2021-22 CURRICULUM MAP FOR IT YEAR 11

HALF TERM 1: **Modern Technologies & Cyber Security**
 	
Component 3: Effective Digital Working Practices
KQ1: How and why modern technologies are used by organisations and stakeholder to access and manipulate data?
Communication technologies
• Setting up ad hoc networks (open Wi-Fi, tethering, personal hotspots)
• Ad hoc networks are created between two or more wireless PCs together, without the use of a wireless router or an access point.
  • Security issues with\ open networks e.g. open networks not requiring usernames or passwords
  • Performance issues with ad hoc networks e.g. limited range, poor signal
  • Issues affecting network availability e.g. rural Vs city locations, developed Vs developing countries, blackspots
• Features and uses of cloud storage (where files created and used on one or more computers or devices are stored and managed remotely)
  • Setting and sharing access rights
  • Synchronisation of cloud and individual devices
  • Availability (24/7)
  • Scalability (getting more by renting/freeing to save money)
• Features and uses of cloud computing (Web-based applications which run entirely through browsers)
  • Online applications
  • Consistency of versions between users
  • Single shared instance of a file
  • Collaboration tools/features
• Selection of platforms impacts clout technologies:
  • Number and complexity of features
  • Paid for versus free
  • Interface design including layout, accessibility, mobile Vs desktop
  • Available devices
• Implications for organisations when choosing cloud technologies:
  • Consideration of disaster recovery policies
  • Security of data
  • Compatibility
  • Maintenance including software updates, downtime, staff expertise
  • Getting a service/storage up and running quickly
  • Performance considerations (responsiveness to user, complexity of task, available devices.
 	
KQ2: Explain the impacts of modern technologies on organisations?
 	
• Changes to modern teams facilitated by modern technologies:
  • World teams
	
	 
	 
	 
		Article on access to modern technology during coronavirus and how this has changed business operations
		
		Explanation why issues with communication can impact different areas and the different features of having cloud computing in organisations.
		
		Discussion of the impacts of covid on business processes including how modern technologies are used
		
		Links to business by identifying impacts of how these modern technologies have changed business day – to day running.

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• Multicultural • Inclusivity • 24/7/365 • Flexibility (remote working Vs Office based) • How modern technologies can be used to manage teams • Collaboration tools • Communication tools • Scheduling and planning tools e.g. online calendar • How organisations use modern technologies to communicate with stakeholders • Communication platforms (website, social media, email) • Selecting appropriate communication channels for sharing information and data. (private/direct message, public status update) • Positive and negative impacts of modern technologies on organisations: • Requirements infrastructure (communication technologies, devices) • Demand on infrastructure of chosen tools/platforms • Availability of infrastructure • 24/7 access • Security • Collaboration • Inclusivity (age, health, additional needs, multicultural) • Accessibility (meeting legal obligations, provision requirements) • Remote working • Positive and negative impacts of modern technologies on individuals: • Flexibility (home/remote working) • Working styles (choice of time, device, location) • Impact on individual mental wellbeing (depression, loneliness, self-confidence, separation from stressful environment, feel in control of own schedule, schedule adjusted to meet needs of family, less time commuting) **KQ3: What are the threats to data?** • Why systems are attacked: • Fun/challenge - Hackers may attack systems for thrill, adrenaline rush or sense of personal achievement • Industrial espionage - This is where individuals will attack an organisation such as stealing design, business strategies etc. and possibly copying or providing cheaper products in order to make the organisation lose money • Financial gain - Obtaining money from victims of a cyberattack • Personal attack - Some attacks are personally motivated e.g. ex-employees who hold a grudge against the former company/employer		

