

NASCA

ICT: Curriculum Statement



higher education
& training

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Design and Layout by: Mzellers Media. www.mzellers.com

ISBN: 978-1-77018-793-1

INFORMATION AND COMMUNICATION TECHNOLOGY

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Section 1: Subject Introduction

Background

The Information and Communication Technology (ICT) subject is an additional subject of choice, with a 30-credit weighting; and that the external examination for the ICT subject will be set and administered by DHET or by an accredited private assessment body and certified by Umalusi and that only the external examination mark will be considered for certification.

Overview

The subject ICT is the study of the various interrelated physical and non-physical technologies used for the capturing of data, the processing of data into useful information and the management, presentation and dissemination thereof. It also include the activities that deal with the solution of problems through logical and computational thinking. It incorporates the study of the integrated components of a computer system (hardware and software) and the practical techniques for their efficient use and application to solve everyday problems. The solutions to problems are designed, managed and processed *via* end-user applications, software development tools (including visual programming tools) and communicated using appropriate Information and Communication Technologies (ICTs). ICTs are the combination of networks, hardware and software, as well as the means of communication, collaboration and engagement that enable the processing, management and exchange of data, information and knowledge.

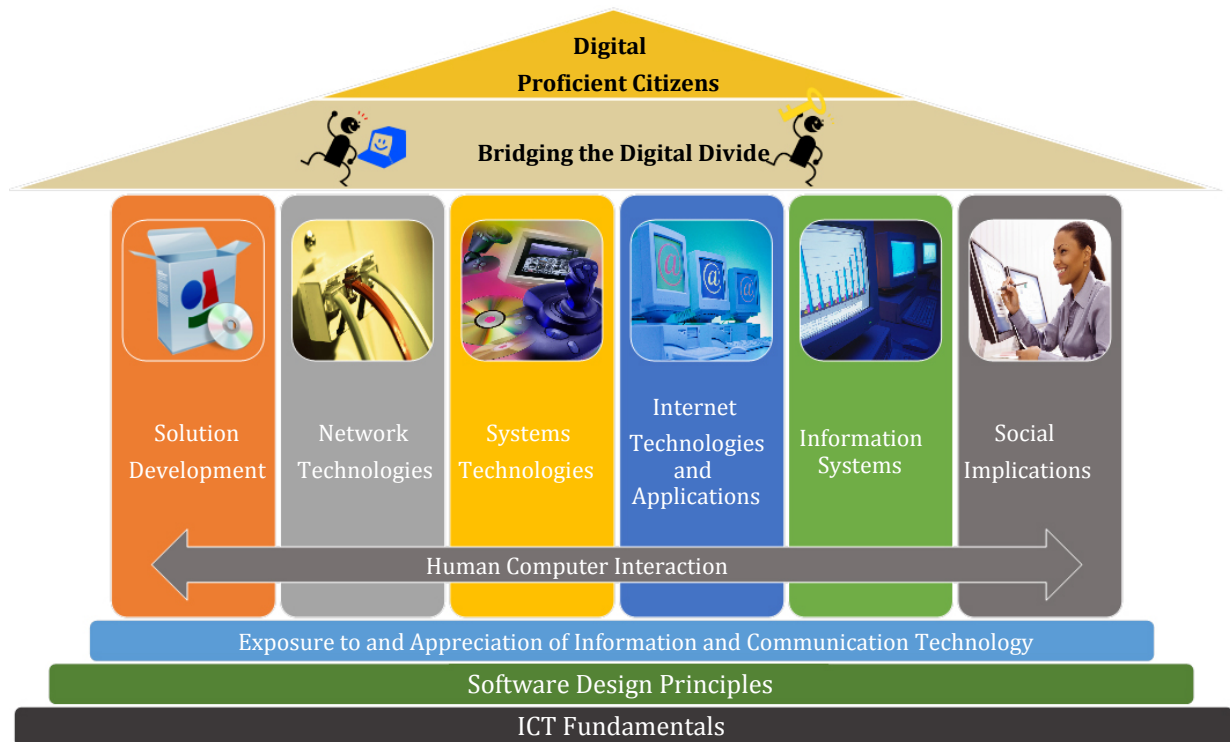


Figure 1: Main topic areas for the ICT subject.

The Figure 1 illustrates how the main topic areas of the ICT subject support the learning process of digitally enabled students, based on the staged approach as presented in Figure 1.

Figure 1 also highlights the predominant broad outcomes of the subject which are rooted in a comprehension and appreciation of ICT fundamentals, and Software Design Principles. These principles inform the fundamental topic pillars.

The subject ICT comprises content and skills derived from domains, such as Digital Literacy and fluency, Computer Science and Information Technology.

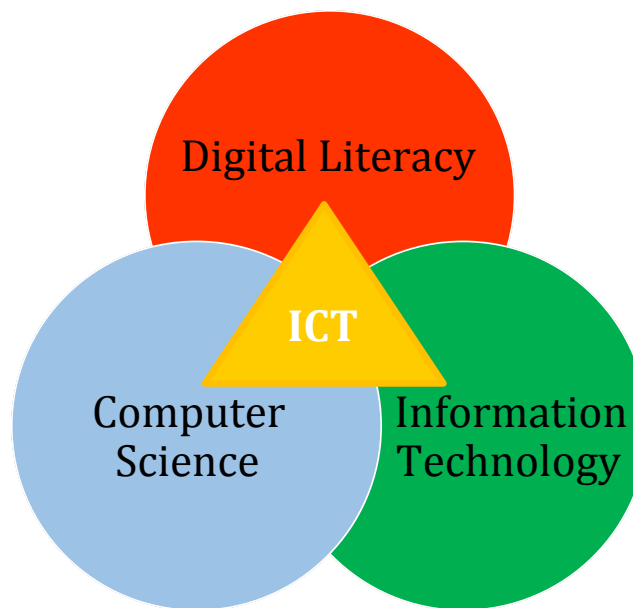


Figure 2: Position of ICT as a subject.

The subject content includes knowledge (described as theoretical and/or factual knowledge) and skills described as:

- 1) Cognitive:** involving the use of logical, intuitive, creative and computational thinking;
- 2) Practical:** involving the use of steps, procedures, principles, techniques, strategies and tools.

Figure 3 presents the cognitive complexities involved, which refer to the technological skills as the basis, communication and information management as higher skills and programming skills as the highest level.



Figure 3: Cognitive Complexity

Aims

In the subject ICT a student will:

- Use end-user software applications proficiently to produce solutions to problems within a defined scenario;
- Understand the concepts of ICTs with regard to the technologies that make up a computing system;
- Understand the various technologies, standards and protocols involved in the electronic transmission of data *via* a computer-based network;
- Use the internet and the *www* and understand the role that the internet plays as part of the global information super-highway;
- Find authentic and relevant information, process the information to draw conclusions, make decisions and communicate the findings in appropriate presentation media;
- Recognise the legal, ethical, environmental, social, security and health issues related to the use of ICTs and learn how to use ICTs responsibly;
- Use appropriate techniques and procedures to plan simple solutions and algorithms to solve problems using suitable techniques and tools;
- Design a computer-based solution incorporating basic programming principles and computational thinking constructs;
- Appreciate and comprehend the various systems technologies used in the developing of a computer-based system, and
- Understand that ICT encompasses various domains and careers and provides an appreciation for each of these.

Exit-Level Outcomes

The exit-level outcomes for the NASCA presented below provide an indication that candidates successfully completing the qualification. Figure 4 presents the ICT exit-level outcomes.

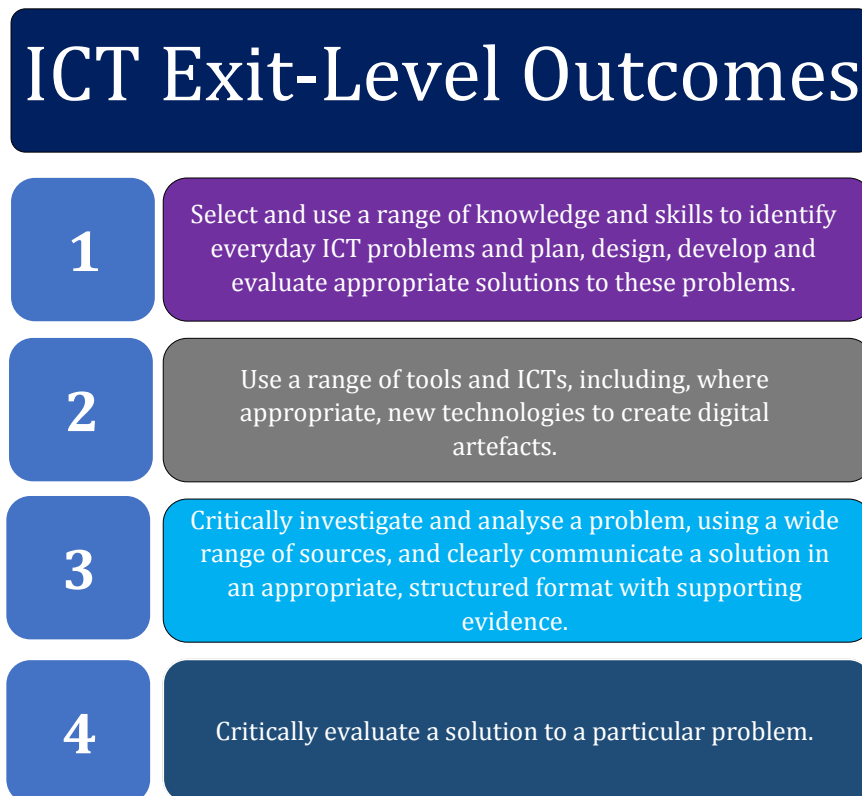


Figure 4: ICT Exit-level outcomes.

The capabilities expressed in the ICT exit-level outcomes for the qualification are presented and achieved as part of the content for the various NASCA subjects of which this subject forms a part.

Weighting of the Levels and Cognitive Demand

These exit-level outcomes are reflected in the following taxonomy.





Domain	Level 1	Level 2	Level 3	Level 4
	20%	30%	25%	25%
	Knowledge / Remember	Understand	Apply	Analyse / Evaluate / Create Problem-Solving
	Recall/retrieve obvious content knowledge	Explain concepts	Use concepts in familiar contexts	Examine, see relationships Test / Determine / Conclude Combine / Solve / Make Plan, Transfer
	Basic Routine Skills, Concepts & Procedures	Routine Cognitive & Practical Skills and Procedures	Multi-Step Procedures	Problem-Solving
	Remember principles / practical or programming	Convert from one format to another, explain steps/procedures	Combine concepts / isolatable bits	Develop/Create solution
 	Data Gathering	Information Processing	Building Understanding	Applying Understanding / Productive Thinking
	Determine what is known / have what is needed, find, collect	Determine relevance, sort, sift, group, calculate, compare	Query, interpret	Plan / strategise, devise, put together, report, conclude, recommend / give options

Table 1: Taxonomy and Weighting of outcomes.

Structure of Assessment

Examinations

Paper 1: One 4-Hour Practical Paper of 180 Marks (50% of the total marks for the subject)

This will be a practically-oriented paper covering questions on the Topic of: Solution Development.

To successfully complete this paper, each student must have access to his or her own computer in the examination room. Provision needs to be made for a sufficient number of computers to enable the examination to be completed in two sittings.

This paper assesses the practical skills pertaining to Solution Development. For the application packages studied, namely word processing, spreadsheets and databases as well as for creating simple programmes using programming code constructs. These skills will be assessed in an integrated manner, based on real-life scenarios. Problem-solving and aspects of file management will form part of the application questions in this paper.

The paper will be comprised of questions based on a scenario and will cover the following content areas in an integrated manner:

- Word processing;
- Spreadsheets;
- Databases;
- Programming and algorithms;
- HTML web page design and development;
- General (the integration and application of techniques, knowledge and procedural skills to new situations).

The student will not be required to enter large amounts of data. The required data is to be retrieved from a data disk or imported from documents such as a text file, word processing document, a database table or a spreadsheet.

Paper 2: One 3-Hour Written Paper of 150 Marks (50% of the total marks for the subject)

The paper will cover the theoretical aspects of all topics, including elements of Solution Development (*viz.* application packages and file management). A section will also assess the understanding of the technologies studied to make informed decisions in a real - life end - user scenario, ranging from choices of technology to responsible use. The paper should also include a number of design-based and problem-solving practical questions relating to applicable Topics and LO's.

Different types of questions are to be utilised in the paper including a Short Answer Section (+/- 20 marks), which includes a range of short questions covering the topics such as:

- Multiple choice;
- Modified true and false; and
- Matching columns.

The short question mark total could then be deducted from the suggested mark totals per topic as presented in the appendices.

Physical Subject Requirements

Due to the nature of the subject, students should have access to a computer which conforms to at least the minimum standard of the software requirements of the various packages used.

In the subject ICT, students are required to work individually on a computer during contact time (where applicable) and need access to the Internet.

Colleges and centres of instruction should have a business plan for the subject that addresses the following:

- Initial capital layout for setting up a computer laboratory. The layout should provide for the following:
 - Entrance-level computers (to ensure a lifespan of 3 – 4 years), networked;
 - One computer per student per period (during contact time);
 - Provision of a computer laboratory with a sufficient number of computers or configured to enable the practical examination to be completed;
 - Internet access (which is controlled during assessment);
 - One high-speed printer per network;
 - Data projector or demonstrating software;
 - Software (operating system, office suite, security software – antivirus, internet);
- Budget should be set up to cater for:
 - Annual running costs;
 - Software licensing (operating system, application software, security software);
 - Cartridges, paper, storage media;
 - Breakage and maintenance (regular service plan);
 - Insurance;
 - Internet connectivity;
 - Sustainability plan to upgrade or replace software and equipment every 3 – 4 years.

It is also highly recommended (although not compulsory) that students should (especially self-learners) have their own PC or laptop with the same software installed as recommend within the curriculum. Personal internet access is also strongly recommended.

Subject Content

Generic Subject Background

The subject Information and Communication Technology presents students with the required skills and acumen to achieve the relevant exit-level outcomes of the National Senior Certificate for Adults, as well as the critical cross-level outcomes, as specified in the SAQA 91672 qualification document.

ICT is frequently used as an umbrella term for various interrelated technologies and concepts, and includes terms which relate to the retrieval, processing and storage of data by electronic devices capable of such operations. Information and Communication technologies play an integral role in today's competitive knowledge-driven economy. The purpose of this subject is to introduce a student to the necessary skills and knowledge to become productive digital citizens, and to allow sufficient knowledge and skills to gain entry into institutions of higher learning.

The layout and approach followed as part of this curriculum is presented as a phased/staggered cognitive development approach, as depicted in the next figure.

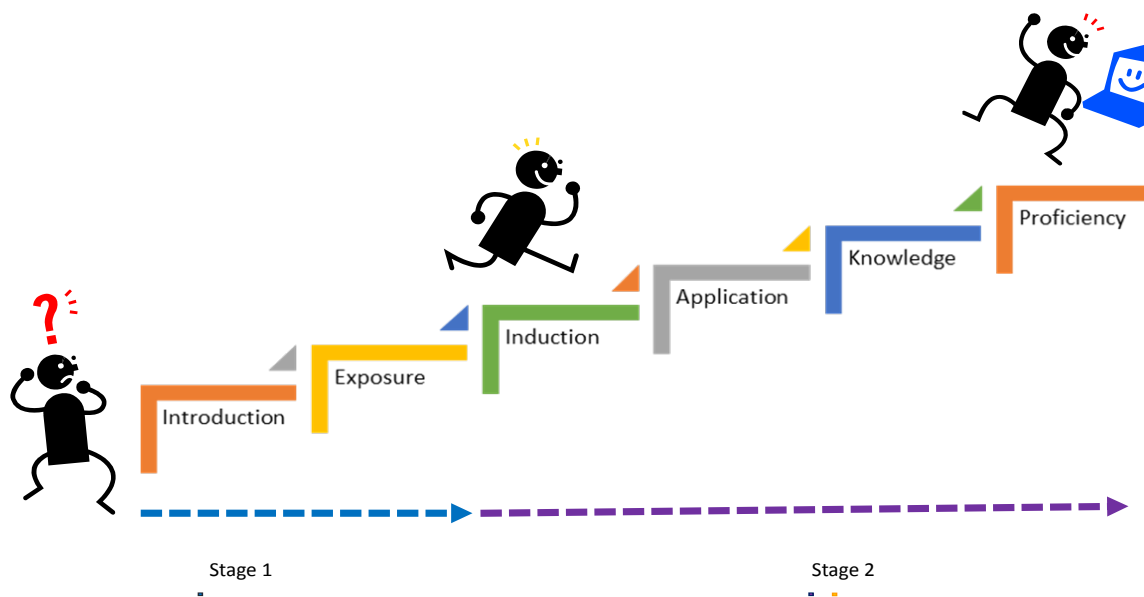


Figure 5: Staggered stage ICT learning approach.

