit 22 LO2
Correcting and manipulating data	Tutors could introduce the topic by explaining the need to correct errors and to manipulate data. Examples of data that needs to be corrected or manipulated could be provided for learners to see, hear and view. Tutors could then demonstrate to the group error correcting and manipulation techniques in a variety of software applications. Learners could be provided with raw data that needs to be checked for errors, corrected and manipulated so that it is ready to be used for data analysis. The exercises could include different types of data e.g. text, images, video, audio and numbers. Useful resources: Organisation: Trump Excel Resource Title: 10 Super Neat Ways to Clean Data in Excel Web Link: https://www.youtube.com/watch?v=e0TfIbZXPeA Description: 10 really good features in Excel that are suitable for data analysts to use to clean data.	1–2 hours	Unit 7 LO1 Unit 22 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Correcting and manipulating data (continued)	Organisation: Trump Excel Resource Title: Filter the Smart Way – Use Advanced Filter in Excel Web Link: https://www.youtube.com/watch?v=ZUFEqjDLM2I Description: Demonstration of using advanced filters in Excel. Organisation: ExcellsFun Resource Title: Excel Data Analysis: Sort, Filter, PivotTable, Formulas (25 Examples): HCC Professional Day 2012 Web Link: https://www.youtube.com/watch?v=i5WiYh2jmG8 Description: Examples and 'how to' guide, which has downloadable spreadsheet to use along with the demonstration. Organisation: Computerworld Resource Title: 5 tips for data manipulation in Excel Web Link: http://www.computerworld.com/article/2488184/enterprise-applications/5-tips-for-data-manipulation-in-excel.html Description: An article with some useful functions in Excel for manipulating data. Organisation: How-To Geek Resource Title: 3 Simple Ways to Improve Low Resolution Images (and Typography) Web Link: http://www.howtogeek.com/105952/3-simple-ways-to-improve-low-resolution-images-and-typography/ Description: Ways to enlarge, smooth, sharpen and adjust colour on low resolution images and text using Photoshop. Organisation: wikiHow Resource Title: How to Improve Jpeg Image Quality Web Link: http://www.wikihow.com/Improve-Jpeg-Image-Quality Description: Six steps to improve image quality lost due to compression. Organisation: Axe Studios Resource Title: Adobe after effects: How to enhance video quality in the editing process [HD] Web Link: https://www.youtube.com/watch?v=cT8lCMtc90w Description: How to enhance video quality in the editing process.		

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Core functions of automated processing	Tutors could introduce the topic by demonstrating natural language processing on a smartphone, e.g. Siri. Tutors could ask learners for examples of other natural language processing tools that they know about. Tutors could extend the range of automated processing tools by demonstrating the use of song recognition software, e.g. Shazam. Tutors could ask learners for examples of other automated processing tools that they know about. Tutors could ask learners to work in small groups to explore a range of automated processing tools (see the Teaching Content for examples). Tutors could ask learners to answer the following questions during their exploration: • What it is called? • Where it is used? • How it works?	45 minutes	Unit 7 LO1, LO2 Unit 22 LO2
Using core functions to automate the processing of data	Tutors could introduce this topic by asking learners to spend five minutes reflecting on how the automated processes they have looked at actually worked. Tutors could list the automated processing tools from the Teaching Content and invite learners to contribute by saying what the core process is, e.g. fingerprint analysis uses algorithms to recognise similar patterns in the minutiae in a search of known fingerprints and returns those with a high percentage match for expert visual analysis by someone such as a forensic scientist. Therefore, in this example, the core process is the use of algorithms to search a database for key features and return only results with a good match. Tutors could provide examples for learners of where they could use core functions to automate the processing of data that they have captured. Tutors could discuss with learners the use of: macros to automate processes; formulae and functions in Excel to automatically identify data that meets specific criteria; complex queries in Access to select particular data; Python in Excel to search multiple files or multiple rows in one file and check or compare data; and automatic photo processing like Google's Photos app to automatically upload, label and catalogue photos. Tutors could provide learners with a variety of tasks to perform using core functions to automate the processing of data.	1 –1.5 hours	Unit 7 LO1, LO2 Unit 22 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Analysis of processed data	Tutors could introduce this topic by asking learners how a data analyst could analyse data to present results to management to make a business decision. Tutors could discuss with learners types of questions that might need to be answered by data analysis and how the results could be presented, e.g. How have the numbers of reported cases of a disease in the UK changed over the last 10 years? What are the sales figures of five branches of the company over the last year? How do the sales of bulbs compare with the total sales of garden plants this year? How did the actual exam grades last year compare with the target grades? How often has the temperature been below -15ºC in Leicester in the last 10 years? How much are sales influenced by the money spent on advertising? What are the sales figures for different types of bread over the last month? What is the average house price by county? Tutors could also discuss with learners the use of algorithms and models in data analysis and introduce learners to statistical analysis of data. Tutors could provide learners with sets of processed data and learners could be given the task of analysing the data to answer specific questions. Useful resources: Organisation: Quality Digest Resource Title: Data Analysis—10 Key Questions and Reasons Web Link: http://www.qualitydigest.com/inside/six-sigma-article/data-analysis-10-key-questions-and-reasons.html# Description: Article by Peter J. Sherman published 2009. Organisation: The datapine Blog Resource Title: Your Data Won't Speak Unless You Ask It The Right Data Analysis Questions Web Link: http://www.datapine.com/blog/data-analysis-questions/ Description: Blog by Agata Kwapien (2016) with 6 tips for asking the right data analysis questions. Organisation: The datapine Blog Resource Title: Designing Charts and Graphs: How to Choose the Right Data Visualizations Web Link: http://www.datapine.com/blog/how-to-choose-the-right-data-visualizations/ Description: Blog by Jac Reid on when to use different types of charts to visualise data and what to avoid (2015). Organisation: The Telegraph Resource Title: The trouble with big data Web Link: http://www.telegraph.co.uk/sponsored/business/business-reporter/11998703/using-big-data.html Description: Video of interview with Mike Holcombe, director, Advanced Computing Research Centre about big data analysis (2015). Video length: 13.05 mins with written article as well.	1–1.5 hours	Unit 2 LO3 Unit 7 LO1, LO2 Unit 22 LO2