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• Disruption - An attack that prevents a company from operating normally resulting in loss of earning and reputational damage. • Data/information theft - These can be sold to criminal gangs or organisations for financial gain. This is done by stealing customer payment information that is used to purchase goods. • External threats (threats from outside the organisation) to digital systems: • Unauthorised access/hacking - Where users attempt to gain access to remote systems without the permissions or authorisation of the owners to do so legally. • Malware (Virus, worms, botnet, spyware) • Virus - designed to cause harm to a computer system by deleting files • Word - replicates itself across a network. Usually designed to make a computer inaccessible • Spyware – record a computer users actions, key strokes and relay them back to a third party • Phishing (fake emails) - Spoof email pretending to be from a legitimate company. Spoof means that the email is forgery but looks genuine. • Pharming - This is a combination of phishing and farming. This is where a user is maliciously directed to a fake website thinking is it real and they unwittingly enter confidential details such as usernames and passwords. Cyber criminals capture these details. • Social engineering - This is where individuals contact users via email or phone pretending to be the users bank and asking them to confirm there identify such as username and password. • Shoulder surfing - Spying on the user of a cash-dispensing machine or other electronic device in order to obtain their personal identification number, password, • 'Man, in the middle' attack - This is where the network is intercepted between the user and web server, where the attacker can obtain confidential information. • Denial of service attack - A cyber-attack in which the perpetrator seeks to make a machine or network resource unavailable to its intended users by temporarily or indefinitely disrupting services of a host connected to the Internet • Internal threats (threats within the organisation) • Disclosure of data - Can be accidentals or malicious and require overriding security controls and portable storage devices. • Stealing or leaking information - Selling to a rival (industrial espionage) for financial gain, revenge, social or political reasons. • Users overriding security controls - An attempt to access data or information they should not access • Use of portable storage devices - Such as USB drives which may be infected with viruses or be		

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used to copy and remove secure data from the organisations • Downloads from the internet - Illegal (or non-approved) software which may contain viruses and infect IT systems • Visiting untrustworthy websites - May have phishing threats or contain downloadable viruses • Impact of security breaches: • Data loss • Damage to public image • Financial loss • Reduction in productivity • Downtime • Legal action Keywords • Communication • Modern • Technologies • Ad hoc • Network • Hotspot • Wireless • Wi-fi • Tethering • Performance • Security • Signal • Blackspots • Developed • Developing • Rural • Urban • City • Storage • Cloud • Collaboration • Compatibility • Performance • Maintenance • Multicultural • Flexibility • Organisations • Infrastructure • Inclusivity • Cyber • Security • Industrial • Espionage • Financial gain cyberattacks • Disruption • External threats • Internal threats		

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• Unauthorised • Malware • Phishing • Pharming		
-HALF TERM 2: Effective digital working practices **KQ1: How are threats to data prevented and managed?** • User access restriction- this is to restrict who can access/see what, measures that can be used are: • Physical security measures (locks, swipe cards) • Passwords • Using correct settings and levels of permitted access • Biometrics (iris, thumbprint etc.) • Two factor authentications (password and security question characters) • Data levels protection of a system include: • Firewall • Software/interface design e.g. not staying logged in after five minutes of inactivity) • Anti-virus software • Device hardening (eliminate attacks by having security controls e.g. password management, disabling unused network port) • Back-ups for recovering data • Encryption of stored data and transmitted data (encryption is where passwords are mixed up which in unreadable by humans) • Identifying weaknesses in order to improve system security include: • Ethical hacking- individual who is employed by a company to try and gain access to a system in order to identify any vulnerabilities, there are two types of ethical hackers which are: • White hat hacker- asks for permission before testing the system security at an organisation • Grey hat hacker- will attempt to compromise a computer system without permission • Penetration testing- simulated attack on a computer to check for vulnerabilities • Analyse system data/behaviours to identify potential risks **KQ2 – What are policies and why organisations need security policies in place?** • Defining responsibilities • Who is responsible for what? • How to report concerns • Reporting to staff/employees • Defining security parameters: • Password policy e.g. change every 8 weeks • Acceptable software/installation/usage policy • Timeline for data recovery • Location of alternative provision (hardware & Software) • Actions to take after an attack • Investigate (establish severity and nature)	   	Example policies used within organisations e.g. acceptable use policy etc. Explanation of each of the threats to a computer/network and the methods that are available to prevent them. Peer presentation/explanation of how threats to data are prevented and managed. Links to Computer Science –Threats to a computer/network and the methods that are available to prevent them.