Stage 1

This stage provides the platform to which students with no background relating to the use and implementation of ICT's are 1) introduced to the various concepts encapsulated within the ICT domain, and 2) exposed to theory and practical concepts.

Stage 2

This stage presents the student with basic ICT skills and knowledge to progress to become proficient ICT workers and digital citizens with sufficient understanding of the interrelated technologies and domains that encompassed the digital knowledge economy. This is achieved by presenting the student with an 1) induction into the various ICT domains through 2) the application of skills and various interrelated technologies which lead to 3) knowledge generation to become 4) proficient digital citizens.

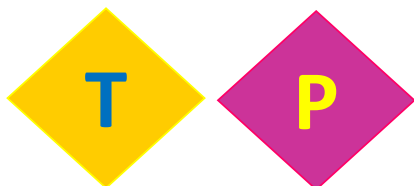
Each of the various subject outcomes of the different topics have been labelled with which icons indicate the content stage level as depicted below. It is suggested that students with limited or little background first master the Subject outcomes of the Stage 1 content before attempting the Stage 2 content.



Practical and Theoretical Subject Content

The subject presents topics and sub-topics of both a theoretical and practical nature. The learning outcomes are grouped in either assessment standards which lean towards being more practical (computer-based) in nature or more theoretical in nature.

The following icons indicate that the assessment standard and subsequent learning outcomes are either completely theoretical (T) in nature or practical (P) in nature.



Some predominantly theoretical content can have practical outcomes which may be theoretically assessed and vice versa. The following icons indicate that the assessment standard's subsequent learning outcomes are predominantly practical or theoretical in nature and a possibility exists for some assessment +/- 5% to 25% to be assessed the other way around.

Predominantly theoretical with some practical questions or predominantly practical with some theoretical questions.



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Subject Topics, Sub -Topics and Weighting

The table below sets out the topics and sub-topics in the ICT curriculum.

Main Topic Area	Sub-Topics	Sub-Topic Weighting	Weighting (Volume)	Resources
Systems Technologies	<ul style="list-style-type: none"> • Concepts of Computing • Hardware • Software • Computer Management 	10%		Computers Textbook Internet Access <ul style="list-style-type: none"> • Web Browser • Search Engine
Solution Development	• Word Processing	8%	55%	Office Suite <ul style="list-style-type: none"> • Word Processor • Spreadsheet • Presentations • Database • Introductory Programming Language
	• Spreadsheets	14%		
	• Databases	12%		
	• Presentation Software	3%		
	• Problem-Solving and Introduction to Computer Programming	18%		
Network Technologies	<ul style="list-style-type: none"> • Introduction to Networks and Communications • Use of Networks 		5%	Programming Environment (Scratch) Text-Based Editor for HTML Editing (Notepad++)
Internet Technologies	<ul style="list-style-type: none"> • Internet and World Wide Web • Internet Service Technologies 		7%	
Information Systems	• Data and Information Representation	6%	18%	Typing Tutor Security Software (Anti-virus/Internet Security)
	• Principles of Digital Logic and Systems	6%		
	• Principles of Information Systems and Software Engineering	3%		
	• Theory of Computer Programming and Programming Languages	3%		
Social Implications	<ul style="list-style-type: none"> • Impact on Society • Legal and Ethical and Security Issues • Health and Ergonomic Issues • Environmental Issues • Careers in ICT 		5%	

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Time Allocation (Study Hours)

120 Edits * 10 = 1200 Notional Hours / 4 = 300 Notional Hours per Subject:

- Contact Hours refer to class time and lecturing or practical demonstrations;
- Tutorial/Lab/Practice hours refer to tutorial classes and the time spent by the student to reinforce and master concepts. Tutorials are to be theoretical and practical in nature and should include exercises and step by step tutorials;
- Revision hours refer to the time spent to hone skills before the student attempts the sampler paper.

Note: The contact hours correlate with the weighting for each topic, but tutorial and practice hours present a suggested approximate weighted average for mastering more cognitive demanding topics. Both Tutorial / Lab Practice hours should be lecturer-driven where required.

Main Topic Area	Sub-Topics (Broad Content)	Weighting	Contact Hours	Tutorial/Lab /Practice Hours	Revision Hours
			Instructor - Led	Instructor-Led	
			120	150	30
Systems Technologies	<ul style="list-style-type: none"> • Concepts of Computing • Hardware • Software • Computer Management 	10%	12	5	2
Solution Development	• Word Processing	8%	10	14	3
	• Spreadsheets	14%	16	30	5
	• Databases	12%	16	16	4
	• Presentation Software	3%	4	4	1
	• Problem-Solving and an Introduction to Computer Programming	18%	24	24	6
Network Technologies	<ul style="list-style-type: none"> • Introduction to Networks and Communications • Use of networks 	5%	6	3	1
Internet Technologies	<ul style="list-style-type: none"> • Internet and World Wide Web • Internet Service Technologies • Principles of Web Page Development 	7%	8	8	1

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Information Systems	<ul style="list-style-type: none"> Data and Information Representation 	6%	7	13	2
	<ul style="list-style-type: none"> Principles of Digital Logic and Systems 	6%	7	12	2
	<ul style="list-style-type: none"> Principles of Information Systems and Software Engineering 	3%	4	3	1
	<ul style="list-style-type: none"> Theory of Computer Programming and Programming Languages 	3%	4	3	1
Social Implications	<ul style="list-style-type: none"> Impact on Society Legal and Ethical and Security Issues Health and Ergonomic Issues Environmental Issues Careers in ICT 	5%	6	3	1

Presentation and Approach Towards the Content of the Main Topic Areas

The following table presents some important considerations relating to the presentation and teaching approach to be followed in the construction and development of learning material, as well as assessments, exercises and tasks. Where necessary, more detailed sub-topic and learning outcome notes are presented as part of the outcomes in a subsequent section.

Main Topic Area	Notes and Suggestions
Systems Technologies	<p>Hardware and software should be introduced at a non-technical to low technical level, so that the student is enabled to:</p> <ul style="list-style-type: none"> Understand the concepts that make up a computer system; Demonstrate knowledge and an understanding of the functions and uses of the main hardware and software components of a computer system; Select the right software for a task; Troubleshoot at an elementary level or select the most appropriate hardware for a given scenario; Know whether to upgrade or buy new equipment; Be aware of new trends and developments and how to integrate these with existing or new equipment; Know how technology can benefit the user in specific contexts; and Understand the operations involved in the management and optimal utilisation of a computer system.

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	<p>Content in this focus area should be taught from a basis of familiar contexts to unfamiliar contexts (new trends and developments). This focus area lends itself meaningfully to integrate content from the Social Implications and Internet and Network Technologies focus and topic areas, and should be taught in this way.</p>
<p>Network Technologies Internet Technologies</p>	<p>Internet and Network technologies should be introduced at a non-technical to low technical level, so that the student is able to:</p> <ul style="list-style-type: none"> • Understand the role that the Internet and the WWW play as part of the global information super-highway and the contribution towards the digital age; • Introduce the software involved to render the Internet as a service; • Understand the concepts of the technologies and standards implemented to enable electronic communication; • Troubleshoot at an elementary level and find workable solutions for Internet problems; • Understand how technology can benefit specific scenarios; and • Be aware of new trends and developments.
<p>Social Implications</p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> • Provide an overview and understanding on how ICTs impact modern-day living; • Be aware of computer related threats; and • Use ICTs responsibly. <p>Much of the content of Social Implications should be dealt with and integrated with other topics. The time scheduled for this topic may therefore be added to that of other topics.</p>
<p>Information Systems</p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> • Provide an overview and understanding of how data is represented and transmitted as part of everyday communication; • Understand the concepts of digital logic and systems and present an appreciation toward the functioning of digital devices and decision-making; • Introduce and apply the principles of systems and software engineering in the development of simple software solutions to problems; • Design, plan, develop, test and maintain simple solutions; • Show an appreciation towards different tools and methodologies used as part of the development of systems.
	<p>The various techniques, tools and features of the respective application packages should be taught so as to develop a</p>

<p>Solution Development</p>	<p>computer-based solution, as an end-user, within different scenarios and using a variety of applications effectively and efficiently.</p> <p>Application packages share common features that are reinforced when working with the different applications.</p> <p>Through teaching and practising the mechanical/technical skills and functions of applications, for the student becomes familiar with the tool that he/she uses. The same paradigm is to be followed for computational thinking.</p> <p>It is important that students are also taught the underlying knowledge and understand the skills and the applications they are working with. The subject should be taught in such a way that students will be able to transfer skills and knowledge to new versions of the applications, as well as to other similar applications.</p> <p>The development of solutions utilising a programming language presents the student with the opportunity to develop a solution from a designer perspective, in contrast to that of being an end-user. Applications and scenarios involving programming (using the suggested tool) should also be interrelated with the domains and scenarios that have been solved using the various packages. Students should appreciate the various processes involved as part of the practice of computational thinking.</p>
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Solution Development - Software Packages (Integrated Teaching Approach Guidelines)

Getting acquainted and mastering the various software packages which form part of the solution development topic require a unique presentation and teaching approach.

Often concepts and learning outcomes are integrated and the same skill *e.g. saving and opening a document* or *changing the font* is similar across packages. These skills, once mastered, are easily applied in other packages as well.

Figure 6 highlights the notion that concepts can be taught as logical groupings. The student should be able to see and recognise the casual relationships between the functionality provided by the different tools. The student should also recognise that each document, whether a word processing or spreadsheet or presentation document, has certain common traits and possible levels of editing.

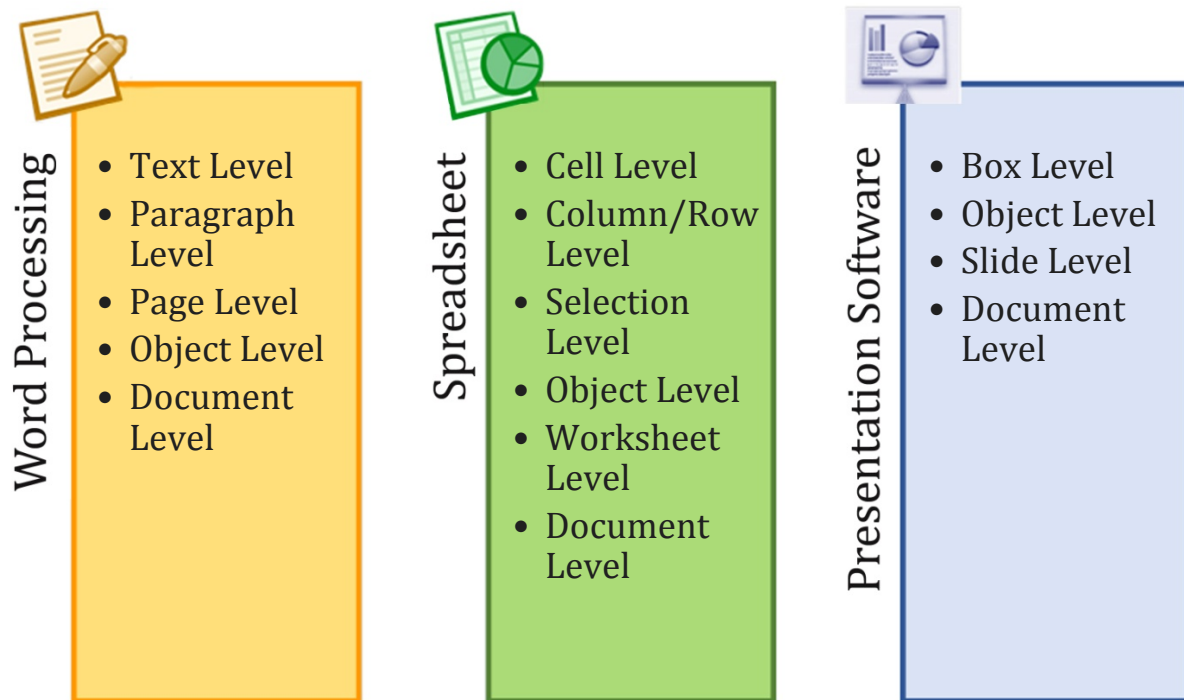








Figure 6: Common Levels of Editing



Each application has different levels of editing and some editing options on the same level exist between applications. E.g., within a word processing document, basic formatting and editing applies at text level, whereas for spreadsheets the same could be applied on cell level, and box level for presentation software. Object level refers to objects that can be created or inserted as part of a document e.g. clipart, diagrams, SmartArt, tables and textboxes, etc.





Detailed Topic Content and Curriculum

Topic 1 - Systems Technologies													
Sub-Topic	1.1 Concepts of Computing												
	<p>1.1.1 Introduction to the Concepts of ICTs, the Digital World and Digital Citizenship</p> <p>Content:</p> <ul style="list-style-type: none"> • Introduction to ICTs; • The digital world and digital citizenship. <p>Learning Outcomes: Candidates should be able to:</p>												
	<table border="1"> <tr> <td style="background-color: #0070C0; color: white; text-align: center; width: 40px; height: 40px;">1</td> <td>1.1.1.1 Define the term ICT;</td> </tr> <tr> <td></td> <td>1.1.1.2 Describe the term digital citizen;</td> </tr> <tr> <td></td> <td>1.1.1.3 Describe the various functions ICT provide for users to live in a digital world;</td> </tr> <tr> <td style="background-color: #FFD700; text-align: center; width: 40px; height: 40px;">T</td> <td>1.1.1.4 Describe the different services, technologies and tools available to digital citizens;</td> </tr> <tr> <td></td> <td>1.1.1.5 Discuss examples of typical computer usage from a user perspective (<i>Range: Home user, Small office user, power user, enterprise user</i>);</td> </tr> <tr> <td></td> <td>1.1.1.6 Discuss examples of computer usage and applications as part of society (<i>Range: Health Care, Manufacturing, Education, Finance, Agriculture, Travel and Government</i>).</td> </tr> </table>	1	1.1.1.1 Define the term ICT;		1.1.1.2 Describe the term digital citizen;		1.1.1.3 Describe the various functions ICT provide for users to live in a digital world;	T	1.1.1.4 Describe the different services, technologies and tools available to digital citizens;		1.1.1.5 Discuss examples of typical computer usage from a user perspective (<i>Range: Home user, Small office user, power user, enterprise user</i>);		1.1.1.6 Discuss examples of computer usage and applications as part of society (<i>Range: Health Care, Manufacturing, Education, Finance, Agriculture, Travel and Government</i>).
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	<p>1.1.2 Explain What a Personal Computer is and How it is Used</p> <p>Content:</p> <ul style="list-style-type: none"> • Personal computers (PCs); • Model of a PC; • Overview of the information processing cycle. <p>Learning Outcomes: Candidates should be able to:</p>												
	<table border="1"> <tr> <td style="background-color: #0070C0; color: white; text-align: center; width: 40px; height: 40px;">1</td> <td>1.1.2.1 Describe the basic components of a computer and their purpose;</td> </tr> <tr> <td style="background-color: #FFD700; text-align: center; width: 40px; height: 40px;">T</td> <td>1.1.2.2 Describe a general model of a computer in relation to the information processing cycle: input, processing, output, storage, as well as communication.</td> </tr> </table>	1	1.1.2.1 Describe the basic components of a computer and their purpose;	T	1.1.2.2 Describe a general model of a computer in relation to the information processing cycle: input, processing, output, storage, as well as communication.								
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		<p>1.1.3 Describe Different Types of Computers</p> <p>Content:</p> <ul style="list-style-type: none"> • Computer classification; • Mobile computing; • Client server concepts. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.1.3.1 List and differentiate between the different types of computers (<i>Range: Dedicated vs. multi-purpose devices e.g. ATMs and electronic appliances, mobile computers and devices such as smart phones</i>);</p> <p>1.1.3.2 Describe multi-purpose computers in terms of processing power, range, storage, use and price;</p> <p>1.1.3.3 Differentiate between portable and non-portable computers (<i>Range: Super computers, mainframe computers, desktop computers, laptops, netbooks, tablets, smartphones and smart devices e.g. google glass, media players</i>);</p> <p>1.1.3.4 Explain the term client-server computing;</p> <p>1.1.3.5 List examples of the applications of client-server computing in the real world.</p>
		<p>1.1.4 Advantages and Disadvantages of the Use of ICTs</p> <p>Content:</p> <ul style="list-style-type: none"> • Advantages and disadvantages of ICT technologies; • Computers in the real world. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.1.4.1 Describe the advantages of using ICT technologies in everyday life;</p> <p>1.1.4.2 Describe the disadvantages of using ICT technologies in everyday life;</p> <p>1.1.4.3 Discuss the reasons for using computers (<i>Range: saving paper, time, labour, communication costs, efficiency, accuracy, reliability, effect on time and distance, global communication, including social networks and web tools such as blogs and wikis</i>).</p>
Sub-Topic	1.2 Hardware	
		<p>1.2.1 Hardware</p> <p>Content:</p> <ul style="list-style-type: none"> • Computer components;