SUGGESTED ACTIVITIES

LO No:	4		
LO Title:	**Be able to present data analysis outcomes**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Planning a presentation	Tutors could provide learners with some guidelines and ask them to plan the content of a presentation. A scenario and data analysis could be provided by tutors, so that learners can focus on the presentation content and the questions that are raised in the Teaching Content. Learners could be provided with a choice of formats for their presentation, e.g. report, delivered presentation or video presentation. If a live or videoed presentation is chosen, learners should include timings in the plan.	45 minutes	Unit 6 LO4 Unit 7 LO1 Unit 14 LO4 Unit 22 LO3
Skills development – delivering a presentation	Tutors could introduce the topic of delivering a presentation by asking learners to spend five minutes reflecting on what makes a good written or delivered presentation. Learners could write their responses on sticky notes and stick them onto a flip chart or whiteboard so that other learners can view them. Tutors could select items from the sticky notes to discuss with the group.

Tutors could ask learners to work in groups to review a report or presentation and suggest ways that it could be improved.

Useful resource for developing presentation techniques:

Organisation: University of Leicester
Resource Title: Delivering an effective presentation
Web Link: http://www2.le.ac.uk/offices/ld/resources/presentations/delivering-presentation
Description: A study guide and in-depth details of how to improve presenting techniques in 6 steps. Includes links to using visual aids. | 30 minutes | Unit 6 LO4 Unit 7 LO1 Unit 14 LO4 Unit 22 LO3 |
| **Creating a presentation** | Tutors could ask learners to develop the planned presentation by creating the presentation in their chosen format. | 45 minutes | Unit 6 LO4 Unit 7 LO1 Unit 14 LO4 Unit 22 LO3 |
| **Delivering a presentation** | Tutors could introduce this as a role-play activity and ask learners to deliver the presentation or report that the learner had created to a small group of learners. Those learners that had produced a report could answer questions from a small group of learners about the content of their report. Audio or video recordings could be used to enable learners to review their performance. | 1–2 hours | Unit 6 LO4 Unit 7 LO1 Unit 14 LO4 Unit 22 LO3 |

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Laws applying to data	Tutors could provide learners with copies of the laws that relate to the collection, storage, processing and use of data and information (see Teaching Content) for reference when reviewing a selection of case studies where the laws had been contravened. Tutors could then ask learners to work in groups and discuss the case studies and note which aspects of the laws had been contravened in each case. Useful sources for case studies: Organisation: Techworld Resource Title: The UK's 11 most infamous data breaches 2015 Web Link: http://www.techworld.com/security/uks-11-most-infamous-data-breaches-2015-3604586/ Description: Brief details of 11 data breach cases with links to further details on Techworld's website. Organisation: Computer Business Review Resource Title: Sony fined £250,000 after breaching Data Protection Act Web Link: http://www.cbronline.com/news/sony-fined-250000-after-breaching-data-protection-act-240113 Description: An article about a breach of the Data Protection Act. Organisation: Out-Law.com Resource Title: Sony Music hackers given suspended prison sentence Web Link: http://www.out-law.com/en/articles/2013/january/sony-music-hackers-given-suspended-prison-sentence/ Description: An article about a breach of the UK Computer Misuse Act in 2013. Organisation: Michael J L Turner Resource Title: Computer Evidence Web Link: http://www.computerevidence.co.uk/Cases/CMA.htm Description: Brief details from a database of archived cases under the Computer Misuse Act with links to press articles about the cases. Organisation: BBC News Wales Resource Title: Council breached information law Web Link: http://news.bbc.co.uk/1/hi/wales/8680412.stm Description: News item on breach of Freedom of Information Act. Organisation: Out-Law.com Resource Title: Nintendo mod chip seller infringed copyright, rules High Court Web Link: http://www.out-law.com/page-11268 Description: Article on an infringement of copyright laws.	1 hour	Unit 2 LO4 Unit 3 LO1 Unit 13 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Organisation policies and procedures to ensure compliance with the law	Tutors could introduce this topic by informing learners that organisations will need to have policies and procedures in place to ensure that their organisation complies with the law. Tutors could provide learners, working in groups, with copies of the policies and procedures for an organisation or their learning centre and ask them to discuss what implications these would have for data analysts working in that organisation. The groups could provide feedback on their findings to the larger group at the end of the session.	45 minutes	Unit 1 LO5 Unit 2 LO4, LO6 Unit 3 LO1, LO3, LO4 Unit 13 LO2

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