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• Respond (inform/update stakeholders and appropriate authorities)
• Manage (containment, procedures)
• Recover (implement disaster recovery plan, remedial action)
• Analyse (update policy and procedures)
 	
KQ3: What legislation governs the use of data and digital systems and what is its impact on the ways in which organisations use them?
• Blurring of social and business boundaries:
  • Use of social media for businesses purposes
  • Impact of personal use of digital systems (social media, web) on professional life e.g., individuals checking and responding to emails outside of work or using career-style social media platforms such as LinkedIn to network and job hunt.
• Data protection principles
  • Lawful processing
  • Collected data for specific purposes
  • Only needed information is collected
  • Should be accurate
  • Kept only if necessary
  • Data subject rights
  • Protected
  • Not transferred to countries with less protection
• Data and the use of the internet
  • The right to be forgotten- this means individuals have the right to pursue their life without being unfairly treated because of a specific action taken or comment made in the past.
  • Appropriate legal use of cookies and other transactional data- often when users go online, they leave a digital footprint which contains personal information that organisations can sell to other businesses that may wish to use the information.
• Dealing with intellectual property
  • The importance of intellectual property in organisations is important so other businesses do not try and copy their brand names, logos or product designs.
  • Methods of identifying/protecting intellectual property include registering patents, design rights, copyright or trademarking.
  • Legal and ethical use of intellectual property including licensing and asking for permission to use an image or pay a fee to the owner to use
• The criminal use of computer systems
  • Unauthorised access - Criminals target a system to identify its security weaknesses
  • Unauthorised modifications of materials - Criminals who have managed to access a system find content to change.
  • Creation of malware - Malware such as viruses, is written by criminals to be used to infect systems		

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either to cause damage or to seal money and information. • Intentional spreading of malware - Malware is spread through infected files, and these can be spread over the internet of infected USB devices. Keywords ○ Legislations ○ Lawful processing ○ Protected ○ Intellectual property ○ Malware		

-HALF TERM 3: Collecting, presenting and interpreting Data **C3→ 1 month of this half term before exam in Feb** **KQ1: How can different types of notations be used to explain systems, data and information?** ○ Forms of notations are where organisations create lists or diagrams to show the technologies they have and how they are connected. Diagrams are useful for communication complex ideas. ○ Data flow diagrams - Used to explain how data is processed by an existing system and how it could be processed by future systems. Main symbols and flow of a data flow diagram include a process box which indicates something happening to data e.g., ordering a sandwich, a data store is where the data goes once processed e.g., an address book, diary (m is for manual data store, D is for Digital data store), an entity oval which is an organisation or group e.g., customer and an arrow which shows the way data is flowing. ○ Flowcharts - A visual representation of processes showing the actions in the order they happen. Main symbols of a flowchart are a terminator which shows the start and end of the process, a rectangle process box which shows that an action is taking place, a diamond decision box which is where a selection needs to be made, a data shows inputs into the processes and arrows which link the components together and shows the flow of information. ○ System diagrams - Models used to visually show the boundary between the system or part of a system and its environment showing the entities that interact with it. An example could be a diagram which shows how an internet service provider interacts with other systems, environment and entities.		Students will need to read up and research different ways to collect data and the benefits and drawbacks of the different methods. Written report on the characterisitcs of data and why organisations used a range of methods to capture and store data. Class disucssion/paired disucssion by analysing data aand predicting future trends. Showing students how companies analyse and predict trends for the future based on current information. Links with business by identifying how data is collected and stored by organisations.

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○ Tables - Displaying information tables is often an ideal way to organise information easier and see information in the same fields. ○ Written information - When documenting systems, written information will also be needed. This can be an executive summary. Sometimes you need to add text descriptions to tables, charts or diagrams to give them context. **Coursework- Component 2** **KQ1: What are the different characteristics of data and information?** ○ Data is a series of numbers or letters that has no structure or context and which by itself unless processed ○ Information is data that has been processed. The processing may involve doing several different things to data such as structure. ○ Characteristics of data ○ No meaning: the important characteristic of data is it needs to be meaningful and tells you something you need to know or would be useful to know. ○ No Structure: structure is provided by dividing information into field and records. Not all information can be divided e.g., a book is structured into chapters with headings and sub-headings. ○ No Context ○ Unprocessed ○ Characteristics of information ○ Has meaning ○ Has structure ○ Has context ○ Is processed **KQ2: identify the different ways of representing information?** ○ Text - Text is used to present information books, websites, reports and other documents. Text can provide large or small amounts of information which can very detailed. ○ Numbers - Commonly used to represent quantitative information as can be best measured using numbers and uses statistical methods e.g. calculate the average height of people in your class by totalling all the heights and dividing by total number of people measured. ○ Tables - Useful is representing numbers and text where they can be divided into different groups/categories. ○ Graphs/charts - Used commonly to summaries numerical information. Trying to understand		