		<ul style="list-style-type: none"> Hardware classifications. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.1.1 Describe the term: Hardware;</p> <p>1.2.1.2 Describe how hardware communicates (<i>Range: electrical signals (analogue vs binary) signals</i>);</p> <p>1.2.1.3 Classify different hardware components in relation to the evolution of technology (<i>Range: Processing hardware, storage hardware, input/output devices, and communication devices</i>);</p> <p>1.2.1.4 List different hardware components in relation to their uses: Input, Processing, Storage, Output and Transmission.</p>
		<p>1.2.2 Hardware Components of a Typical System</p> <p>Content:</p> <ul style="list-style-type: none"> Input, Processing, Storage and Output hardware; Systems unit and components; Communication ports. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.2.1 Define the term input hardware and provide some examples of each;</p> <p>1.2.2.2 Describe the purpose of input hardware;</p> <p>1.2.2.3 Describe the purpose of output hardware;</p> <p>1.2.2.4 Describe the purpose of processing hardware;</p> <p>1.2.2.5 Describe the purpose of storage hardware;</p> <p>1.2.2.6 Define the term processing hardware and provide some examples of each;</p> <p>1.2.2.7 Define the term output hardware and provide some examples of each;</p> <p>1.2.2.8 Describe the typical components of a systems unit;</p> <p>1.2.2.9 Discuss the concept: Modular design of a computer-based system;</p> <p>1.2.2.10 Describe the different types of ports available as part of a system e.g. ports on a desktop PC and laptop.</p>
		<p>1.2.3 Different Types of Hardware of a Common System</p> <p>Content:</p> <ul style="list-style-type: none"> System Unit; Motherboard; CPU;





		<ul style="list-style-type: none"> • Memory; • Input and Output hardware. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.3.1 Identify the components of the system unit;</p> <p>1.2.3.2 Explain the term CPU and its purpose;</p> <p>1.2.3.3 Describe the term CPU and explain the impact of using different types of CPUs;</p> <p>1.2.3.4 Describe different types of CPUs with regard to use, and power;</p> <p>1.2.3.5 Define the term computer memory;</p> <p>1.2.3.6 Discuss the primary purpose of memory;</p> <p>1.2.3.7 Differentiate between different types of memory and their purpose (<i>Range: RAM, ROM, CMOS, cache memory and flash memory</i>);</p> <p>1.2.3.8 Explain how data is stored in memory;</p> <p>1.2.3.9 Define the purpose of the motherboard and its components;</p> <p>1.2.3.10 Describe different types of input hardware with regard to their use and classification e.g. direct and indirect entry;</p> <p>1.2.3.11 Discuss how data is transferred between memory i.e. between primary and secondary memory and the CPU;</p> <p>1.2.3.12 Describe the Flow/transfer of data between components (<i>Range: USB – PnP, U3 and Point-to-point connections</i>);</p> <p>1.2.3.13 Describe the factors to consider when choosing an input device (<i>Range: Ergonomic considerations and Wireless vs cables</i>);</p> <p>1.2.3.14 Describe different types of output hardware;</p> <p>1.2.3.15 Describe the purpose and use of devices such as docking stations for mobile and laptop computers.</p>
		<p>1.2.4 Input Hardware Described in Terms of Use Classification and Mode of Operation</p> <p>Content:</p> <ul style="list-style-type: none"> • Input peripherals; • Data capturing. <p>Learning Outcomes: Candidates should be able to:</p>

		 	<p>1.2.4.1 Describe how data is captured and transformed into digital signals;</p> <p>1.2.4.2 Describe the purpose of the input process;</p> <p>1.2.4.3 List and describe examples of peripheral input devices and their uses, and differences in operation (<i>Range: Scanners and digital cameras, biometric input, input via PDAs, smart phones, tablet PCs, data collection devices, webcams, mobile scanners, microphones, barcode readers, RFID readers, terminals (POS), ATMs, touch screens and alternative input devices such as virtual keyboards, optical keyboards and interactive white boards</i>);</p> <p>1.2.4.4 Discuss the advantages and limitations of the use of different input devices (<i>Range: Digital cameras, web cams, scanners, monitors: uses, advantages and limitations, resolution and image quality and software to use with these, such as OCR</i>);</p> <p>1.2.4.5 Discuss the use and layout of a standard keyboard;</p> <p>1.2.4.6 Discuss the different types of ports and their use to obtain input;</p> <p>1.2.4.7 Discuss some input devices to aid and support physically disabled users.</p>
		<p>1.2.5 Output Hardware Described in Terms of Use Classification and Mode of Operation</p> <p>Content:</p> <ul style="list-style-type: none"> • Output peripherals; • Ports. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>1.2.5.1 Describe how digital signals are transformed from storage devices and the CPU to understandable output;</p> <p>1.2.5.2 Describe the purpose of the output process;</p> <p>1.2.5.3 Differentiate between hard copy and softcopy output and provide examples of each;</p> <p>1.2.5.4 List and describe examples of output devices and their use, and difference in operation (<i>Range: Monitors, LCD, LED, PLASMA, graphics cards, graphics processor, quality and size of monitors, data projectors, mobile printers, laser printers, ink-jet printers, plotters, impact vs non-impact printers, interactive white boards and sound output</i>);</p>





			<p>1.2.5.5 Discuss the different types of ports and their use to provide output;</p> <p>1.2.5.6 Discuss some output devices to aid and support physically disabled users;</p> <p>1.2.5.7 Motivate which printer or output device is best suited for a particular task, and why (<i>Range: Budget, speed, colour, cost per page, graphics capability, photo printing, paper type and size, system compatibility, future needs, wireless capability, mobility, fit for purpose, resolution, economical and environmental considerations</i>).</p>
		<p>1.2.6 CPU – Central Processing Unit</p> <p>Content:</p> <ul style="list-style-type: none"> • CPU and components, and operation; • Use of the CPU in different computers. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #800080; color: white; padding: 5px; margin-bottom: 10px;">2</div> <div style="background-color: #FFD700; color: blue; padding: 5px; margin-bottom: 10px;">T</div> </div>	<p>1.2.6.1 Describe the purpose of the CPU;</p> <p>1.2.6.2 Discuss the evolution of the CPU in relation to size and processing power;</p> <p>1.2.6.3 List examples of common types of CPUs and their manufacturers;</p> <p>1.2.6.4 Contrast different types of CPUs by capacity, main uses and processing power;</p> <p>1.2.6.5 Discuss how different types of CPUs are used in different types of devices, e.g. Super-Computers, servers, desktop computers, mobile computers and other devices such as smartphones, etc;</p> <p>1.2.6.6 Discuss the main components of the CPU and their purpose (<i>Range: Control Unit, Arithmetic Logic Unit and registers.</i>);</p> <p>1.2.6.7 Discuss the operations of the machine cycle;</p> <p>1.2.6.8 Discuss the purpose of the system clock;</p> <p>1.2.6.9 List different types of CPUs and compare available processors with regard to price and speed;</p> <p>1.2.6.10 Describe the purpose of processor cooling;</p> <p>1.2.6.11 Contrast different methods and techniques for processor cooling;</p> <p>1.2.6.12 Describe the concept and the benefits of parallel processing.</p>
		<p>1.2.7 Components of a Typical Motherboard</p>	





		<p>Content:</p> <ul style="list-style-type: none"> • Motherboard components; • Expansion buses. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.7.1 Identity the different major components of a motherboard;</p> <p>1.2.7.2 Describe the purpose of each of the components (<i>Range: BIOS chip, CPU, RAM, ROM, slots, cards and buses</i>);</p> <p>1.2.7.3 Discuss the purpose of the expansion bus.</p>
		<p>1.2.8 Computer Memory</p> <p>Content:</p> <ul style="list-style-type: none"> • Computer memory; • Electronic data storage. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.8.1 Define the term computer memory;</p> <p>1.2.8.2 Describe how data is stored electronically;</p> <p>1.2.8.3 Differentiate between various types of memory with regard to use, purpose and size (<i>Range: RAM, ROM, Cache, Flash Memory and CMOS</i>);</p> <p>1.2.8.4 Describe the purpose and role of cache memory and caching.</p>
		<p>1.2.9 Storage Hardware</p> <p>Content:</p> <ul style="list-style-type: none"> • Storage hardware; • Technologies for storage; • Use of storage hardware; • Capacity of storage. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>1.2.9.1 Describe the term storage hardware;</p> <p>1.2.9.2 Discuss the purpose of using storage hardware (<i>Range: Processing, portability and backup</i>);</p> <p>1.2.9.3 Discuss the concepts: Capacity, volatility, durability, backup, fit for purpose in relation to storage hardware;</p> <p>1.2.9.4 Describe how the size of a HDD or storage device is presented with regard to storage capacity;</p> <p>1.2.9.5 Differentiate between different types of storage hardware and the means of storing data (<i>Range:</i></p>



			<p><i>Electronic, magnetic and optical);</i></p> <p>1.2.9.6 Discuss the characteristics of a common hard disk;</p> <p>1.2.9.7 List examples of different types of hard disks and external storage devices and differentiate between their different uses and size;</p> <p>1.2.9.8 Discuss how data is stored and retrieved from a typical magnetic disk;</p> <p>1.2.9.9 Discuss how data is stored and retrieved from a typical optical disk;</p> <p>1.2.9.10 Discuss how data is stored and retrieved on a typical electronic media device, e.g. flash drive.</p>
		<p>1.2.10 Recommend a System for a Particular User</p> <p>Content:</p> <ul style="list-style-type: none"> • System components; • Analysis and evaluation and motivation of different components to build a system. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #6A329F; color: white; padding: 5px; margin-bottom: 10px;">2</div> <div style="background-color: #FFD700; color: blue; padding: 5px; margin-bottom: 10px;">T</div> </div>	<p>1.2.10.1 Describe the required system with regard to its intended use;</p> <p>1.2.10.2 Recommend typical hardware required to fulfil the particular purpose of the system e.g. Small office user, Personal use, etc;</p> <p>1.2.10.3 Motivate the selection of the components (<i>Range: Type of device (laptop, desktop, tablet) CPU, storage capacity, memory size, input and output peripherals, i.e. (making informed decisions regarding the basic components of a system unit e.g. buying a system that will be suitable for running particular software (system requirements) for the processor and RAM);</i></p> <p>1.2.10.4 Interpret specifications regarding CPU and RAM;</p> <p>1.2.10.5 Interpret specifications regarding printers, and input devices.</p>
Sub-Topic	1.3 Software		
		<p>1.3.1 Purpose of Software</p> <p>Content:</p> <ul style="list-style-type: none"> • Software as a component of a computerised system; • Categories of software. <p>Learning Outcomes: Candidates should be able to:</p>	

		 	<p>1.3.1.1 Describe the term software;</p> <p>1.3.1.2 Describe the purpose and function of software;</p> <p>1.3.1.3 Describe the basic concepts of software (<i>Range: Software as programmes. Identify software components. Concept of a graphical user interface (GUI). Identifying and using typical components of a GUI such as icons, toolbars, menu usage and navigation, radio buttons, checkboxes, dialogs, lists and combo boxes. Minimising, restoring, resizing, moving and closing windows. Basic accessories such as calculator, paint and snipping tool</i>);</p> <p>1.3.1.4 Contrast: System software vs application software;</p> <p>1.3.1.5 Differentiate between: Shareware, Freeware, Open Source Software and Proprietary software, Firmware;</p> <p>1.3.1.6 Discuss the process of how software is obtained and installed;</p> <p>1.3.1.7 Differentiate between online software and installed software;</p> <p>1.3.1.8 Discuss the following terms in relation to software (<i>Range: Compatibility issues, versions, patches and service packs, updating software</i>).</p>
		<p>1.3.2 Application Software</p> <p>Content:</p> <ul style="list-style-type: none"> • Application software; • Different types of applications and their use. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>1.3.2.1 Define the term application software;</p> <p>1.3.2.2 Discuss the purpose of application software;</p> <p>1.3.2.3 Define the concept of an App in relation to a mobile or standalone device;</p> <p>1.3.2.4 Discuss and differentiate between different types of application software and their purpose (<i>Range: Business Software – Office Suites / Productivity suites, database software, note taking software, Accounting and Payroll software, Graphical suites</i>) <i>Software for home or personal use: - Video editors, games, finance software, educational software and personal information management software</i>);</p> <p>1.3.2.5 Describe the concept of web and online applications;</p> <p>1.3.2.6 List examples of web applications and describe their</p>






			<p>use;</p> <p>1.3.2.7 Discuss the concept of a programming language as an example of an application software;</p> <p>1.3.2.8 List and differentiate between different types of programming languages (<i>Range: Compilers, Interpreters, and Scripting Languages</i>);</p> <p>1.3.2.9 Explain the concept of RAD and the use of Integrated Development Environments;</p> <p>1.3.2.10 Discuss examples of application software to aid physically disabled users.</p>
		<p>1.3.3 System Software</p> <p>Content:</p> <ul style="list-style-type: none"> • System software; • Operating system. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #6A329F; color: white; padding: 5px; margin-bottom: 20px;">2</div> <div style="background-color: #FFD700; padding: 5px; margin-bottom: 20px;">T</div> </div>	<p>1.3.3.1 Define the term system software;</p> <p>1.3.3.2 Discuss the purpose of system software;</p> <p>1.3.3.3 Define the term operating system;</p> <p>1.3.3.4 Discuss the purpose of an operating system;</p> <p>1.3.3.5 List and describe different types of operating systems and their benefits;</p> <p>1.3.3.6 Differentiate between free operating systems and proprietary OS's;</p> <p>1.3.3.7 Describe the main functions of an operating system (<i>Range: General role: Suite/group of related programmes which manage hardware and software. Specific role: Provides user Interface, I/O management, device management, task management and performance management</i>);</p> <p>1.3.3.8 Discuss the role of the operating system in terms of file, disk, memory, and storage and process management;</p> <p>1.3.3.9 Differentiate between stand-alone (single user), server type operating systems (multiple user) and embedded operating systems;</p> <p>1.3.3.10 Differentiate between different types of operating systems in terms of cost, size, hardware needed, and platform;</p> <p>1.3.3.11 List and describe different types of typical utility programmes which accompany an operating system;</p>




			<p>1.3.3.12 Discuss the function of each of the utility programmes;</p> <p>1.3.3.13 Discuss the various <i>processing techniques (managed by systems software) (Range: Multi-tasking, multi-threading and multi-processing)</i>;</p> <p>1.3.3.14 Discuss the purpose and use of device drivers.</p>
		<p>1.3.4 Operating System (OS)</p> <p>Content:</p> <ul style="list-style-type: none"> OS Components and Functions. <p>Learning Outcomes: Candidates should be able to:</p>	
		<p></p> <p></p>	<p>1.3.4.1 Discuss the OS in terms of its purpose and tasks e.g. Memory Management, Device management etc;</p> <p>1.3.4.2 Differentiate between the different OS components;</p> <p>1.3.4.3 Describe the common functionalities of an OS.</p>
Sub-Topic	1.4 Computer Management		
		<p>1.4.1 Starting up and Shutting Down an Operating System</p> <p>Content:</p> <ul style="list-style-type: none"> Start a computer system. <p>Learning Outcomes: Candidates should be able to:</p>	
		<p></p> <p></p>	<p>1.4.1.1 Describe the concept of starting and operating system;</p> <p>1.4.1.2 Start an operating system, and log on;</p> <p>1.4.1.3 Discuss the concept of users and user profiles;</p> <p>1.4.1.4 Describe the concept of logging of, placing a computer in sleep mode;</p> <p>1.4.1.5 Describe the concept of restarting a computer using an appropriate routine;</p> <p>1.4.1.6 Log-off or shut down or restart a computer.</p>
		<p>1.4.2 Explore and use the Operating System (OS)</p> <p>Content:</p> <ul style="list-style-type: none"> Operating System use and functions. <p>Learning Outcomes: Candidates should be able to:</p>	
		<p></p>	<p>1.4.2.1 Identify and name components of the OS desktop;</p> <p>1.4.2.2 Outline the purpose of the desktop and the task bar;</p> <p>1.4.2.3 Use the start button on the taskbar to gain access to</p>





