

Topic 1: Digital Devices

Students need to know about the range of digital devices available. Developments in the features and functionality of digital devices are rapid and this impacts on the way that they are used by individuals, organisations and society. Students need to understand the principles of these devices and to be able to select suitable devices and associated hardware and software to use used in particular situations.

1 Digital Devices	Students should:
<p>1.1 Types of digital devices</p> <p>Students need to know about computers and other digital devices. They need to understand how each type of device is used but not the technology behind their operation.</p>	<p>1.1.1 Be aware that mainframe computers are used for complex processing tasks and microprocessors are embedded in products such as washing machines.</p> <p>1.1.2 Understand that laptop and desktop computers are types of personal computers. Some laptops are used as desktop replacements.</p> <p>1.1.3 Know about types of mobile phones; smartphones and specialist phones and how they connect to the network (SIM).</p> <p>1.1.4 Know about tablet devices.</p> <p>1.1.5 Be able to describe the purpose and use of other digital devices such as:</p> <ul style="list-style-type: none"> • cameras and camcorders • games consoles • home entertainment systems • media players. <p>1.1.6 Know about navigation aids and how they are used.</p> <p>1.1.7 Understand the terms 'multifunctional' (e.g. mobile phones that include a camera, have limited game playing functionality and GPS) and 'convergence' (e.g. functionality of smartphones and tablet devices becomes more similar) in the context of digital devices.</p>
<p>1.2 Features of digital devices</p>	<p>1.2.1 Understand features of digital devices: portability, performance, storage, user interface, connectivity, media support, energy consumption, expansion capability, security features.</p> <p>1.2.2 Be able to discuss the features of identified digital devices.</p>

1 Digital Devices	Students should:
<p>1.3 Software</p> <p>Students need to know the types of software used in digital devices. They need to be able to identify the differences between system software and application software. They need to know the types of software applications that are available.</p>	<p>1.3.1 Be able to identify the purpose of systems software and applications software.</p> <p>1.3.2 Know about operating systems and system software tools such as utilities.</p> <p>1.3.3 Know about the role/function of the operating system, including basic knowledge of:</p> <ul style="list-style-type: none"> • single user and network • memory management • resource management • security • print spooling. <p>1.3.4 Know about software applications (apps), including office-productivity tools, web authoring, image and sound editing, presentation software, control software, project management software.</p> <p>1.3.5 Know about software licensing types (free/open source and proprietary software).</p> <p>1.3.6 Understand that the purpose of communication software is to provide remote access to systems and to exchange files and messages in text, images, audio and/or video formats between different computers or users.</p> <p>1.3.7 Know why software is updated, how it is done and possible risks to data/systems.</p>
<p>1.4 Types of peripheral devices – input and output</p>	<p>1.4.1 Know about types of output peripheral such as monitor (screen size, resolution), printer (laser, inkjet, 3D), plotter, data projector, speaker, control device and when they would be used.</p> <p>1.4.2 Know about types of input peripheral such as keyboard, mouse, tracker ball, joystick, graphics tablet, scanner, digital camera, webcam, microphone, touch screen, OMR reader, OCR reader, bar code scanner, biometric scanner, magnetic stripe reader, chip and pin, sensor and when they would be used.</p>