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large amounts of information can be hard, however when data is displayed using a chart it can be much easier to spot trends. ○ Infographics - Usually only one page and provides a useful and quick summary of important information by combining information, graphs, diagrams, images and tables. **KQ3: How can you ensure that data entered a system is suitable?** ○ Validation methods ○ Range check - Used for numerical entries that must fall within a certain range e.g., a month must fall in the range 1-12 ○ Type check - Ensure that data is of the right type e.g., if you need to enter a phone number you can't input text. ○ Lookup check - Data must be from a valid list e.g., postcodes ○ Presence check - Ensuring that fields contain an entry otherwise page cannot be processed ○ Length check - Input data must be a certain length, anything shorter or longer than the required length should be rejected e.g., UK mobile number should be 11 digits. ○ Verification methods ○ Proofreading - Check documents such as reports for spelling, grammar errors. ○ Double entry - This is where data is entered twice e.g., stock amounts in a warehouse y perhaps two different people to minimise mistakes but doesn't stop them **KQ4: How do data collection methods and features affect data reliability?** ○ Data collection methods ○ Primary data- information collected directly from the source ○ Secondary data- information collected by a third party. ○ Data collection features ○ Size of sample ○ Who was in the sample? ○ Where the data was collected ○ When the data was collected ○ Methods used ○ Big data- extremely large sets of data that may be analysed computationally to reveal patterns, trends. ○ Collection of big data e.g. social networks, shop loyalty schemes, census, sensors, ATN/cash machines, mobile phone networks, Wi-Fi points, digital televisions, search engine data, e-commerce		

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KQ5: Why quality of information important and what is its impact on decision making? ○ Quality of information factors ○ Source/collection method- over the phone telephone or online form. ○ Accuracy- primary methods are more accurate e.g., shopping scanned at supermarkets. Secondary data is compiled by others and might not have all the information you need and can be outdated ○ Age- how long ago was the information collected as many aspects as possible of how business life can change quickly so data collected several years ago might not reflect the current situation. ○ Completeness- having all the data needed to decide ○ Amount of detail- if data lacks detail, you may not be able to use it for the intended purpose but if it is too detailed may be difficult to spot trends. ○ Format/presentation- data can be formatted in various ways such as table/graph. If data is poorly formatted, then it may make it hard to interpret and to make decisions. ○ Volume- amount of data collected can have a major impact on the results. If you just ask four people what their favourite video game is, you are unlikely to get an accurate idea of the most popular game in the UK in comparison to if you ask 400 people. **KQ6: Which sectors use data modelling?** ○ Transport ○ Education ○ Retail ○ Banking ○ Entertainment ○ Government ○ Health care ○ Construction ○ Communication ○ Health and safety **KQ7: How is data modelling is used in decision making?** ○ Which customer to target for advertisements ○ Where to deploy staff during busy periods ○ Just-in-time delivery ○ Where and when to adapt transport schedules ○ Financial management ○ Accident prevention ○ Demographic analysis **KQ8: identify the threats that face individuals who have data stored about them?** ○ Invasion of privacy - Information is collected about us all the time e.g. mobile phone providers store records about what numbers		

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you called, for how long and when. This information can be used to build a picture on your private life and who you communicate with. ○ Fraud - Data held by organisations could potentially be used for fraudulent purposes, such as obtaining money illegally, which would cause sever distress ○ Targeting vulnerable groups of people - People with malicious intentions will target vulnerable groups such as young people, elderly people and people with disabilities. Young people may share information on social media, which could result in data about them being collected and shared with third parties. ○ Inaccurate data could be stored - The consequences of having incorrect data is serious e.g. when moving to a new house, you need to change addresses for all your items. You could by accident put the wrong door number which could have consequences of your post with private information going elsewhere. Keywords ○ Characteristics ○ Representing information ○ Graphs ○ Infographics ○ Validation methods ○ Range check ○ Type check ○ Presence check ○ Length check ○ Verification methods ○ Proofreading ○ Double entry ○ Primary data ○ Secondary data ○ Big data ○ Demographics ○ Financial ○ Invasion of privacy ○ Fraud ○ Forms of notations ○ Data flow diagrams ○ Flowcharts ○ System diagrams		
-HALF TERM 4: Collecting, presenting and interpreting data		Research different types of dashboards identifying their strengths and weaknesses. Reading up on different functions in excel and how to use them