			<p>other functions of Windows;</p> <p>1.4.2.4 Identify common icons and present discuss their meaning such as: file icons, folder icons, drive icons, peripheral device icons, shortcuts, recycle bin, applications;</p> <p>1.4.2.5 Open different windows;</p> <p>1.4.2.6 Use two programmes simultaneously in Windows and switch between the two;</p> <p>1.4.2.7 Identify the content of disks and folders in the content panel of Windows Explorer;</p> <p>1.4.2.8 Identify the file types correctly according to their extensions;</p> <p>1.4.2.9 Create folders;</p> <p>1.4.2.10 Use the Help function to solve problems.</p>
		<p>1.4.3 Exploring the File Management Operations of the Operating System</p> <p>Content:</p> <ul style="list-style-type: none"> • File management concepts; • Using the OS. <p>Learning Outcomes: Candidates should be able to:</p>	
		  And 	<p>1.4.3.1 Discuss the concept and purpose of File organisation;</p> <p>1.4.3.2 Discuss the concept of naming files and folders as well as naming conventions (<i>Range: Meaning, Location, Purpose and Aid searches etc</i>);</p> <p>1.4.3.3 Describe different types of files (<i>Range: File extensions (association)-common/generic extensions such as archived/compressed, forms of text files, web pages applications like word processor, spreadsheet, database and presentations graphics, movie, sound, animation, and Adobe Acrobat</i>);</p> <p>1.4.3.4 Discuss concepts such as: Drive, path, filename and file extension;</p> <p>1.4.3.5 Discuss and explain the concepts of: File naming, conventions and properties – types and size;</p> <p>1.4.3.6 Interpret the representation of a list files in the windows explorer;</p> <p>1.4.3.7 Differentiate between the terms: copy, rename, delete, restore, move, view and sort files and folders;</p> <p>1.4.3.8 Perform basic file organisation operations (<i>Range: Open</i></p>





			<p><i>a file, folder or a drive, Select individual files and folders or collections of files and folders, Sort files according to specific criteria, Create a folder or a file, Move a folder or a file, Copy a folder or a file, Rename a folder or a file and Restore a folder or a file);</i></p> <p>1.4.3.9 Discuss the concept of compressing a folder or file;</p> <p>1.4.3.10 List examples file compression utilities and their associated file extensions;</p> <p>1.4.3.11 Explain the difference between a compressed folder or file and that of a non-compressed folder or file;</p> <p>1.4.3.12 Display a file, or folder properties and interpret the information provided (<i>Range: Size, location, name and number of files);</i></p> <p>1.4.3.13 Discuss the concept of a hidden file;</p> <p>1.4.3.14 Discuss the concept of a system file;</p> <p>1.4.3.15 Change the list/view options of a folder;</p> <p>1.4.3.16 Search a file using the Operating System search utility implementing wildcards and specifying criteria such as date modified, size etc.</p>
		<p>1.4.4 File Storage Concepts</p> <p>Content:</p> <ul style="list-style-type: none"> • File storage; • File organisation; • Storage options. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>	
		 	<p>1.4.4.1 Describe the concept of file and folder and storage medium size, storage capacity with regard to file size measurements (<i>Range: Bit, Byte, Kilobyte, Megabyte, Terabyte and Petabyte);</i></p> <p>1.4.4.2 Discuss the concept of available storage and used storage;</p> <p>1.4.4.3 Describe how files are stored and accessed on a storage medium (<i>Range: Magnetic (tape and disk) Optical and Digital);</i></p> <p>1.4.4.4 Explain how files are stored on a RAID (Redundant Array of Inexpensive Disks) system;</p> <p>1.4.4.5 Introduction to file organisation, discuss concepts such as drives, folders and files;</p> <p>1.4.4.6 Describe the concept and process of using File</p>




			<p>Allocation tables and indexed file locations;</p> <p>1.4.4.7 Define the term Cloud storage;</p> <p>1.4.4.8 Describe the use of the Cloud as a storage option;</p> <p>1.4.4.9 List examples of Cloud services providing storage functionality;</p> <p>1.4.4.10 List and describe common operations provided by Cloud services to manage stored data.</p>
		<p>1.4.5 Explore the Maintenance Utilities of the Operating System</p> <p>Content:</p> <ul style="list-style-type: none"> • Systems Maintenance operations. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #6A329F; color: white; padding: 5px; margin-bottom: 10px;">2</div> <div style="background-color: #FFD700; padding: 5px; margin-bottom: 10px;">T_P</div> </div> <p>1.4.5.1 Describe the concepts relating to the maintenance and management tasks of the operating system. <i>(Range: Management of desktop, Management of files and folders, General housekeeping tasks: Defragmentation, Scheduling/updating, Archive, backup, Compress/decompress files. Security features - firewall, anti-virus, control of spyware, adware);</i></p> <p>1.4.5.2 Describe the concept and purpose of Installing/uninstalling software (custom and full installation, product keys, activation codes);</p> <p>1.4.5.3 Perform the operations relating the maintenance and management tasks of the operating system: General housekeeping tasks: Defragmentation, Scheduling / updating, Archive, backup, Compress/decompress files. Security features – activate and deactivate a firewall, anti-virus;</p> <p>1.4.5.4 Uninstall and install software packages.</p>	
		<p>1.4.6 Generalise Computer Management Issues Regarding Safeguarding Against Threats</p> <p>Content:</p> <ul style="list-style-type: none"> • Threats to a computer system; • Safeguards and measures; • Viruses. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #6A329F; color: white; padding: 5px; margin-bottom: 10px;">2</div> </div> <p>1.4.6.1 Describe the concepts safety and security messages to safeguard a system;</p> <p>1.4.6.2 Discuss the concepts: Human error (GIGO, accidents);</p>	





			<p>1.4.6.3 Describe different threats to a computer system with regard to: Physical access, Theft, Hardware failures, Power failure and acts of God;</p> <p>1.4.6.4 Discuss the risks associated to computers as part of a network;</p> <p>1.4.6.5 Define the term computer virus;</p> <p>1.4.6.6 Differentiate between different types of viruses and threats (<i>Range: Malware, Spyware, Virus, worm, Trojan, rootkit, spoofing, phishing</i>);</p> <p>1.4.6.7 Describe various remedies and precaution measures against threats (<i>Range: Backup, UPS, passwords, rights, firewalls, anti-virus, validation, user authentication, upgrading and maintenance of anti-virus software and the operating system</i>).</p>
Topic 2 - Solution Development			
Sub-Topic	2.1 Word Processing		
		<p>2.1.1 Purpose of using Word Processing Applications Content:</p> <ul style="list-style-type: none"> • Word processing concepts. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.1.1.1 Define the term Word Processing;</p> <p>2.1.1.2 List and describe different uses of word processing (types of documents created) to represent information to users;</p> <p>2.1.1.3 Describe the benefits of using a word processor;</p> <p>2.1.1.4 Describe the characteristics of a good document.</p>
		<p>2.1.2 Starting a Word Processing application Content:</p> <ul style="list-style-type: none"> • Performing basic operations with a Word Processing application; • Storing and retrieving files; • Common file and document operations. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.1.2.1 Open/Start a Word processor;</p> <p>2.1.2.2 Create a new blank document;</p> <p>2.1.2.3 Create a document based on a template;</p> <p>2.1.2.4 Describe the concept and purpose of templates;</p> <p>2.1.2.5 Open an existing document;</p> <p>2.1.2.6 Export/Save a document in another format (<i>Range:</i></p>



			<p><i>Previous version, rtf, pdf, txt);</i></p> <p>2.1.2.7 Switch between different documents;</p> <p>2.1.2.8 Explore common features of the Ribbon Tabs, Quick Access toolbar, and Office Button, Menus;</p> <p>2.1.2.9 Change the default folder for saving documents;</p> <p>2.1.2.10 Use the help function provided.</p>
		<p>2.1.3 Keyboarding and Keyboard Proficiency in a Document</p> <p>Content:</p> <ul style="list-style-type: none"> • Use of the keyboard; • Common keys and their function. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.1.3.1 Identify and use a number of keys and explore their effects in a word document (<i>Range: Alphabetical keys, number keys/num lock, Caps Lock, Enter, Backspace, Delete, Spacebar, Shift, Tab, Ctrl + Alt, Delete and F keys</i>);</p> <p>2.1.3.2 Practise using these keys to create and edit a text document, for example using tab key for indenting;</p> <p>2.1.3.3 Use basic features to edit a Word document (<i>Range: Move around in it; type in it (INS); delete text; start a new paragraph; type in capital letters and use UNDO and REDO functions. Select data using keyboard and/or mouse, entering, editing and deleting text. Basic punctuation - one space after all punctuation, including periods and formatting marks</i>);</p> <p>2.1.3.4 Describe the GIGO (Garbage in Garbage Out) principle using a word processor document.</p>
			<p>Note on 2.1.3 – Keyboard proficiency do not include skills towards common typing speed measurement in assessment, but relate to accuracy and proficient use of a keyboard, for document creation, editing and formatting. It exclude the use of typical typing editing symbols, but presents a practical understanding of the use of the Word processor’s built in review tools and functions.</p>
		<p>2.1.4 Use Basic Features to Create and Edit and Format a Document</p> <p>Content:</p> <ul style="list-style-type: none"> • Edit a document; • Format a document; 	



		Learning Outcomes: Candidates should be able to:	
		 	2.1.4.1 Use basic features to format a Word processor document; 2.1.4.2 Use editing functions and shortcuts such as:: cut, copy, paste, find and replace; 2.1.4.3 Apply basic formatting to a document (<i>Range: Font type, style, size, colour, highlight and effects. Paragraph: spacing, justification, intonation, alignment, borders, shading and indents and using existing quick styles in gallery</i>); 2.1.4.4 Add remove bullets numbers in a single level list, switch between standard bullets, numbered bullets; 2.1.4.5 Apply reading and proofing techniques. Range: proofing: spelling and grammar.
		2.1.5 Use Page Layout Functions to Create and Edit a Document Content: <ul style="list-style-type: none"> Edit and format a document. Learning Outcomes: Candidates should be able to:	
		 	2.1.5.1 Set margins of the document, page or set of pages according to requirements; 2.1.5.2 Select and use a page orientation for different purposes; 2.1.5.3 Create and edit text using the Columns and column breaks functions; 2.1.5.4 Change the spacing between paragraphs, and text; 2.1.5.5 Insert page breaks and section breaks; 2.1.5.6 Add themes and a background; 2.1.5.7 Insert and use and modify line numbers; 2.1.5.8 Set the indentation values of a paragraph.
		2.1.6 Use Insert Functions to Create and Edit a Document Content: <ul style="list-style-type: none"> Edit a document; Use insert functions and functionality. Learning Outcomes: Candidates should be able to:	





		 	<p>2.1.6.1 Insert a table, picture or clip art, header and footer, word-art, SmartArt, shapes, chart, textbox, screenshot, page number, header and footer and page breaks in a text;</p> <p>2.1.6.2 Create a table, and edit insert and modify data in a table;</p> <p>2.1.6.3 Modify the appearance of a table by modifying (inserting, moving, merging, deleting cells, rows and columns);</p> <p>2.1.6.4 Apply an existing style to a table;</p> <p>2.1.6.5 Modify the appearance of a table, borders, fill, cell border;</p> <p>2.1.6.6 Modify the size position and layout and appearance of the inserted object (<i>Range: shape, table, SmartArt, chart, textbox, WordArt.</i>);</p> <p>2.1.6.7 Modify the position and the text wrapping options of the inserted object;</p> <p>2.1.6.8 Select, copy and move an object in a document and between different documents;</p> <p>2.1.6.9 Use the send to front and send to back features of an inserted object;</p> <p>2.1.6.10 Add a symbol to a document (E.g. ∞, €);</p> <p>2.1.6.11 Format a table using the borders and shading function;</p> <p>2.1.6.12 Format a picture or clip art using the resizing function;</p> <p>2.1.6.13 Preview and print the document using advanced printing functions.</p>
		<p>2.1.7 Use the Integrated Features and Intermediate Functions of the Word Processor</p> <p>Content:</p> <ul style="list-style-type: none"> • Document management, formatting and techniques; • Importing data from external sources. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>	
		 	<p>2.1.7.1 Apply file management techniques to the document (<i>Range: Printing(including options such as range of pages, odd or even, number of copies, print quality, pages per sheet), send to (e-mail, Internet fax), convert, properties</i>));</p> <p>2.1.7.2 Add multi-level numbering and bullets;</p>

			<p>2.1.7.3 Insert Input data from different file formats, e.g. text files, csv, rtf, tables and objects from other office suite applications E.g. Spreadsheet chart, partial spreadsheet, tables, diagrams and images;</p> <p>2.1.7.4 Differentiate between inserting an object into a document and pasting an object into a document;</p> <p>2.1.7.5 Select and use a page orientation for different purposes;</p> <p>2.1.7.6 Apply special editing features (<i>Range: Paste special, find and replace (extend to using more options)</i>);</p> <p>2.1.7.7 Apply intermediate Document layout functions (<i>Range: Section breaks and sections, Headers and footers (including date, path and filename) Page numbers: Different first page, odd, even, starting from a specific number</i>).</p>
		<p>2.1.8 Use the Mail Merge Feature in a Document</p> <p>Content:</p> <ul style="list-style-type: none"> • Data and data import; • Creating labels and data table; • Importing and using external data. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.1.8.1 Create a primary document for distribution and mailing purposes for example an invitation, notice or a label;</p> <p>2.1.8.2 Select or create an applicable datasource (spreadsheet or database table, word table or csv, (comma separated values file) outlook address book; for use in the mail merge;</p> <p>2.1.8.3 Insert various data labels for the main document;</p> <p>2.1.8.4 Merge a mailing list with a letter, label or other document as a new file or printed output;</p> <p>2.1.8.5 Save and print the mailing list or document.</p>
			<p>Generic note: When working with applications, students should be taught to use various methods and techniques to achieve the same objective, compare the methods and determine which one is more efficient or works best for them. This will teach them not only to follow a specific instruction/set of instructions but also to complete a given task that involves careful thinking and reasoning about how to do it and if there is more than one way, to compare</p>




			the methods and find the best way of doing it.
Sub-Topic	2.2 Spreadsheets		
	<p>2.2.1 Spreadsheet Applications</p> <p>Content:</p> <ul style="list-style-type: none"> • Purpose and use of spreadsheets; • Benefits of using spreadsheets. <p>Learning Outcomes: Candidates should be able to:</p>		
	 		<p>2.2.1.1 Define the term spreadsheet processing;</p> <p>2.2.1.2 List and describe different uses of spreadsheets (types of documents created) to represent information to users;</p> <p>2.2.1.3 Describe the benefits of using a spread sheet application;</p> <p>2.2.1.4 Describe the characteristics of a good spreadsheet document;</p> <p>2.2.1.5 Discuss how spreadsheets are used to transform data into useful information and list examples of such cases.</p>
	<p>2.2.2 Starting the Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> • Use the spreadsheet application; • Spreadsheet documents. <p>Learning Outcomes: Candidates should be able to:</p>		
	 		<p>2.2.2.1 Open/Start the spreadsheet application;</p> <p>2.2.2.2 Create a new blank spreadsheet / worksheet;</p> <p>2.2.2.3 Navigate a workbook;</p> <p>2.2.2.4 Create a new spreadsheet based on a template;</p> <p>2.2.2.5 Open an existing spreadsheet;</p> <p>2.2.2.6 Export/Save a spreadsheet in another format (<i>Range: Previous version, rtf, pdf, txt, csv</i>);</p> <p>2.2.2.7 Switch between different spreadsheets and worksheets;</p> <p>2.2.2.8 Explore common features of the Ribbon Tabs, Quick Access toolbar, and Office Button, Menus;</p> <p>2.2.2.9 Use the help function provided.</p>



		<p>2.2.3 Use Basic Features to Create and Edit a Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> • Edit a spreadsheet; • Apply basic formatting. <p>Learning Outcomes: Candidates should be able to:</p>
	<p></p> <p></p>	<p>2.2.3.1 Add content to a cell;</p> <p>2.2.3.2 Edit content of an existing cell;</p> <p>2.2.3.3 Use basic features to format a Spreadsheet (<i>Range to format text: Highlight text; typing text in bold, italics and underline; typing text in different styles and font sizes; using the alignment functions - left, right, merge & centre; adjust the width of the columns and height of rows and insert borders (horizontal and vertical lines);</i>)</p> <p>2.2.3.4 Use basic features to edit and change information in a spreadsheet Range of editing: Move around in it; delete text; type in capitals letters, insert rows and columns and use UNDO and REDO functions (<i>Range of changes: Change the contents of a cell or part of the contents of a cell, change the formats of dates and currency, change number formats and decimal settings);</i>)</p> <p>2.2.3.5 List and describe the common types of data that may be entered into a cell;</p> <p>2.2.3.6 Understand the concept that a cell in a worksheet document refer to only one element of data of a specific type;</p> <p>2.2.3.7 Understand the concept of a Column, Row and worksheet and the purpose of each;</p> <p>2.2.3.8 Enter data of different types in a cell;</p> <p>2.2.3.9 Differentiate between different data types and their use to represent data/information (<i>Range: Strings, General, Number, Currency, Date and Time);</i>)</p> <p>2.2.3.10 Edit the data content of a cell;</p> <p>2.2.3.11 Select a cell, range of adjacent cells, range of non-adjacent cells, entire worksheet;</p> <p>2.2.3.12 Understand and apply the concept of a cell reference;</p> <p>2.2.3.13 Format the content of a cell;</p> <p>2.2.3.14 Implement good practices in creating lists and tables (<i>Range: avoid blank rows and columns in the main</i></p>