1	Digital Devices	Students should:
1.5	Types of peripheral devices – storage	<p>1.5.1 Be able to differentiate between storage devices and the media used to store data.</p> <p>1.5.2 Know the characteristics of hard disk drives (HDD), solid state drives (SSD), optical disk drives, flash memory drives.</p> <p>1.5.3 Know that storage devices can be internal or external.</p> <p>1.5.4 Know about types of storage media such as hard disks, optical disks (CD, DVD, Blu-ray), flash memory devices, magnetic tape</p> <p>1.5.5 Know that storage media can be recordable / write once (R) and rewritable (R/W)</p> <p>1.5.6 Understand the terms describing the capacity of storage such as bit, byte and multiples of these (kbytes, mbytes, gbytes, tbytes) (using 1Kb = 1000 bytes).</p>
1.6	Memory	<p>1.6.1 Know that RAM stands for Random Access Memory and that ROM stands for Read Only Memory.</p> <p>1.6.2 Be able to describe the characteristics of RAM and ROM, the differences between them and the impact on the user of the size of ROM/RAM.</p> <p>1.6.3 Be able to describe the characteristics and uses of flash memory.</p>
1.7	Processors	<p>1.7.1 Understand the function of the processing unit (CPU).</p> <p>1.7.2 Know how the speed of a processor is measured.</p>
1.8	ICT systems to meet specified needs	<p>1.8.1 Be able to identify digital devices and associated peripheral devices that meets particular needs, including accessibility.</p> <p>1.8.2 Be able to identify appropriate software that meets specified needs.</p> <p>1.8.3 Understand that settings of ICT systems can be configured to meet the accessibility needs of individuals.</p> <p>1.8.4 Be able to justify choices made in identifying and configuring hardware and software.</p>

Topic 2: Connectivity

Students need to know and understand the ways in which digital devices exchange data and communicate with each other and with the larger systems supporting online organisations. They should also be aware of the increasing importance of 'access everywhere' developments.

Students' understanding is not expected to be based on the details of the technology but should focus on the selection of the most appropriate digital communications for a particular context and the impact of this on the quality of connection.

2	Connectivity	Students should:
2.1	Types of digital communications	<p>2.1.1 Know the range of ways that digital devices communicate: satellite, broadcast (TV, radio), wired (cable), wireless.</p> <p>2.1.2 Know that digital devices can communicate device to device and by using networks: local area network (LAN), wide area network (WAN), personal area network (PAN), tethering.</p> <p>2.1.3 Know the types of wireless communication: Wi-Fi, Bluetooth, GPS, 3G, 4G, infra-red (IR), near-field communication (NFC).</p> <p>2.1.4 Know the differences between Wi-Fi and Bluetooth and when each is best used.</p>
2.2	Factors influencing the choice of digital communication in a network	<p>2.2.1 Understand factors influencing the speed and volume of data transfer.</p> <p>2.2.2 Understand the benefits and drawbacks of wired versus wireless communication in local networks.</p> <p>2.2.3 Understand the significance of bandwidth and latency, and their impact on the 'user experience'.</p> <p>2.2.4 Understand the features of broadband, mobile broadband and cellular networks.</p>

2	Connectivity	Students should:
2.3	Requirements for connecting to a network, including the internet	<p>2.3.1 Know about network operating systems and how devices are identified on a network: device name, internet protocol (IP) and machine address code (MAC).</p> <p>2.3.2 Understand the function of components of wired and wireless systems: cable, wireless access point, router, gateway, booster, server.</p> <p>2.3.3 Know the role of these for connecting to and using the internet:</p> <ul style="list-style-type: none"> • web browser • ISP • search engine • filter software.
2.4	Benefits of using a LAN/home network	<p>2.4.1 Know about peer-to-peer and client-server networks.</p> <p>2.4.2 Know about the role of servers in a client-server network.</p> <p>2.4.3 Understand the benefits of using local area network:</p> <ul style="list-style-type: none"> • shared peripherals • shared data • flexible access • media streaming • communication • shared access to the internet. <p>2.4.4 Understand the benefits of using a client-server network:</p> <ul style="list-style-type: none"> • control of user access rights • centralised administration • centralised backup • shared software • shared storage and file access • roaming profiles (hotdesk).
2.5	Securing data on a network, including the internet	<p>2.5.1 Know about and understand the use of log-ins and passwords, firewalls, WEP/WPA, encryption, VPN, file access rights, transaction logs and backups.</p> <p>2.5.2 Be able to select suitable methods of securing data for a particular context.</p>

Topic 3: Operating Online

Students need to understand the risks to individuals and organisations of operating online. They also need to understand the way in which risks can be managed by both the individual and organisations. They need to be aware of the impact on individuals, organisations and society of the use of digital devices.