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<table>
<tr>
<td rowspan="3">KQ1: How can data be imported from an external source?
• Dashboard- displays important information, using visual and other methods of presentation.
• Importuning data e.g., from other files, the internet
• Formulae e.g., add, divide, subtract, multiply
• Decision-making functions e.g., IF, WHTIF, SUMIF
• String operations functions e.g. LEFT, RIGHT
• Count functions e.g. COUNTBLANK, COUNTIF
• Logical operation e.g. NOT, AND, OR
• Sorting e.g. soring multiple columns and values
• Outline e.g. group, ungroup, subtotal
• Filtering e.g. greater than, less than, equals, contains, beings with, ends with
• Text to columns e.g. delimited, fixed width
• Absolute and relative cell referencing e.g. use of dollar sign and named cells
• Macros e.g. for automatic navigation change graph options, change data ranges
• Data validation e.g. list check, type check, length check
• Multiple and linking worksheets e.g. for dashboard and raw data
• Cell comments
• Alternative views e.g. hiding/unhiding cells, freezing panes
• Conditional formatting e.g. data bars, colour scales icon sets
KQ2: How can data be manipulated and summarised through the creation of a dashboard?
• Show data summaries from data sets:
○ Totals
○ Counts
○ Percentages
○ Sales breakdowns
○ Departmental breakdown
○ Time allocations
○ Budget allocations
• Appropriate presentation methods
○ Form controls e.g. dropdown menus, spinners, tick boxes, radio buttons
○ Graphs/charts incl dynamic graphs/charts
○ Pivot tables- table of statistics that summarises data in more extensive tables
○ Conditional formatting
○ Select data/range
• Use appropriate presentation features
○ Font size, style and colour
○ Cell borders and shading
○ Graphics
○ Axis labels
○ Titles, including overall and section titles

Keywords
• Cell
• Cell reference
• Dashboard
• Importing</td>
<td>  </td>
<td>Ste-by-step methods using screenshots and brief instructions on how to complete features in escel such as functions and what they do.</td>
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<td>Class demonstration on key skills and pared discussions on how to use Excel features</td>
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<td>Links with business and maths by using a range of mathematical operators to find patterns and trends to improve busineses.</td>
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• Formula • String operation • Count function • Logical operation • Filtering • Absolute cell referencing • Relative cell referencing • Data validation • Conditional formatting • Data summaries • Axis		
-HALF TERM 5: Collecting, presenting and interpreting data **KQ1: How can conclusions be drawn from information?** • Drawing conclusions ○ Trends - Spotting trends that shows either an increase or decrease overtime based on the trend values on a graph ○ Patterns - You can identify patterns with some data e.g. seasonal patterns such as ice cream is sold more in the summer ○ Anomalies - This may occur when some aspects of the data does not fit the overall trend or pattern and could be due to an error in the data ○ Possible errors - Errors I data can come in many forms such as human errors, such as typing mistakes. It is important that errors don't affect trends or patterns in the data. • Making recommendations ○ e.g. which customers/areas to target for advertisements ○ where to deploy staff to deal with increased demands ○ how and when to adapt transport schedules **KQ2: How does presentation affect the understanding of data/information?** • Information being misinterpreted - the way you present data in a dashboard can have an impact on the way it is interpreted or misinterpreted • Information being biased- bias can occur when the data is presented in such a way that is appears to support an opinion or show the information I a more favourable light • Inaccurate conclusions being made- if the information in the dashboard is poorly presented, then it may lead to inaccurate conclusions being made. Keywords ○ Conclusions ○ Trends ○ Patterns ○ Anomalies ○ Recommendations misinterpreted bias ○ Opinion	   	Reading through work and researching how to identify/spot patterns trends in a range of graphs/tables and written summaries Suggest trends and patterns and how businesses can improve in order for their organsiation to excel in the future Class paired discussion looking at example dashboards and drawing conclusions on patterns and trends and forecasts for the future Links to business, identifyinf trends for the future and suggesting where needs improvements.