			<p><i>body of list, insert blank row before Total row and ensure cells bordering list are blank.);</i></p> <p>2.2.3.15 Spell check; preview and set print (range or sheet) options and print the document.</p>
		<p>2.2.4 Use Formulae to Perform Basic Calculations in a Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> Construct and use formulae; Apply basic calculations and techniques. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.2.4.1 Perform the basic spreadsheet calculations by inserting formulas and using basic operators including +, -, *, /, ;</p> <p>2.2.4.2 Understand the order of precedence and the use of brackets;</p> <p>2.2.4.3 Use the auto fill tool to repeat formulae and increment data entries;</p> <p>2.2.4.4 Understand the implementation and use copy and paste to repeat data entries and formula;</p> <p>2.2.4.5 Insert and use functions and/or create equivalent equations to: add, subtract, divide, multiply, auto sum percentage, average, maximum, minimum, count and auto-fill cells, rows and columns;</p> <p>2.2.4.6 Understand the use and purpose of absolute cell referencing;</p> <p>2.2.4.7 Implement absolute cell referencing as part of a formula;</p> <p>2.2.4.8 Understand the importance of using cell references rather than constant values in cells and formulae;</p> <p>2.2.4.9 Understand and interpret and manage (correct/fix) error indicators. (<i>Range: #####, #NAME!, #DIV/0!, #REF!, #VALUE!, #NUM!</i>).</p>
		<p>2.2.5 Managing and Editing a Worksheet /Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> Edit a spreadsheet / worksheet; Manage a spreadsheet or worksheet. <p>Learning Outcomes: Candidates should be able to:</p>	






		 	<p>2.2.5.1 Select a row / column or sets of adjacent cells;</p> <p>2.2.5.2 Multi-select different rows and cells or columns;</p> <p>2.2.5.3 Modify the column and row widths;</p> <p>2.2.5.4 Modify the display settings of a column or row or set of cells;</p> <p>2.2.5.5 Freeze and unfreeze rows and columns;</p> <p>2.2.5.6 Switch between different worksheets;</p> <p>2.2.5.7 Insert, edit and delete a worksheet;</p> <p>2.2.5.8 Apply good naming techniques in the naming of worksheets;</p> <p>2.2.5.9 Edit a worksheet by changing the formatting of cells (<i>Range: Data type, borders, shading, colouring, alignment, wrapping, merge, alignment, text direction, merge, split and autofill</i>);</p> <p>2.2.5.10 Apply formatting techniques to rows, columns and sheets by changing the Size (width and height), insert, delete, hide, unhide, borders and styles;</p> <p>2.2.5.11 Reinforce generic/common concepts such as formatting and editing, page layout, illustrations, search and proofing as in word processor;</p> <p>2.2.5.12 Display and print the formulae entered into a worksheet.</p>
		<p>2.2.6 Create and Edit Charts Within a Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> • Charing concepts. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>	
		 	<p>2.2.6.1 Identify the different types of charts;</p> <p>2.2.6.2 Describe different types of charts and explain their applicable use and purpose i.e. type/summary of information they convey;</p> <p>2.2.6.3 Interpret a given chart and make certain deductions;</p> <p>2.2.6.4 Validate a chart against a set of data;</p> <p>2.2.6.5 Create a column, line and pie chart;</p> <p>2.2.6.6 Create format and edit and exiting chart by adding and modifying the basic elements and appearance of a chart;</p> <p>2.2.6.7 Apply options appropriate to the graph type chosen;</p> <p>2.2.6.8 Insert a chart as an object or to a separate</p>

			<p>worksheet;</p> <p>2.2.6.9 Insert and modify chart titles and legends;</p> <p>2.2.6.10 Edit the appearance of a chart by changing the fill colour.</p>
		<p>2.2.7 Use Formulae and Implement Advanced Functionality to Perform Intermediate to Advanced Calculations in a Spreadsheet</p> <p>Content:</p> <ul style="list-style-type: none"> • Use advanced formulae constructs; • Incorporate advanced calculations. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #4B0082; color: white; padding: 5px; margin-bottom: 10px;">2</div> <div style="background-color: #800080; color: white; padding: 5px; margin-bottom: 10px;">P</div> </div>	<p>2.2.7.1 Implement auto-fill options as part of a spreadsheet;</p> <p>2.2.7.2 Incorporate and use spreadsheet functions (<i>Range: round, small, large, countif, counta, countblank, sumif, power and rand / random, rand between</i>);</p> <p>2.2.7.3 Use 'a' if statement / function as part of a worksheet (<i>Range: If statement nested to a maximum of two conditions</i>);</p> <p>2.2.7.4 Use of relational operators (> < <= >= <>) in simple IF functions;</p> <p>2.2.7.5 Use and incorporate basic date and time functions and calculations;</p> <p>2.2.7.6 Use and incorporate text functions (<i>Range: left, right, mid, concatenate, len, value and find</i>);</p> <p>2.2.7.7 Implement rounding off numbers and understand and illustrate the difference between rounding and formatting;</p> <p>2.2.7.8 Incorporate the Vertical lookup function, including error indicator #N/A;</p> <p>2.2.7.9 Incorporate and apply conditional formatting as part of a worksheet;</p> <p>2.2.7.10 Interpret manage and resolve additional error messages such as interpreting error indicators such as: circular reference, #NULL!.</p>
		<p>2.2.8 Integrate and Practise Creating and Editing Different Spreadsheet Documents to Solve Problems</p> <p>Content:</p> <ul style="list-style-type: none"> • Problem-solving with a spreadsheet; • Problem analysis; • Solution development; 	



		<ul style="list-style-type: none"> Validation of a solution; Incorporating different techniques and functions. <p>Learning Outcomes: Candidates should be able to:</p>
	<div style="text-align: center;">   </div>	<p>2.2.8.1 Analyse a given problem into inputs, processes and requirements for output;</p> <p>2.2.8.2 Utilise a spreadsheet and applicable functionality to present a solution to a particular problem, based on the analysis;</p> <p>2.2.8.3 Consolidate and reinforce content, concepts and skills;</p> <p>2.2.8.4 Import data from different formats into a worksheet;</p> <p>2.2.8.5 Recognise common relationships and patterns in the data presented;</p> <p>2.2.8.6 Apply and construct appropriate formulas and calculations for implementation towards the solution;</p> <p>2.2.8.7 Identify appropriate functions to suit scenario and solve problem (<i>Range: Date and time, maths, statistical, text, logical, lookup and reference, calculations</i>);</p> <p>2.2.8.8 Present a solution to the problem utilising available spreadsheet tools and functionality;</p> <p>2.2.8.9 Use more advanced combinations of functions and formulas to solve a problem and present information;</p> <p>2.2.8.10 Include an appropriate graph for a given scenario;</p> <p>2.2.8.11 Interpret and communicate the solution design;</p> <p>2.2.8.12 Create. Modify, Save and edit a spreadsheet for use as part of a mail merge operation.</p>
	<div style="text-align: center;">  </div>	<p>Notes on 2.2.8</p> <p><i>Some of the types of problems that could be presented for solution development could include topics and content from various domains such as:</i></p> <ul style="list-style-type: none"> <i>Finance e.g. budgets, orders, estimates, statements, investments, etc;</i> <i>Measurement e.g. distances travelled, athletic times and scores, temperatures, etc;</i> <i>Statistics e.g. Min, Maximum, Mode, Median, Frequency, Standard deviation, Correlation etc;</i> <i>Maps and fixed designs (drawings) which include</i>




			<p>representations of the physical world e.g. tabulated distances between locations travelled, Summary and comparisons between different structured and buildings, Volumes of shapes etc;</p> <ul style="list-style-type: none"> • Handling, analysis and interpreting data in various forms and formats, e.g. Ranges in months, dates, textual data, forecasts, probabilities, graphs etc. <p>The questions, problems and scenarios posed could be interrelated from various domains to illustrate the use of technology as an enabler and supporter of business operations.</p> <p>It is also important that the students present an understanding of generic concepts relating to problem-solving and computational thinking which include concepts such as: Tax, VAT, Interest, Depreciation, Percentage, Fraction, Frequency, Mode, Mean, Inflation, Decrease, Increase, Ratios, Composition, Subtotals and Totals.</p>
Sub-Topic	2.3 Presentation Software		
		<p>2.3.1 Purpose of Using Presentation Software</p> <p>Content:</p> <ul style="list-style-type: none"> • Purpose and the use of presentation software. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.3.1.1 Define the term presentation software;</p> <p>2.3.1.2 List and describe different uses of presentations (types of presentations created) to represent information to users;</p> <p>2.3.1.3 Describe the benefits of using presentation applications;</p> <p>2.3.1.4 Describe the characteristics of a good presentation document;</p> <p>2.3.1.5 Discuss how presentations are used to convey information and knowledge and list practical examples of such cases.</p>
		<p>2.3.2 Use Basic Features to Create, Edit and Format a Presentation</p> <p>Content:</p> <ul style="list-style-type: none"> • Create a presentation; • Edit and format a presentation. <p>Learning Outcomes:</p>	



		Candidates should be able to:	
		 	<p>2.3.2.1 Create a presentation incorporating slides using different slide layouts and format themes;</p> <p>2.3.2.2 Use basic features to format the slides (<i>Range to format text: Highlight text; typing text in bold, italics and underline; typing text in different styles and font sizes; using numbers and bullets first level and using the alignment functions - left, right, centre</i>).</p>
		<p>2.3.3 Use Features to Create and Format a Presentation</p> <p>Content:</p> <ul style="list-style-type: none"> • Create a presentation; • Edit and format a presentation. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.3.3.1 Design a presentation for a specific content matter and select a slide layout and format;</p> <p>2.3.3.2 Insert a relevant clip art or picture in the presentation;</p> <p>2.3.3.3 Perform common editing operations on a slide show;</p> <p>2.3.3.4 Insert a relevant piece of text or object or chart from a word processor or spreadsheet document into a slide;</p> <p>2.3.3.5 Differentiate between embedding and inserting an object;</p> <p>2.3.3.6 Select and apply appropriate animation effects for your presentation;</p> <p>2.3.3.7 Spell check and save the presentation;</p> <p>2.3.3.8 Preview and print by selecting different printing options (<i>Range: Slides, hand-outs and notes pages</i>).</p>
Sub-Topic	2.4 Databases		
		<p>2.4.1 Database Concepts</p> <p>Content:</p> <ul style="list-style-type: none"> • Use of databases; • Importance of databases. <p>Learning Outcomes: Candidates should be able to:</p>	

		 	<p>2.4.1.1 Define the term database;</p> <p>2.4.1.2 Define the term database management software;</p> <p>2.4.1.3 Describe the concept of a data hierarchy. (<i>Range: Bits, bytes, fields, records, tables, databases, data warehouses, data marts</i>);</p> <p>2.4.1.4 Describe the purpose of databases within the information cycle;</p> <p>2.4.1.5 Describe common features that a database offer, in relation to the storage of data for processing;</p> <p>2.4.1.6 Define the concept data integrity;</p> <p>2.4.1.7 Describe the common components of a Database Management System;</p> <p>2.4.1.8 Define the term transaction and describe how transactions affect the data that is stored and processed.</p>
		<p>2.4.2 Different Types of Databases and Database Design</p> <p>Content:</p> <ul style="list-style-type: none"> • Different types of databases and topologies; • Database design; • Relational databases. <p>Learning Outcomes: Candidates should be able to:</p>	
		  And 	<p>2.4.2.1 Describe and motivate the common design principles behind a relational database;</p> <p>2.4.2.2 Differentiate between various types of database topologies (<i>Range: Relational, Object-Oriented and Multi-dimensional databases</i>);</p> <p>2.4.2.3 Expand concepts relating to relational database design, use and management (<i>Range: Normalisation (overview and purpose) with regard to the reasons: Reduce data redundancy, limiting data anomalies. Where does un-normalised data come from? Analyse general documents, e.g. a till slips to identify possible data entities, Design/entities, keys, record organisation</i>);</p> <p>2.4.2.4 Describe the common components of a database (<i>Range: Tables, Queries, Views, Users including (User rights)</i>);</p> <p>2.4.2.5 Describe the concept of a relationship;</p> <p>2.4.2.6 Differentiate between different keys and their</p>




			<p>purpose;</p> <p>2.4.2.7 Explain the purpose of relational DB design;</p> <p>2.4.2.8 Describe the concept and purpose of referential integrity;</p> <p>2.4.2.9 Describe the characteristics of a good database in terms of the design (<i>Range: Data integrity, data independence, data redundancy, data security and data maintenance</i>);</p> <p>2.4.2.10 Design a relational database with tables in 3rd normal form;</p> <p>2.4.2.11 Identify and implement various keys as part of the database design (<i>Range: Primary key, alternate key, concatenated key and foreign key</i>);</p> <p>2.4.2.12 Draw or modify a simple Entity Relationship Diagram using the Chen or Crows foot notation, indicating the cardinality of the relationship between the entities, as well as the applicable fields and key indicators.</p>
		<p>2.4.3 Create and Manage a Relational Database Using a Software (DBMS) Tool</p> <p>Content:</p> <ul style="list-style-type: none"> • Database design; • Modifying a database; • Use a DBMS. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #4B0082; color: white; padding: 5px; margin-bottom: 10px;">2</div> <div style="background-color: #800080; color: white; padding: 5px; margin-bottom: 10px;">P_T</div> </div>	<p>2.4.3.1 Open an existing database;</p> <p>2.4.3.2 Save a database;</p> <p>2.4.3.3 Differentiate between a: Table, form, query, report and describe the purpose of each;</p> <p>2.4.3.4 Identify and use the options on the Menu and Database toolbar;</p> <p>2.4.3.5 Distinguish between a table a record and a field;</p> <p>2.4.3.6 Differentiate between the different data types in fields;</p> <p>2.4.3.7 Distinguish between: Basic field properties: size/length, default value, decimal places, required;</p> <p>2.4.3.8 Save and print the data structure;</p> <p>2.4.3.9 Incorporate different data types and distinguish between the different types with regard to their</p>

			<p>purpose as part of a table. Range: Text, number, date and time, currency, auto number, Yes/No and Memo;</p> <p>2.4.3.10 Create or modify a data structure and capture information. (<i>Range: Create or alter a table setting and modifying fields and field types. Setup and define a primary key, Setup and define relationships between tables. Enter records and modify data.</i>);</p> <p>2.4.3.11 Modify data as part of a table. Range Add and delete records, fields;</p> <p>2.4.3.12 Incorporate and implement Basic data validation techniques;</p> <p>2.4.3.13 Use find, replace and sort functions to search and edit information in the data structure. (table or query);</p> <p>2.4.3.14 Apply formatting techniques to fields, records, tables, forms, queries and reports.</p>
		<p>2.4.4 Create and Implement Queries With a Query Design Tool</p> <p>Content:</p> <ul style="list-style-type: none"> • Importance of queries; • Use of queries; • Design a query; • Run a query against a set of specifications. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.4.4.1 Describe the purpose of a query;</p> <p>2.4.4.2 Describe the advantages in using queries;</p> <p>2.4.4.3 Discuss the concept and implementation of the Structured Query language;</p> <p>2.4.4.4 Design basic queries using and, or, not and sorting options;</p> <p>2.4.4.5 Save a query;</p> <p>2.4.4.6 Open/Run a query;</p> <p>2.4.4.7 Select appropriate fields to display in a query;</p> <p>2.4.4.8 Format the results of a query (column or field);</p> <p>2.4.4.9 Create a query using more than one related table;</p> <p>2.4.4.10 Add a calculated field to a query;</p> <p>2.4.4.11 Add criteria to a query using one or a combination of different operators. (<i>Range: =, <>, <, <=, >, >=</i>);</p> <p>2.4.4.12 Add criteria to a query using one or a combination</p>










			<p>of different operators: AND, OR, NOT;</p> <p>2.4.4.13 Use different (one or a combination of) wildcards in a query Range;, * or %, ? or _;</p> <p>2.4.4.14 Incorporate group functions as part of a query, Min, Max, Avg, Count, Sum;</p> <p>2.4.4.15 Incorporate the IsNull function as part of a query;</p> <p>2.4.4.16 Create a query that incorporates a parameter;</p> <p>2.4.4.17 Edit a query: add, modify, and remove criteria;</p> <p>2.4.4.18 Create a query containing a combination of the requirements and outcomes as presented in points (9 – 17) above.</p>
		<p>2.4.5 Create and Implement a Form</p> <p>Content:</p> <ul style="list-style-type: none"> • Purpose of forms; • Create and edit a form; • Use a form. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>2.4.5.1 Describe the purpose of a form as part of database development;</p> <p>2.4.5.2 Create a form to manage various database transactions (<i>Range: Add, Delete, Edit and Search for records</i>);</p> <p>2.4.5.3 Design a form in design view and modify the layout by adding or removing fields;</p> <p>2.4.5.4 Include a calculated field as part of a form.</p>
		<p>2.4.6 Reports & Reporting</p> <p>Content:</p> <ul style="list-style-type: none"> • Purpose of reports; • Create and design a report; • Edit a report. <p>Learning Outcomes: Candidates should be able to:</p>	
			<p>2.4.6.1 Describe the purpose of a report as part of an information system;</p> <p>2.4.6.2 Open an existing report;</p> <p>2.4.6.3 Save a report;</p> <p>2.4.6.4 Create a report based on a table or query;</p>