3 Operating Online	Students should:
3.1 Potential risks to data and personal information when information is transmitted and stored digitally	<p>3.1.1 Be aware of risk to data and information:</p> <ul style="list-style-type: none"> • unauthorised access • deliberate damage by malware • accidental deletion • theft of personal data: phishing, pharming. <p>3.1.2 Know about methods available to secure data and personal information online:</p> <ul style="list-style-type: none"> • firewalls • encryption • passwords, PIN, biometrics, CAPTCHA tests, security questions • anti-malware, anti-virus, anti-adware, anti-spyware • access rights, file permissions • secure websites • not opening email attachments or following web links • backup procedures. <p>3.1.3 Know about online payment systems – Third party payment systems: Paypal, bank cards, contactless cards using NFC – and how payments are protected: VeriSign, HTTPS</p>

3	Operating Online	Students should:
3.2	Impact of the internet on individuals	<p>3.2.1 Know about the impact on employment, such as new job opportunities as the nature of a job changes, new skills requirements, potential job loss.</p> <p>3.2.2 The impact on working practices, including collaborative working and flexible or mobile working.</p> <p>3.2.3 Better access to information and services, new ways of learning, wider range of entertainment and leisure opportunities.</p> <p>3.2.4 Know about social impacts such as:</p> <ul style="list-style-type: none"> • reduced social interaction • increases in cyberbullying • reduced physical activity. <p>3.2.5 Understand how to stay safe online.</p>
3.3	Online working from home	<p>3.3.1 Understand how the availability of digital devices and the internet enables individuals to work from home.</p> <p>3.3.2 Know the benefits and drawbacks of working from home for individuals and organisations.</p>
3.4	Impact of the internet on organisations	<p>3.4.1 Understand positive impacts: improved communication, access to global markets and workforce, changes in the way information is managed and used.</p> <p>3.4.2 Understand negative impacts: security issues, risk of hacking, greater competition</p>
3.5	Impact of the internet on society	<p>3.5.1 Understand the impact on society of the ability of individuals to have less-restricted access to networks at any time.</p> <p>3.5.2 Know about the gap between information rich and information poor.</p> <p>3.5.3 Understand the causes and implications of unequal access to ICT (locally, globally).</p> <p>3.5.4 Know about the impact on individuals and communities of limited or no access to digital technologies.</p> <p>3.5.5 Understand the impact of changes in ways of socialising.</p>

3	Operating Online	Students should:
3.6	Types of online communities	<p>3.6.1 Understand key features of online communities:</p> <ul style="list-style-type: none"> • social networking • online gaming • online work spaces • virtual learning environments (VLE) • user-generated reference sites: wikis, websites, forums • user-generated content: video sharing sites, blogs, websites • social bookmarking.
3.7	Use of online communities	<p>3.7.1 Know the functions and target audience of different forms of online communities.</p> <p>3.7.2 Understand the ways in which online communities are used to communicate and collaborate on a global scale.</p> <p>3.7.3 Be aware of the purpose of responsible use and acceptable behaviour policies.</p> <p>3.7.4 Understand how to stay safe online: cyber bullying, anonymity of others (misrepresentation), disclosure of personal information/location.</p>
3.8	Implications of the use of digital technologies	<p>3.8.1 Know about data protection, the legal requirements of those storing data about individuals and an individual's legal rights.</p> <p>3.8.2 Understand how copyright legislation affects the use of digital information and media.</p> <p>3.8.3 Understand that individuals' movements and communications can be monitored.</p> <p>3.8.4 Be aware of safe and responsible practice when using ICT.</p> <p>3.8.5 Understand sustainability issues and ways of mitigating the environmental impact of digital devices.</p> <p>3.8.6 Understand the health and safety issues that arise from individuals' use of ICT and know how they can be minimised.</p>

3	Operating Online	Students should:
3.9	Availability of information online and the use of online information	<p>3.9.1 Understand that information can be gathered from a wide range of sources.</p> <p>3.9.2 Be able to select and use appropriate sources of information.</p> <p>3.9.3 Know how to use search engines effectively.</p> <p>3.9.4 Be able to evaluate the fitness for purpose of available information in terms of accuracy, age, relevance, reliability, bias.</p> <p>3.9.5 Understand issues related to copyright: permission to use, acknowledgement of source.</p> <p>3.9.6 Understand issues related to plagiarism: copy and paste, rewriting, paraphrasing.</p>

Topic 4: Online Goods and Services

In addition to understanding how standalone and local area networks are used students need to know about the increasing use of the online systems using dedicated links and the internet.

4 Online Goods and Services	Students should:
4.1 Types of services	<p>4.1.1 Understand what online services are offered by:</p> <ul style="list-style-type: none"> shopping sites – basket, checkout, secure payment, product catalogue booking systems for travel, leisure and entertainment banks education and training providers – VLE, online support, online training courses, remote access gaming sites news and other information providers auction sites entertainment providers – on demand, streaming, downloads.
4.2 Impact of online services	<p>4.2.1 Understand the impact on an individual's lifestyle and behaviour of the availability of goods and services online.</p> <p>4.2.2 Understand the impact of the internet on the ways that organisations do business.</p> <p>4.2.3 Understand how transactional data is collected and used: what is collected, cookies, transaction tracking.</p> <p>4.2.4 Know about targeted marketing and personalisation techniques.</p> <p>4.2.5 Understand the features and characteristics of online services and local services.</p>
4.3 Online software	<p>4.3.1 Understand the impact of cloud-based services: hosted applications, storage.</p> <p>4.3.2 Understand the features and characteristics of hosted applications software and locally installed software.</p> <p>4.3.3 Understand the features and characteristics of online data storage and local storage.</p>

Topic 5: Applying Information and Communication Technology

Students need to be able to use a range of software applications effectively and appropriately.

5 Applying ICT	Students should:
5.1 Software applications	5.1.1 Use the following software effectively: <ul style="list-style-type: none"> • word processing • database management • spreadsheet • web authoring • presentation (multimedia) • graphics. 5.1.2 Select appropriate software applications to meet needs.
5.2 Data and information	5.2.1 Understand the difference between data and information 5.2.2 Use: <ul style="list-style-type: none"> • text • numbers • images • animation. 5.2.3 Enter, organise, develop, refine and format information, applying editing techniques to meet needs. 5.2.4 Bring together and organise different types of information to achieve a purpose.
5.3 Using software applications	5.3.1 Produce information that is fit for purpose and audience, using accepted layouts and house styles. 5.3.2 Use styles appropriately, including serif and sans serif fonts, colour choice. 5.3.3 Work accurately and proofread, using software facilities where appropriate for the task.

5	Applying ICT	Students should:
5.4	Reviewing outcomes	<p>5.4.1 Review the outcomes of the use of software applications by comparing the digital product with the original requirements.</p> <p>5.4.2 Identify strengths and weaknesses in a digital product and suggest possible improvements.</p> <p>5.4.3 Make modifications to improve the outcomes.</p> <p>5.4.4 Evaluate the selection, use and effectiveness of ICT tools and facilities used.</p>

Topic 6: Software Skills

Students need to demonstrate skills in using the software applications identified in 5.1.1.

6 Software Skills	Students should be able to:
6.1 Word processing	<p>6.1.1 Enter or edit text that is appropriate for a given context using accurate spelling, punctuation and grammar.</p> <p>6.1.2 Enter, edit and format text using: bullets, numbering, sub-numbering, alignment, tabs, line spacing, colour, font size and style, text wrap, text boxes.</p> <p>6.1.3 Use columns and/or tables: horizontal and vertical text alignment, merge and split cells, gridlines, borders, shading.</p> <p>6.1.4 Use page layout: headings, sub-headings, lists, templates, header, footer, portrait, landscape, page breaks, page numbering.</p> <p>6.1.5 Integrate in a single document: charts, tables, images, callouts/autoshapes, text from different files, text boxes, grouping, layering (in front of/behind), values from spreadsheet).</p> <p>6.1.6 Produce documents in these document types: letter, report, newsletter, poster, leaflet, information sheet (fact sheet), memo.</p> <p>6.1.7 Use standard conventions: salutation, complimentary close, date, subject, logo.</p> <p>6.1.8 Use mail merge: mail merge from word processed, spreadsheet and database documents.</p>