			<p>2.4.6.5 Modify the arrangement of data in groupings and headers;</p> <p>2.4.6.6 Include and modify specific fields in a grouped report by sum, minimum, maximum, average, count, at appropriate break points;</p> <p>2.4.6.7 Design and modify a report incorporating: grouped headers and footers, and calculations in groups and fields;</p> <p>2.4.6.8 Design and create a multi-level grouped report with summaries and appropriate headings;</p> <p>2.4.6.9 Change the format layout and appearance of a report as part of the design process;</p> <p>2.4.6.10 Add fields with calculations in queries to a report as part of output;</p> <p>2.4.6.11 Open a report for printing purposes.</p>
			<p>Notes on 2.1 to 2.4.</p> <p><i>It would be useful for students to apply simple business applications in MS Excel, write reports etc. in MS Word, and use MS PowerPoint for presentations. Links to doing assignments for their other subjects could be provided, as part of other subject text, curricula and prescribed resources.</i></p> <p><i>Students should apply a combination of techniques, knowledge and skills learned to new situations in order to complete a task/solve a problem or achieve an objective.</i></p> <p><i>Students should complete integrated practical tasks that encourage thinking and decision - making.</i></p> <p><i>Emphasis should also be placed on educating students as informed users who are able to use and make decisions around appropriate use of technology to support business and daily life. Scenarios used as part of the content presentation could include business scenarios, the creation of applicable reports and statements as well as generic business oriented problems and activities. Students should be proficient in exhibiting skills to:</i></p> <ul style="list-style-type: none"> ▪ <i>Apply routine and non-routine procedures and problems in a wide range of familiar and unfamiliar contexts and situations;</i> ▪ <i>Select and apply a range of mathematical and computational thinking skills and methods to find solutions;</i> ▪ <i>Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions;</i> ▪ <i>Compile documents, including extended writing, and communicate information, ideas and opinions effectively and persuasively;</i> ▪ <i>Manage information storage to enable efficient retrieval;</i>


			<ul style="list-style-type: none"> ▪ <i>Bring together information to suit content and purpose;</i> ▪ <i>Enter, develop and format information independently to suit its meaning and purpose, including text and tables, images, numbers, graphs and records;</i> ▪ <i>Apply decision-making and problem-solving skills;</i> ▪ <i>Extend planning, research, critical thinking, analysis, synthesis, evaluation and presentation skills;</i> ▪ <i>Develop confidence in applying the content, application software and technologies they have studied;</i> ▪ <i>Develop and apply skills creatively, demonstrating initiative and enterprise;</i> ▪ <i>Seek advice and support when needed, and from appropriate sources.</i>
Sub-Topic	2.5 Problem-Solving and Introduction to Computer Programming		
		<p>2.5.1 Problem-Solving Process and Concepts</p> <p>Content:</p> <ul style="list-style-type: none"> • Problem-solving; • Application of problem-solving constructs; • Developing solutions. <p>Learning Outcomes: Candidates should be able to:</p>	
		<div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="background-color: #0070C0; color: white; padding: 5px 15px; border-radius: 5px;">1</div> <div style="background-color: #C00080; color: yellow; padding: 5px 15px; border-radius: 5px;">P</div> <p>And</p> <div style="background-color: #FFD700; color: blue; padding: 5px 15px; border-radius: 5px;">T</div> </div>	<p>2.5.1.1 Define the term problem-solving;</p> <p>2.5.1.2 Define the term computational thinking;</p> <p>2.5.1.3 Describe the phases of the PLDC (Programme Development Life Cycle);</p> <p>2.5.1.4 Describe the purpose of problem-solving leading to solutions;</p> <p>2.5.1.5 Explain and apply various problem-solving steps. Polya, G.,(1957) <i>(Range: Understand the problem (task/problem description or scenario/user stories)</i></p> <ul style="list-style-type: none"> • <i>State in own words</i> • <i>Clarity on what needs to be done</i> • <i>What is known or given?</i> • <i>What is missing or needed?</i> • <i>Devise a plan/algorithm (storyboard – visual or textual)</i> • <i>Look for patterns</i> • <i>Look at related problems, known solutions</i> • <i>Examine simpler or special cases</i> • <i>Make a table, create diagram, use guess and check, work backwards, identify sub-goal</i>



		<ul style="list-style-type: none"> • Carry out the plan/implement the algorithm (write the code) • Look back/test (see if it works) • Check results against original problem. Does it make sense? Is there another solution?) <p>2.5.1.6 Use appropriate tools and techniques to present a solution (Range:</p> <ul style="list-style-type: none"> • User stories (written by the client and provide the requirements); • Noun-verb analysis of user stories; • List of nouns provides identification of objects and state; • List of verbs provides identification of behaviour; • Acceptance tests (does the programme meet the requirements?).
		<p>2.5.2 Construct an Algorithm and Present a Solution to a Given Problem</p> <p>Content:</p> <ul style="list-style-type: none"> • Problem-solving; • Algorithm design; • PLDC; • Flowcharts; • Pseudo code; • Trace tables. <p>Learning Outcomes: Candidates should be able to:</p>
	<div style="text-align: center;">   And  </div>	<p>2.5.2.1 Define the term algorithm and its purpose in the problem-solving process (Range: Basic concepts of an algorithm, what is an algorithm? and develop a clear understanding of the problem presented.);</p> <p>2.5.2.2 Extrapolate the position of algorithm development as part of the PLDC (Programme Development Life Cycle);</p> <p>2.5.2.3 List examples of algorithms in life, e.g. instructions to draw a kite or fold a paper jet, recipe to bake a cake;</p> <p>2.5.2.4 Construct and devise an algorithm/ basic instructions to complete similar tasks;</p> <p>2.5.2.5 Describe the purpose of input, processing and output as part of the solution creation process;</p> <p>2.5.2.6 Define the term IPO chart and explain its purpose in solution development;</p>

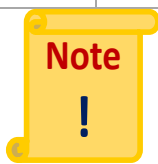
		<p>2.5.2.7 Implement and understand the basic algorithmic constructs used to create a flowchart / algorithm. Range: Input, Output, Processing and calculations, selection, and iteration;</p> <p>2.5.2.8 Implement and use a list or array (single dimensional, but not excluding parallel lists or arrays) in the development and construction of a solution (<i>Range: Insert an element, Manipulate an element, Basic list operations: Searching, Sorting, deleting and replacing an element or elements, calculating averages, determining the maximum and minimum values in a list /array etc</i>);</p> <p>2.5.2.9 Create a flowchart to present a particular algorithm and its associated tasks;</p> <p>2.5.2.10 Interpret a basic flow chart and describe its intended operation / function;</p> <p>2.5.2.11 Explore and create algorithms in the form of an IPO chart or flowchart which include various constructs, such as:</p> <ol style="list-style-type: none"> i. Determine smallest, largest value of more than two values ii. Swapping values iii. Determining aggregates e.g. sum and average iv. Basic calculations such as calculating area, volume, VAT v. Determine whether a number is even vi. Determine whether a number is a factor of another number; <p>2.5.2.12 Trace an algorithm to determine the outcome or the correctness – trace table;</p> <p>2.5.2.13 Compare algorithms considering, e.g. order, precision and efficiency.</p>
		<p>Notes on 2.5.1 and 2.5.2</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;"> <p style="text-align: center; color: red; font-weight: bold;">Note</p> <p style="text-align: center; font-size: 24px; margin: 0;">!</p> </div> <p><i>The content of 2.5.1 and 2.5.2 could be presented or studied in tandem.</i></p> <p><i>The purpose of 2.5.1 and 2.5.2 is to serve as an introduction to solution development to develop the student’s computational thinking practices strategies and the practice of algorithm development, problem-solving and programming</i></p>

	<p><i>using everyday scenarios.</i></p> <p><i>Exploring algorithms to solve generic problems will enable a student to use similar principles to devise algorithms for new problems or situations. It will also enable the student to identify the types of problems requiring certain generic algorithms.</i></p> <p><i>Investigating specific algorithms should provide the student with the opportunity to explore various ways to solve the same problem by using different principles or tools.</i></p> <p><i>Many of the same type of problems solved as part of 2.5.2 of the spreadsheets content could also be used as a background and scenario for the development of small solutions.</i></p>		
	<p>2.5.3 Programming and Solution Development</p> <p>Content:</p> <ul style="list-style-type: none"> • Problem-solving; • Algorithm design; • Programming languages; • Writing programme code using a graphical (visual) programming language; • Debugging; • Compilation; • Testing; • Running an application. <p>Learning Outcomes: Candidates should be able to:</p>		
	<table border="0" style="width: 100%;"> <tr> <td style="width: 20%; vertical-align: top;">   And  </td> <td style="vertical-align: top;"> <p>2.5.3.1 Define the term high level programming language;</p> <p>2.5.3.2 Define the term programming code;</p> <p>2.5.3.3 Describe the basic purpose of a programming language in terms of its operation and what it produces;</p> <p>2.5.3.4 Define the terms compiler and interpreter;</p> <p>2.5.3.5 Define the term Development Environment;</p> <p>2.5.3.6 Explore and use the programming language development environment (<i>Range: Open an existing programme i.e. code, save an existing programme, modify an existing programme, debug an existing programme, create a programme and run a programme</i>);</p> <p>2.5.3.7 Construct (code/write) using the visual tool, debug and run simple programmes incorporating:</p> </td> </tr> </table>	  And 	<p>2.5.3.1 Define the term high level programming language;</p> <p>2.5.3.2 Define the term programming code;</p> <p>2.5.3.3 Describe the basic purpose of a programming language in terms of its operation and what it produces;</p> <p>2.5.3.4 Define the terms compiler and interpreter;</p> <p>2.5.3.5 Define the term Development Environment;</p> <p>2.5.3.6 Explore and use the programming language development environment (<i>Range: Open an existing programme i.e. code, save an existing programme, modify an existing programme, debug an existing programme, create a programme and run a programme</i>);</p> <p>2.5.3.7 Construct (code/write) using the visual tool, debug and run simple programmes incorporating:</p>
  And 	<p>2.5.3.1 Define the term high level programming language;</p> <p>2.5.3.2 Define the term programming code;</p> <p>2.5.3.3 Describe the basic purpose of a programming language in terms of its operation and what it produces;</p> <p>2.5.3.4 Define the terms compiler and interpreter;</p> <p>2.5.3.5 Define the term Development Environment;</p> <p>2.5.3.6 Explore and use the programming language development environment (<i>Range: Open an existing programme i.e. code, save an existing programme, modify an existing programme, debug an existing programme, create a programme and run a programme</i>);</p> <p>2.5.3.7 Construct (code/write) using the visual tool, debug and run simple programmes incorporating:</p>		

			<p>Declaration of variables of different types, use and assignment of values to variables, incorporating programme constructs with sequence, selection and iteration structures. Expose and apply various programming concepts as part of the coded solution such as:</p> <ol style="list-style-type: none"> i. The use of variables (defining and naming); ii. Variable naming conventions; iii. Assigning values to variables (assignment operator); iv. Data type - exposure: integers, strings, floats, boolean; v. Input and output of information and messages and values; vi. Using single or a combination of different operators (plus, minus, multiply, divide, modulus) and order of precedence; vii. Retrieving remainders: modulus; viii. Differentiate between real value division and integer division; ix. Comparison operators and performing logical comparisons; x. Incorporate and write code constructs to perform basic calculations such as area, volume, vat and simple formulae, typical calculations done in other subjects; xi. Include conditional constructs [if and if-then-else] (up to a maximum of three nested levels); xii. Include iteration (looping) structures [pretest – post test and fixed counter loop]; xiii. Incorporate a combination of iteration and condition structures as part of the solution (i.e. Programme code). <p>2.5.3.8 Write code which applies algorithms such as solving general problems, swapping values, finding aggregates, isolate digits in an integer number, finding the smallest/biggest of two numbers. Determine if a number is a factor of another number, determine if a number is even. Finding the highest, lowest or average of a set of values entered using an iteration structure;</p> <p>2.5.3.9 Differentiate between a pre-test and a post-test iteration structure;</p> <p>2.5.3.10 Rewrite a conditional structure in a different way</p>
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			<p>using relational operators and vice versa;</p> <p>2.5.3.11 Write code which applies programming language tools and constructs to draw various shapes (turtle type commands) on an output screen/window. Reinforce concepts such as:</p> <ol style="list-style-type: none"> i. Sequence; ii. Selection; iii. Iteration; iv. Creation of objects and shapes. <p>2.5.3.12 Design a coding solution to a problem incorporating a combination of different programming constructs which include:</p> <ol style="list-style-type: none"> i. Sequence; ii. Selection; iii. Iteration. <p>2.5.3.13 Design and develop solutions for specific problems that include computational thinking and applying software engineering principles;</p> <p>2.5.3.14 Apply generic algorithms as part of the solution;</p> <p>2.5.3.15 Explore lists/arrays (storing and accessing a list of numbers and strings) and containers (<i>Range: Manipulating lists/arrays such as adding, deleting, replacing, inserting items.</i>);</p> <p>2.5.3.16 Devise a specific algorithm where applicable to solve a problem utilising user-defined code constructs;</p> <p>2.5.3.17 Motivate the use of a specific algorithm;</p> <p>2.5.3.18 Validate the solution against a set of data using different techniques, e.g. trace tables, watches, manual output comparison.</p>
		<p>2.5.4 Develop an Integrated Solution Using Various Software Tools</p> <p>Content:</p> <ul style="list-style-type: none"> • Problem analysis; • Solution design development and testing; • Presenting the solution. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>	
			<p>2.5.4.1 Develop and construct a solution a generic problem;</p> <p>2.5.4.2 Decide on the best tool or combination of software to present the solution;</p> <p>2.5.4.3 Incorporate different tools in the design, e.g. Word</p>

		 And 	<p>processor, spreadsheet, presentation software, programming language;</p> <p>2.5.4.4 Convert a solution as part of a spreadsheet into programme code using the appropriate language constructs;</p> <p>2.5.4.5 Consolidate content, concepts and skills to develop a software solution (<i>Range: Use integrated software effectively and efficiently to reproduce and create documents that incorporate text, graphics and data. Manipulate graphics and text within documents. Use integrated software and content created with different packages to create and design documents for specific purposes</i>);</p> <p>2.5.4.6 Apply general principles of layout and design to a document process. Emphasise information using techniques such as placement and colour. Create documents by customising templates, Use media, visual literacy and technology skills to create products that express understanding.</p>
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Students should solve problems, i.e. apply a combination of techniques, knowledge and skills learned to new situations.

Students should also be able to solve computational problems through:

- Identifying and analysing requirements for a specific problem;
- Designing effective algorithms;
- Converting these to code and
- Testing the solution to see if it meets the requirements.

Teach students to use and combine information, data and ideas to solve the problems to discover and explain relationships or trends and predict behaviour/events,

Tasks given to students should also involve procedural and problem-solving skills and encourage computational thinking.

Important note on the use of a programming environment applicable to 2.5





Basic programming principles and constructs are introduced through an easy-to-learn, fun tool. An introductory graphical programming teaching tool such as Scratch





Scratch is used to introduce students to important computational skills and concepts, algorithm development, problem-solving and programming.





cf. (<http://wiki.scratch.mit.edu/wiki/Scratch>).