6	Software Skills	Students should be able to:
6.2	Database management	<p>6.2.1 Identify data types: alphanumeric/text, numeric/number, date, currency, logical/Boolean.</p> <p>6.2.2 Explain the structure of a given database, including: record, field, table, primary key/field, foreign key/field, relationships between tables.</p> <p>6.2.3 Explain the need for validation and identify validation checks such as range check, presence check, type check, length check.</p> <p>6.2.4 Sort using a single field, multiple fields, ascending/descending order.</p> <p>6.2.5 Input information to given tables or forms applying format consistently.</p> <p>6.2.6 Use search/query using single criterion, multiple criteria, search within results, relational operators, logical operators.</p> <p>6.2.7 Produce outputs: reports, mail merge documents, specified fields, design view (table structure, searches/queries, forms, relationships), data view (table, search/query results, forms).</p>

6 Software Skills	Students should be able to:
6.3 Spreadsheet	<p>6.3.1 Know data types, number, text.</p> <p>6.3.2 Format a worksheet: currency, percentage, decimal places, date, time, text wrap, row height, column width, gridlines, merge/split cells, cell borders, cell shading, hiding rows and columns.</p> <p>6.3.3 Use formulae: arithmetic operators (plus, minus, multiply, divide), percentage, single operators, multiple operators, absolute and relative cell referencing, named cells/ranges. Replicate effectively.</p> <p>6.3.4 Use functions: SUM, AVERAGE, IF, VLOOKUP /LOOKUP, MAXIMUM, MINIMUM, COUNT (COUNTA, COUNTIF), LENGTH, PRODUCT.</p> <p>6.3.5 Use other features: multiple worksheets, linked tables, sorting, filtering.</p> <p>6.3.6 Add graphs and charts: pie chart, line chart, bar/column chart, scattergram.</p> <p>6.3.7 Select an appropriate graph/chart and format it effectively adding title, axis labels, legends, axis, scale, trend line as appropriate.</p> <p>6.3.8 Print selected columns/rows from a worksheet formula view or data view in landscape or portrait format, adding headers and footers, row and column headers.</p>
6.4 Web authoring	<p>6.4.1 Use a template: tables/frames, standard page features, banners, menu/navigation.</p> <p>6.4.2 Insert text, images, buttons, animation.</p> <p>6.4.3 Format a web page: headings, subheadings, body text, alignment.</p> <p>6.4.4 Use HTML code: insert hyperlinks, insert images, font enhancements.</p>

6	Software Skills	Students should be able to:
6.5	Presentation	<p>6.5.1 Create a template/master slide: placeholders, footer, slide number, background, font enhancements (bold, italic, underline).</p> <p>6.5.2 Create slides: insert text, images, action buttons, hyperlinks; add animation, transition effects.</p> <p>6.5.3 Print: handouts (two to a page, three to a page), notes pages, full page, headers and footers.</p>
6.6	Graphics	<p>6.6.1 Explain features of image types: bitmap, vector.</p> <p>6.6.2 Create images: combining basic shapes and text, rectangles (including square), circles (including ovals), lines, triangles, arrows, text boxes.</p> <p>6.6.3 Edit images: image editing, cropping, adding captions/text, editing/deletion of unwanted aspects.</p>
6.7	File management	<p>6.7.1 Save work regularly and keep information secure.</p> <p>6.7.2 Use sensible filenames and formats.</p> <p>6.7.3 Create and manage files and folder structures.</p>