Topic 3 - Network Technologies	
3.1	Introduction to Computer Networks and Communications
3.1.1 Networking concepts	<p>Content:</p> <ul style="list-style-type: none"> Networks and its use domains; <p>Learning Outcomes: Candidates should be able to:</p>
<div style="display: flex; flex-direction: column; align-items: center; justify-content: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; margin-bottom: 10px;">1</div> <div style="background-color: #FFD700; color: #0070C0; padding: 5px; margin-bottom: 10px;">T</div> </div>	<p>3.1.1.1 Define the term network;</p> <p>3.1.1.2 List and describe common examples of everyday networks (briefly);</p> <p>3.1.1.3 Differentiate between the advantages and disadvantages of using networks;</p>
3.1.2 Hardware Components that Constitute a Network	<p>Content:</p> <ul style="list-style-type: none"> Networking hardware; Networks and their use; Modes of communication and media. <p>Learning Outcomes: Candidates should be able to:</p>
<div style="display: flex; flex-direction: column; align-items: center; justify-content: center;"> <div style="background-color: #0070C0; color: white; padding: 5px; margin-bottom: 10px;">1</div> <div style="background-color: #FFD700; color: #0070C0; padding: 5px; margin-bottom: 10px;">T</div> </div>	<p>3.1.2.1 Describe the basic components and hardware required for network communications;</p> <p>3.1.2.2 Differentiate between different communications media (wired vs. wireless), their mode of transmission advantages and disadvantages (<i>Range: Types of cabling and components, Types of transmitters and components. (Coaxial, Twisted Pair, Fibre optic, Infrared, Radio, Cellular, Microwave, Satellite)</i>);</p> <p>3.1.2.3 Differentiate between the use, purpose and operation of different types of networking hardware (<i>Range: Digital modems (different types DSL, ADSL, Wireless, Wired), Network cards, Wireless access points, Routers, Hubs and switches</i>);</p> <p>3.1.2.4 Describe how a small office network or home office network could be installed and with an internet connection.</p>
3.1.3 Different Types of Networks and Architectures	<p>Content:</p>





		<ul style="list-style-type: none"> • Network architectures; • Topologies. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>3.1.3.1 Differentiate between Local area network (LAN) vs. metropolitan area network (MAN) vs. wide area network (WAN) - coverage and where it is used;</p> <p>3.1.3.2 Discuss the internet as a WAN;</p> <p>3.1.3.3 Define the term network architecture;</p> <p>3.1.3.4 Differentiate between different network architectures (<i>Range: client server and peer to peer and internet peer to peer</i>);</p> <p>3.1.3.5 Define the term network topology;</p> <p>3.1.3.6 Differentiate between different types of network topologies and their mode of operation advantages and disadvantages.</p>
3.2 Use of Networks and Network Software		
		<p>3.2.1 Use of Networks to Enable the Digital Era</p> <p>Content:</p> <ul style="list-style-type: none"> • Information age; • Communication networks and tools. <p>Learning Outcomes: Candidates should be able to:</p>
	 	<p>3.2.1.1 Discuss how networks enable the information age;</p> <p>3.2.1.2 Define the term e-collaboration and discuss how networks enable the concept;</p> <p>3.2.1.3 Discuss how e-concepts progress towards overcoming the digital divide (<i>Range: e-government, e-learning, e-health and e-education</i>);</p> <p>3.2.1.4 Discuss reasons for using networks such as communication, access to/sharing resources, centralisation, file and funds transfer, productivity, leisure e.g. (Chat rooms, e-Mail, FTP, Instant messaging, Web, Wiki's, Conferencing).</p>
		<p>3.2.2 Electronic Communication</p> <p>Content:</p> <ul style="list-style-type: none"> • e-Communication tools. <p>Learning Outcomes: Candidates should be able to:</p>





		 	<p>3.2.2.1 Define the term e-communication;</p> <p>3.2.2.2 Overview of applications/tools to facilitate e-communication - purpose and uses (What is it? What is it used for?) Email, Web browser, File Transfer Protocol (FTP), instant messaging, chat rooms, video conferencing and (Voice over Internet Protocol (VoIP), RSS aggregator, Weblog, text, picture and video messaging;</p> <p>3.2.2.3 Discuss, e-mail as a form of e-communication (<i>Range: Uses of email, Email accounts (Internet Service Provider (ISP) and web-based), Email addresses</i>);</p> <p>3.2.2.4 List and discuss the advantages and disadvantages of using e-mail;</p> <p>3.2.2.5 Discuss the proper use of email;</p> <p>3.2.2.6 Explain the different components of an e-mail message (<i>Range: e-mail address, addressees, attachment, and signature</i>);</p> <p>3.2.2.7 Create an e-mail address on the Internet using a client. (e.g. gmail);</p> <p>3.2.2.8 Draft and send e-mails to friends and fellow students;</p> <p>3.2.2.9 Retrieve e-mails and respond appropriately.</p>
		<p>3.2.3 Communication Software</p> <p>Content:</p> <ul style="list-style-type: none"> • Communication software. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<ol style="list-style-type: none"> 1. Describe the purpose of communication software 2. List examples of communication software
Topic 4 - Internet Technologies			
Sub-Topic	4.1 Internet and the WWW		
		<p>4.1.1 Introduction to the Internet</p> <p>Content:</p> <ul style="list-style-type: none"> • Internet; • Connectivity; • Data transmission. 	

		Learning Outcomes: Candidates should be able to:	
		 	4.1.1.1 Define the term internet; 4.1.1.2 Describe the term connectivity; 4.1.1.3 Discuss the components/constituents and the purpose of internet enabling technologies and terms. <i>(Range: Internet addresses - Internet protocol (IP) addresses and domain names);</i> 4.1.1.4 Discuss how data travels over the internet in relation to networking concepts; 4.1.1.5 Explain the different components required to connect to the internet. <i>(Range: Internet Service Providers (ISPs), wired and wireless connections).</i>
		4.1.2 Overview of the WWW Content: <ul style="list-style-type: none"> WWW; Websites; Impact of the WWW. Learning Outcomes: Candidates should be able to:	
		 	4.1.2.1 Describe the term WWW; 4.1.2.2 Provide a brief overview of the history of the internet and the WWW; 4.1.2.3 Define the terms: Web address/uniform resource locator (URL), and describe their purpose; 4.1.2.4 Differentiate between a Web page and Web site; 4.1.2.5 Discuss examples of different types of Web sites, their purpose and what they offer to their users <i>(Range: Portal, news, informational, business, weblog (blog), wiki, online social network, educational, entertainment, advocacy, web application, content aggregator, and personal web page);</i> 4.1.2.6 Discuss how the www change or impact people's life's; 4.1.2.7 Describe the functioning and purpose of the W3C.
		4.1.3 Obtaining Information and Using the WWW Content: <ul style="list-style-type: none"> Searching; Web browsers. 	

		Learning Outcomes: Candidates should be able to:	
		 	4.1.3.1 Differentiate between browsing and searching; 4.1.3.2 List examples of different web browsers; 4.1.3.3 Define the term search engine; 4.1.3.4 Describe the functioning of a search engine (overview); 4.1.3.5 Perform a search using a search engine (<i>Range: setting up search criteria, evaluating the results</i>); 4.1.3.6 Describe how a website is accessed and information obtained (How to access and browse a Web site); 4.1.3.7 Explore and use social electronic media and networks for various communication purposes. (<i>Range: Facebook, Twitter, blogs, Mxit, Skype, WhatsApp, YouTube etc.</i>).
		4.1.4 Internet Applications, Plug-ins and Web Based Services Content: <ul style="list-style-type: none"> • Online services; • Internet applications. Learning Outcomes: Candidates should be able to:	
		 	4.1.4.1 Define the term internet application and list some examples; 4.1.4.2 Describe the term plug-in applications; 4.1.4.3 Discuss examples and purpose of plug-in applications for browsers (<i>Range: PDF converters and tools, Flash player, Java, QuickTime player, Real player, Silverlight</i>); 4.1.4.4 Differentiate between Web 1.0, Web 2.0 and Web 3.0 in terms of data presentation and the provisioning of services; 4.1.4.5 Define the term social media, social platforms; 4.1.4.6 Differentiate between different social media platforms, their purpose and operation; 4.1.4.7 Discuss different media and the use of plug-ins to support the operation (<i>Range: Multimedia, Download vs. streaming, Live broadcasts, Video on-demand and IPTV (Internet Protocol Television)</i>); 4.1.4.8 Define the term Cloud in terms of different applications and services provided;

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			<p>4.1.4.9 Discuss examples of online web services and tools presented in the Cloud;</p> <p>4.1.4.10 Discuss different examples of online services (<i>Range: banking, shopping, booking / reservations</i>);</p> <p>4.1.4.11 Describe the impact of the internet on business (<i>Range (B2B, B2C)</i>).</p>
Sub-Topic	4.2 Internet Service Technologies		
		<p>4.2.1 Internet Service Technologies</p> <p>Content:</p> <ul style="list-style-type: none"> • Internet service technologies; • E-commerce. <p>Learning Outcomes: Candidates should be able to</p>	
		<p></p> <p></p>	<p>4.2.1.1 Define the term internet service technologies;</p> <p>4.2.1.2 Differentiate between different types of websites and what they offer (<i>Range: Types of websites (i.e. what they offer) Static vs. dynamic sites (ability to store data, interactivity, media, advantages, disadvantages), Location based services sites and Internet sites accessibility to mobile devices</i>);</p> <p>4.2.1.3 Describe the term e-commerce;</p> <p>4.2.1.4 Explain the advantages of e-commerce.</p>
		<p>4.2.2 Internet Service Technologies and the Digital Age</p> <p>Content:</p> <ul style="list-style-type: none"> • Service technologies; • Protocols; • Internet services. <p>Learning Outcomes: Candidates should be able to:</p>	
		<p></p> <p></p>	<p>4.2.2.1 Provide an overview of various internet service and supporting technologies by referring to their use and purpose (<i>Range: HTTP, HTTPS, FTP, VoIP, RSS, SEO (search engine optimisation), Rich Internet applications, Security services</i>);</p> <p>4.2.2.2 Differentiate between Internet vs. Intranet vs. Extranet, and discuss their use and service provisions to an organisation;</p> <p>4.2.2.3 Discuss the use and purpose of other internet</p>

			services, presented on different platforms (including mobile) <i>(Range: e-mail, Mailing lists, Chat rooms / tools and services e.g. (Facebook, Twitter, blogs, Mixit, Skype), FTP, newsgroups and RSS feeds).</i>
Sub-Topic	4.3 Principles of Web Page Development		
		4.3.1 Web Page Development and Mark-Up Languages Content: <ul style="list-style-type: none"> Different types of languages for web page development; Web pages, sites and servers; Basic web page design principles. Learning Outcomes: Candidates should be able to:	
		 	4.3.1.1 Describe the basic components of a web site with reference to a page; 4.3.1.2 Explain the process of web page design; 4.3.1.3 List common tools used for web page development; 4.3.1.4 Differentiate between a scripting language and a mark-up language; 4.3.1.5 Differentiate between different mark-up languages and their purpose; 4.3.1.6 Explain how a website is hosted; 4.3.1.7 Discuss the basic components of a web page relating to the design; 4.3.1.8 Discuss the purpose of a browser in the interpretation of web based code.
		4.3.2 Design a Basic Web Page Content: <ul style="list-style-type: none"> Basic HTML constructs; Using an editor to create HTML page for display in a browser. Learning Outcomes: Candidates should be able to:	
		 	4.3.2.1 Define the term HTML; 4.3.2.2 Define the term HTML Editor; 4.3.2.3 Define the term HTML syntax; 4.3.2.4 Discuss the structure and design components of an HTML page; 4.3.2.5 Write HTML code to develop a simple web page using a text editor <i>** See notes on this outcome.</i>



Important note on 4.3.2.5. Only an elementary page using HTML are to be constructed, in order to provide the students with the idea of how web pages are rendered and designed and that code is interpreted for rendering purposes in a web browser. An example of a simple text editor e.g. *NotePad++*.

The following commands and HTML language tags present the range:

	Opening Tag	Closing Tag
Basic document tags	<html> <head> <title> <body>	</html> </head> </title> </body>
Heading elements	<h1> <h6>	</h1> </h6>
Text elements	<p> <hr />	</p>
Text formatting	 <i>	 </i>
Numbered lists		
Bulleted list		
List Items		

HTML Comments

Use of colour (basic) using constants and values

- Background colour e.g. <body style="background:#80BFFF">
- Font and text colour e.g.
- Table colours
- HyperText and link colour





HTML links






- Link syntax: This is a link
- Attributes: target and name





HTML images





- Syntax:
- Attributes: source and alternate text.




Topic 5 - Information Systems










Sub-Topic	5.1 Data and Information Representation	
	<p>5.1.1 Data, Information, Knowledge and Wisdom</p> <p>Content:</p> <ul style="list-style-type: none"> • Data; • Information; • Knowledge. <p>Learning Outcomes: Candidates should be able to:</p>	
	 	<p>5.1.1.1 Define the terms: Data, Information, Knowledge and Wisdom;</p> <p>5.1.1.2 Define the term data representation;</p> <p>5.1.1.3 Define the purpose of data representation;</p> <p>5.1.1.4 Define the term data storage and storage modes;</p> <p>5.1.1.5 Describe the purpose of data storage;</p> <p>5.1.1.6 Revisit data hierarchy with reference to storage size and components (<i>Range: Bits, Bytes and Words</i>).</p>
	<p>5.1.2 Numbering Systems</p> <p>Content:</p> <ul style="list-style-type: none"> • Use of number systems; • Converting between numbers from different systems. <p>Learning Outcomes: Candidates should be able to:</p>	
	 	<p>5.1.2.1 Define the term numbering system;</p> <p>5.1.2.2 Describe the purpose of numbering systems and their use, and representation (<i>Range: Binary, Octal, Decimal and Hexadecimal</i>);</p> <p>5.1.2.3 Convert Decimal number into: Binary, Octal, and Hexadecimal form, and vice versa;</p> <p>5.1.2.4 Perform simple operations relating to binary numbers (<i>Range: Addition and Subtraction</i>);</p> <p>5.1.2.5 Explain how negative numbers are represented in binary (2's compliment);</p> <p>5.1.2.6 Represent a negative number in 2's compliment.</p>
	<p>5.1.3 Data Representation</p>	





		<p>Content:</p> <ul style="list-style-type: none"> Different types of data. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>5.1.3.1 Define the term data representation and its use and purpose within a computerised system;</p> <p>5.1.3.2 Differentiate between character storage and numeric data storage;</p> <p>5.1.3.3 Differentiate digital character; representation, e.g. ASCII/UTF-8, Unicode;</p> <p>5.1.3.4 Differentiate between primitive data types and their storage (integer types, text/string types).</p>
		<p>5.1.4 Data Structures</p> <p>Content:</p> <ul style="list-style-type: none"> Types of data structures; User of data structures in ICT domain. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>5.1.4.1 Define the term data structures;</p> <p>5.1.4.2 List and differentiate between examples of different data structures and data organisations, with regard to storage and representation (<i>Range: Files and Databases</i>);</p> <p>5.1.4.3 Discuss the advantages and disadvantages relating to the use of different structure (<i>Range: Files and Databases</i>);</p> <p>5.1.4.4 Discuss different reasons for using data structures;</p> <p>5.1.4.5 Describe the term database management software (DBMS) with relation to the management of different data structures.</p>
5.2 Principles of Digital Logic			
		<p>5.2.1 Logic Design</p> <p>Content:</p> <ul style="list-style-type: none"> Boolean logic. <p>Learning Outcomes: Candidates should be able to:</p>	
			<p>5.2.1.1 Define the term Boolean logic;</p> <p>5.2.1.2 Explain how Boolean logic relates to computing problems;</p>


			<p>5.2.1.3 Discuss how Boolean logic provide a system of logical operations;</p> <p>5.2.1.4 Express a Boolean algebra statement.</p>
		<p>5.2.2 Construct Simple Logical Circuits and Validate the Solution</p> <p>Content:</p> <ul style="list-style-type: none"> • Digital system concepts; • Logical diagram; • Truth tables; • Logical gates. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>5.2.2.1 Discuss the term logical diagram and its purpose;</p> <p>5.2.2.2 Discuss the term logical gate (<i>Range (NOT, AND, OR)</i>);</p> <p>5.2.2.3 Draw a simple logic diagram incorporating different gates based on a scenario or expression;</p> <p>5.2.2.4 Interpret a simple logic diagram;</p> <p>5.2.2.5 Discuss the term truth table and its purpose;</p> <p>5.2.2.6 Draw a truth table;</p> <p>5.2.2.7 Describe the operation of logic gates and respective truth tables;</p> <p>5.2.2.8 Draw a truth table for given logic circuits;</p> <p>5.2.2.9 Validate a logical design (diagram) using a truth table.</p>
Sub-Topic	5.3 Principles of Information Systems and Software Engineering		
		<p>5.3.1 Information Systems, Information Systems Design and Development</p> <p>Content:</p> <ul style="list-style-type: none"> • Information systems. <p>Learning Outcomes: Candidates should be able to:</p>	
			<p>5.3.1.1 Define the term information system;</p> <p>5.3.1.2 Describe the term system development in relation to the operations and the people involved;</p>





			<p>5.3.1.3 Describe how businesses implement information systems (<i>Range: Enterprise computing systems, Transaction processing systems, Business support systems, knowledge management systems</i>);</p> <p>5.3.1.4 Explain how various information systems fulfil their users' needs;</p> <p>5.3.1.5 Differentiate between the basic operations of common systems development approaches and the steps/phases involved (<i>Range: Software Development Life Cycle, Agile development methods, Joint Application Development and Rapid Application Development</i>);</p> <p>5.3.1.6 Describe how the information systems design (programme development) process is initiated.</p>
		<p>5.3.2 Software Engineering Principles</p> <p>Content:</p> <ul style="list-style-type: none"> • Software engineering; • Information systems design. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>5.3.2.1 Define the term software engineering;</p> <p>5.3.2.2 Explain the relationship between software engineering and information systems design;</p> <p>5.3.2.3 Differentiate between different software engineering tools and their purpose (<i>Range: data dictionary, ERD, Use cases</i>).</p>
Sub-Topic	5.4 Computer Programming and Programming Languages		
		<p>5.4.1 Principles of Software Development</p> <p>Content:</p> <ul style="list-style-type: none"> • Software Development; • PDLC. <p>Learning Outcomes: Candidates should be able to:</p>	
			<p>5.4.1.1 Define the term programming in relation to the software development process;</p> <p>5.4.1.2 Discuss the PLDC as part of the implementation phase of the SDLC;</p>





			<p>5.4.1.3 Discuss the programme development life cycle (PDLC) process as a six phased approach i.e;</p> <ol style="list-style-type: none"> i. Requirements Analysis; ii. Solution design phase including a differentiation between structured design and object-oriented design; iii. Validate the design; iv. Implement the design through coding practices; v. Test the solution; vi. Document the solution.
		<p>5.4.2 The Practice of, and Evolution of Computer Programming</p> <p>Content:</p> <ul style="list-style-type: none"> • Programming and programming languages; • Evolution of programming languages. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<ol style="list-style-type: none"> 5.4.2.1 Define the term programming; 5.4.2.2 Provide a brief overview of the evolution of programming and programming languages; 5.4.2.3 Differentiate between a high level and a low level programming language; 5.4.2.4 Differentiate between Object Oriented and Procedural Programming languages; 5.4.2.5 List examples of different programming languages; 5.4.2.6 Differentiate between compiled, interpreted and scripted programming languages; 5.4.2.7 List examples of languages used for web page development; 5.4.2.8 Differentiate between sample code of programming languages and their implementation differences. E.g. Mark-up languages, (HTML, XML) scripting languages e.g. PHP, JavaScript, Interpreted Languages, Compiled languages, Languages dependant on a virtual machine or intermediate layer etc; 5.4.2.9 Describe the common characteristics practices of a computer programmer.





Topic 6 - Social Implications			
6.1 Impact on Society			
	<p>6.1.1 ICT Impacts Society at Large</p> <p>Content:</p> <ul style="list-style-type: none"> • Use of ICT; • ICT and Society. <p>Learning Outcomes: Candidates should be able to:</p>		
	<table border="0"> <tr> <td style="text-align: center; vertical-align: middle;">   </td> <td> <p>6.1.1.1 Identify areas where ICTs influence one's life and lifestyles;</p> <p>6.1.1.2 Explain how ICT enhances daily living at home;</p> <p>6.1.1.3 Describe how ICT enhances and impacts society (<i>Range: Office practices and education, healthcare, and government, engineering, communication in the digital age, news transmission/delivery, video technology and forensics</i>);</p> <p>6.1.1.4 Explain how mobile technologies impact the emerging world;</p> <p>6.1.1.5 Describe the concept of ICT related crime (cybercrime) by referring to computer criminals – types and what they do/how they operate;</p> <p>6.1.1.6 Explain how ICTs impact on the workplace and employment practices (<i>Range: Mobile offices, virtual office, decentralisation of labour, office automation, workplace automation</i>).</p> </td> </tr> </table>	 	<p>6.1.1.1 Identify areas where ICTs influence one's life and lifestyles;</p> <p>6.1.1.2 Explain how ICT enhances daily living at home;</p> <p>6.1.1.3 Describe how ICT enhances and impacts society (<i>Range: Office practices and education, healthcare, and government, engineering, communication in the digital age, news transmission/delivery, video technology and forensics</i>);</p> <p>6.1.1.4 Explain how mobile technologies impact the emerging world;</p> <p>6.1.1.5 Describe the concept of ICT related crime (cybercrime) by referring to computer criminals – types and what they do/how they operate;</p> <p>6.1.1.6 Explain how ICTs impact on the workplace and employment practices (<i>Range: Mobile offices, virtual office, decentralisation of labour, office automation, workplace automation</i>).</p>
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	<p>6.1.2 Modern Developments and Trends</p> <p>Content:</p> <ul style="list-style-type: none"> • Emerging ICT technologies; • ICT and human advancement. <p>Learning Outcomes: Candidates should be able to:</p>		
	<table border="0"> <tr> <td style="text-align: center; vertical-align: middle;">   </td> <td> <p>6.1.2.1 Identity emerging technologies and their possible impact on society;</p> <p>6.1.2.2 Explain how emerging technologies could impact future developments of other technologies;</p> <p>6.1.2.3 Describe the influences of computer and mobile technologies on society due to globalising trends (<i>Range: Online services (online banking, booking</i></p> </td> </tr> </table>	 	<p>6.1.2.1 Identity emerging technologies and their possible impact on society;</p> <p>6.1.2.2 Explain how emerging technologies could impact future developments of other technologies;</p> <p>6.1.2.3 Describe the influences of computer and mobile technologies on society due to globalising trends (<i>Range: Online services (online banking, booking</i></p>
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			<p><i>reservations, e-learning), video conferencing, interactive whiteboards, online banking, cell phone banking and social websites e.g. Facebook);</i></p> <p>6.1.2.4 Discuss how the advancement of ICT affects the human race e.g. (Computers providing solutions to issues of national and international importance such as weather, elections and census).</p>
		<p>6.1.3 ICT and the Impact on the Economy</p> <p>Content:</p> <ul style="list-style-type: none"> Economy and ICT related issues. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.1.3.1 Define the term economy;</p> <p>6.1.3.2 List and describe some areas where ICT impacts the economy with regard to growth and development;</p> <p>6.1.3.3 Discuss the economic reasons for using computers (<i>Range: Saving paper, labour, communication costs, efficiency, accuracy and reliability</i>).</p>
		<p>6.1.4 ICT and the impact to people with disabilities</p> <p>Content:</p> <ul style="list-style-type: none"> ICT's supporting the disabled. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.1.4.1 Explain how ICT technologies are adapted to support people with living with disabilities with regard to support and accessibility;</p> <p>6.1.4.2 Discuss the options available for enhancing accessibility such as speech recognition, screen readers and magnifiers, on-screen keyboards, screen, mouse and keyboard settings.</p>
		<p>6.1.5 Cyber Crime</p> <p>Content:</p> <ul style="list-style-type: none"> Different type of cyber crime. <p>Learning Outcomes: Candidates should be able to:</p>	

		 	<p>6.1.5.1 Define the term cyber crime;</p> <p>6.1.5.2 Differentiate between different computer criminals (<i>Range: Hackers, crackers, cyber gangs and virus authors</i>);</p> <p>6.1.5.3 Discuss different types of cyber crimes;</p> <p>6.1.5.4 Discuss the effect of cyber crimes;</p> <p>6.1.5.5 Discuss Computer based crimes such as hardware, software, information, identity theft, bandwidth theft, theft of time and services;</p> <p>6.1.5.6 Discuss internet-related fraud scams;</p> <p>6.1.5.7 Discuss internet attacks (<i>Range: worms, virus, denial of service, back doors and ransom ware</i>);</p> <p>6.1.5.8 Explain the concept of unauthorised remote control and administration, e.g. botnets, zombies;</p> <p>6.1.5.9 Differentiate between the right to access vs. right to privacy, misuse of personal information;</p> <p>6.1.5.10 Discuss some safeguards against computer crimes, threats and criminals.</p>
Sub-Topic	6.2 Legal, Ethical and Security Issues		
	<p>6.2.1 Legal Issues Relating to the Use of ICT</p> <p>Content:</p> <ul style="list-style-type: none"> • ICT legal issues; • Cybercrime. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>		
		 	<p>6.2.1.1 Describe the concepts Software piracy, licensing and intellectual property;</p> <p>6.2.1.2 Describe the concept of the user's ability and responsibility to be able to recognise and acknowledge the ownership of electronic material (posts and emails and other digital content);</p> <p>6.2.1.3 Explain the concept of Information accuracy and discuss its importance and relation to potential legal issues;</p> <p>6.2.1.4 Discuss the concept of computer related crimes in relation to hardware, software, information, identity, bandwidth theft, theft of time and</p>

			services. E.g. (Internet-related fraud scams, Internet attacks, Taking over PCs, e.g. bots, zombies, Right to access vs right to privacy, Misuse of personal information).
		<p>6.2.2 Ethical Issues Relating to the Use of ICT</p> <p>Content:</p> <ul style="list-style-type: none"> • Ethical use of networks and computers; • Information privacy. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.2.2.1 Describe the concept of the ethical use of computers, care of PC system and storage devices;</p> <p>6.2.2.2 Discuss the use and application of appropriate communication etiquette;</p> <p>6.2.2.3 Discuss the concept of social engineering;</p> <p>6.2.2.4 Explain the concept of Ethical use of networks and acceptable use policies of companies and institutions;</p> <p>6.2.2.5 Discuss the concept of privacy with reference to concepts such as spyware, adware, role of databases and respecting the privacy and products of others;</p>
		<p>6.2.3 Risks and Security Related Issues With Regard to the Use of ICT</p> <p>Content:</p> <ul style="list-style-type: none"> • Cyber threats; • ICT risks; • Networking; • Safeguards. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.2.3.1 Define the terms: risk, threat and security with regard to ICT technologies;</p> <p>6.2.3.2 Explain the terms risk, threats and security issues by providing examples;</p> <p>6.2.3.3 Explain and differentiate between the concepts of: Viruses, trojans, worms, hoaxes, spam, ransomware, phishing, e-mail spoofing and pharming;</p> <p>6.2.3.4 Explain the potential risks involved with the use of email and the internet. (dangers and tips to ensure safe use);</p>

			<p>6.2.3.5 Discuss different methods and options available for protecting computerised hardware and software against potential risks and threats;</p> <p>6.2.3.6 Explain the concepts of network safety and the related security issues with regard to unauthorised access and the ethical use of networks;</p> <p>6.2.3.7 Discuss the concepts of computer and human error and the effects thereof such as accuracy and validity with regard to data input and the subsequent results produced. Range: Data types used, e.g. , database, Verification and validation of data, e.g. database, Software bugs, hardware failure.</p>
Sub-Topic	6.3 Health and Ergonomic Issues		
		<p>6.3.1 ICT's and Health Related Issues</p> <p>Content:</p> <ul style="list-style-type: none"> • Use of ICT's and personal health. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.3.1.1 Explain how the use of ICT's impacts the health of the individual user as well as that of the broader community;</p> <p>6.3.1.2 List areas where ICT could positively and negatively impact a user's health;</p> <p>6.3.1.3 Discuss some precautionary measures which could be applied to limit the potential negative impact of ICT's on a person's health.</p>
		<p>6.3.2 Ergonomic Issues</p> <p>Content:</p> <ul style="list-style-type: none"> • Ergonomics. <p>Learning Outcomes: Candidates should be able to:</p>	
		 	<p>6.3.2.1 Define the term ergonomics;</p> <p>6.3.2.2 Explain how the concept of ergonomics impacts the design of ICT tools and hardware;</p> <p>6.3.2.3 Discuss some important ergonomical considerations relating to the use of ICT tools.</p>

Sub-Topic	6.4 Environmental Issues	
	<p>6.4.1 Impact of the Use of ICT on the Environment</p> <p>Content:</p> <ul style="list-style-type: none"> • ICT and the environment; • Green computing. <p>Learning Outcomes: Candidates should be able to:</p>	
	 	<p>6.4.1.1 Define the term green computing;</p> <p>6.4.1.2 Define the term e-waste;</p> <p>6.4.1.3 Discuss how the use of ICT's impacts the environment with regard to e-waste management and green computing;</p> <p>6.4.1.4 Explain how the environmental impact of the use of computers could be reduced.</p>
	<p>6.4.2 Responsible Use of Computers</p> <p>Content:</p> <ul style="list-style-type: none"> • Impact of computers to the environment. <p>Learning Outcomes: Candidates should be able to:</p>	
	 	<p>6.4.2.1 Describe the role of the user in relation to the impact towards the environment;</p> <p>6.4.2.2 Discuss how an individual user could make a difference;</p> <p>6.4.2.3 Discuss how organisations could make a difference to limit the impact on the environment.</p>
6.5 Careers in ICT		
	<p>6.5.1 ICT Careers</p> <p>Content:</p> <ul style="list-style-type: none"> • ICT careers; • ICT skills and opportunities. <p>Learning Outcomes: Candidates should be able to:</p>	

		 	<p>6.5.1.1 Define the term ICT-related career;</p> <p>6.5.1.2 Describe examples of ICT-related careers (Range: General business context, organisational IT departments, computer hardware field, computer software field, computer service and repair field, communication and network related fields, education and training fields, IT consultant (development, design and analysis, and testing), and the use of computers and technology for automation purposes in the industry.</p>
		<p>6.5.2 Training and Certification</p> <p>Content:</p> <ul style="list-style-type: none"> ICT certification. <p>Learning Outcomes:</p> <p>Candidates should be able to:</p>	
		 	<p>6.5.2.1 Define the term ICT certification;</p> <p>6.5.2.2 List examples of ICT certification qualifications and their impact towards career development;</p> <p>6.5.2.3 Discuss the common characteristics and skills required to become a professional ICT specialist.</p>

Appendices

Suggested structure of exam papers and weighting of questions and mark allocations

Paper 1: One 3-Hour Written Paper of 180 Marks

Main Topic Area / Section	Sub-Topics (Broad Content)	Suggested Mark Allocation Per Topic in Paper 1
Systems Technologies	<ul style="list-style-type: none"> • Concepts of Computing • Hardware • Software • Computer Management 	20
Solution Development	<ul style="list-style-type: none"> • Generic Problem-Solving principles: <ul style="list-style-type: none"> • Algorithms; • Evaluations of pseudo code; • Determine the output; • Database related content. 	15
Network Technologies	<ul style="list-style-type: none"> • Introduction to networks and communications • Use of networks 	10
Internet Technologies	<ul style="list-style-type: none"> • Internet and World Wide Web • Internet Service Technologies • Principles of web page development 	15
Information Systems	• Data and Information Representation	20
	• Principles of digital logic and systems	20
	• Principles of information systems and software engineering	10
	• Theory of Computer Programming and Programming languages	10
Social Implications	<ul style="list-style-type: none"> • Impact on Society • Legal and Ethical and Security Issues • Health and Ergonomic Issues • Environmental Issues • Careers in ICT 	10
Integrated Scenario	<p>This section is based on a single scenario and will be aligned to all the topics.</p> <p>This section will also assess the understanding of these technologies to make informed decisions in a real-life end-user scenario, ranging from choices of technology to its responsible use.</p>	20
TOTAL		150

Paper 2: One 4-Hour Practical Computer Based Paper of 150 Marks

Suggested Mark Allocation

Main Topic Area	Sub-Topics (Broad Content)	Suggested Mark Allocation Per Topic in Paper 2
Solution Development	• Word Processing	20
	• Spreadsheets	40
	• Databases	30
	• Presentation software	10
	• Problem-Solving and Introduction to Computer Programming <ul style="list-style-type: none"> • One question where a complete solution should be developed +/- 30 Marks • One question where adaptations or alternates are to be made to the given solution or partial solution +/- 15 Marks • One question on a very basic level, based on lower order skills. (Recall an algorithm etc.) +/- 15 Marks 	60
	• HTML / Web page	15
Integrated Problem	• Integration and application of techniques, knowledge and procedural skills to new situations	20
TOTAL		180

Access to Students With Disabilities

Students with disabilities should not be discouraged to enrol for the subject.

According to a report released by the UN (2013:1) entitled “ICT Opportunity for a Disability-Inclusive Development Framework”, it is emphasised that: “the use of Information and Communication Technologies (ICTs) allow the removal of many of the remaining barriers faced by persons with disabilities. With ICTs increasingly integrated into every aspect of the modern world, these ubiquitous technologies have become a positive force of transformation and a crucial element of any personal development/empowerment and institutional framework for inclusive development.”¹

Various diverse assistive technologies are available for use by persons with disabilities. Tools exist to facilitate, enhance and assist people with hearing disabilities, the visual impaired and blind. (One such tool is the JAWS screen reader for visually impaired or blind students) Students with limited motor skills and movement could also use adapted hardware.

Recommendation Towards the Standardisation of Software Tools

The software tools used for the ICT curriculum should be standardized as follows:

- Programming Content;
 - Scratch.
- Applications;
 - MS Office, latest two version available.
- Webpage development;
 - Notepad++.

Using a variety of software tools to implement the curriculum complicates the synchronization of the differences and complexities of the various tools when conducting a national examination. The complexity and synchronisation is affected in terms of the balancing of the cognitive difficulty levels of the questions, as well as technical problems that may arise by not using the same tool and or version.

Non-standardisation also impacts on issues such as:

- Teacher training;
- Resource and LTSM development;
- Migration of Students.

¹ UN (United Nations), 2013. The ICT Opportunity for a Disability-Inclusive Development Framework [Online] Available at: www.itu.int/accessibility [Accessed: 2015/06/05]



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA