



Republic of Zambia

**Ministry of Education, Science, Vocational Training and Early Education**

# **COMPUTER STUDIES SYLLABUS**

**GRADES 10 TO 12**



Prepared and Published by the Curriculum Development Centre  
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Lusaka

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## **VISION**

Quality, lifelong education for all which is accessible, inclusive and relevant to individual, national and global needs and value systems.

**FINAL DRAFT**

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FINAL DRAFT

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## PREFACE

The syllabus was produced as a result of the Curriculum review process carried out by the Ministry of Education, Science, Vocational Training and Early Education under the auspices of the Curriculum Development Centre (CDC). The curriculum reform process started way back in 1999 when the Ministry of Education commissioned five (5) curriculum studies which were conducted by the University of Zambia. These studies were followed by a review of the lower and middle basic and primary teacher education curriculum. In 2005 the upper basic education National survey was conducted and information from learners, parents, teachers, school managers, educational administrators, tertiary institutions traditional leaders civic leaders and various stakeholders in education was collected to help design a relevant curriculum.

The recommendations provided by various stakeholders during the Upper Basic Education National survey of 2005 and National symposium on curriculum held in June 2009 guided the review process.

The review was necessitated by the need to provide an education system that would not only incorporate latest social, economic, technological and political developments but also equip learners with vital knowledge, skills and values that are necessary to contribute to the attainment of Vision 2030.

The syllabus has been reviewed in line with the Outcome Based Education principles which seek to link education to real life experiences that give learners skills to access, criticize analyse and practically apply knowledge that help them gain life skills. Its competences and general outcomes are the expected outcomes to be attained by the learners through the acquisition of knowledge, skills, techniques and values which are very important for the total development of the individual and the nation as a whole.

Effective implementation of Outcome Based Education requires that the following principles be observed: clarity of focus, Reflective designing, setting high expectations for all learners and appropriate opportunities.

It is my sincere hope that this Outcome Based syllabus will greatly improve the quality of education provided at Grade 10 to 12 level as defined and recommended in various policy documents including Educating Our Future 1996 and the Zambia Education Curriculum Framework 2013.



Chishimba Nkocha  
Permanent Secretary  
MINISTRY OF EDUCATION, SCIENCE, VOCATIONAL TRAINING AND EARLY EDUCATION.

## ACKNOWLEDGEMENT

The syllabus presented here is a result of broad-based consultation involving several stakeholders within and outside the education system.

Many individuals, institutions and organizations were consulted to gather their views on the existing syllabus and to accord them an opportunity to make suggestions for the new syllabus. The Ministry of Education wishes to express heartfelt gratitude to all those who participated for their valuable contributions, which resulted in the development of this syllabus.

The Curriculum Development Centre worked closely with other sister departments and institutions to create this document. We sincerely thank the Directorate of Teacher Education and Specialized Services, the Directorate of Planning and Information, the Directorate of Human Resource and Administration, the Directorate of Open and Distance Education, the Examinations Council of Zambia, the University of Zambia, Copperbelt University, schools and other institutions too numerous to mention, for their steadfast support.

We pay special tribute to co-operating partners especially JICA and UNICEF for rendering financial and technical support in the production of the syllabus.



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Director-Standard and Curriculum

MINISTRY OF EDUCATION, SCIENCE, VOCATIONAL TRAINING AND EARLY EDUCATION

## RATIONALE

Computer Studies is about how computers compute. It is much more than computer programming. Computer Studies is the study of ways of representing objects and processes. It involves defining problems; analysing problems; designing solutions; and developing, testing, and maintaining programs. The term Computer Studies refers to the study of Computer Studies, meaning computer and algorithmic processes, including their principles, hardware and software designs, their applications, and the impact they have on society.

The major focus of this subject is the development of programming skills, which are important for success in future postsecondary studies. Computer Studies is relevant for all students because it incorporates a broad range of transferable problem-solving skills and techniques, including logical thinking, creative design, synthesis, and evaluation. It also teaches generically useful skills in such areas as communication, time management, organization, and teamwork.

Computer Studies will provide students with the knowledge and skills to understand the underpinnings of current computer technology and prepare them for emerging technologies. A foundation in this discipline will introduce students to the excitement and opportunities afforded by this dynamic field and will begin to prepare them for a range of rewarding careers.

The subject will build a strong foundation for those who wish to move on to further study and training in specialized areas such as computer programming, database development and analysis, education, computer engineering, software engineering, information technology, and game development.

## GENERAL OUTCOMES

- To build a strong foundation for further study and training in specialized areas such as computer programming, database analysis, education, computer engineering, software engineering, information technology, and game development.

To act as an electronic tool for learning other learning areas

## Key Competences

- **Understand and apply requirements of Computer Studies ethics and security.**  
Learners are expected to be competent in applying the new knowledge so acquired in advancing their daily lives of those of others. They should be able to use computer related software, gadgets and appliances without difficulty. They should also be able to understand the language that is normally used in programming.

Awareness of the risks of using the computer is also important at this level. Software and hardware security is also of great importance at this level.

- **Share their knowledge and skills through the internet**

The Internet is a very powerful media of communication nowadays. After learning CS learners should be able to find useful information using the Internet. They should also be aware of the dangers of using the Internet. The correct use of email addresses for formal communications purposes is vital and. Collaborate and share knowledge and ideas with others.

- **Create simple programs to help the school achieve its goals and other advertisement materials for the school events.**

Learners are expected to be conversant in using multimedia software at this level of education. Learners should be able to correctly use word processing and presentation software.

- **Carry out a simple system design and analysis**

To enhance their understanding at this level learners will be expected to carry out simple system analysis and design in a programming language of their choice.

## Suggested Teaching Methodology

Computer Studies Syllabus offers a wide perspective of the subject. It gives more insights to the Junior Secondary Information and Communications Technology (ICT) syllabus, bringing to the fore Computer application and its impact on society. Computer Studies will be learnt within the context of application. As such, activities, projects and problem solving that replicate real life will form an integral part of the teaching and learning methodologies.

The Senior Secondary School Computer Studies syllabus is meant to prepare learners for the world of work (through application), further education within the discipline and lifelong learning. Computer Technology is extremely dynamic and significantly always impacting on the way we live. Learners should be made to appreciate the constantly changing computer technology and its complexities if they are to become competitive citizens in today's globalised world.

Using computers is an essential part of the study of Computer Studies. Use of computers in Computer Studies facilitates the understanding of and Computer Studies processes and inquiry. Using computers can enhance learning opportunities for a wide range of learners because it caters for a variety of learning and teaching styles.

Principles and procedures



Learners need to develop skills to help them learn. Skills development should happen as a part of learners' learning experiences and the learning and practising of skills needs to occur in the context of units being taught.

Learning of Skills tends to be most effective when:

- learners go from the known to the unknown
- learners understand why it is necessary to gain mastery of specific skills
- skills are developed sequentially at increasing levels of difficulty
- learners identify and analyse the components of the skill
- there are frequent opportunities for practice and immediate feedback possibly frequent use of computer or computer embedded gadgets or tools.
- the skills being taught are varied in terms of amount and type, according to the needs and ability of learners

To teach skills effectively, a teacher needs to include learning activities that span from teacher-directed to student-centred learning, use groups of different sizes ranging from the whole class to small groups and use a range of teaching strategies which use higher-order skills as learners' progress.

### **Teaching and Learning Strategies for Computer Studies**

Teaching and learning strategies for Computer Studies shall include:

Brainstorming - to stimulate creative thinking, Consequence charts - Cause and effect approach, Classroom displays (focuses on the current unit), Charts, Flow charts, Diagrams, Evaluation, Discussion, Guest speaker or visitor, educational tours and visits, Models, Photographs and pictures, Presentations, Problem solving - Learners are involved in identifying and working towards solutions, Reflective learning - thinking about what has been learnt, Research - to think of the questions you want learners to answer, and Project work.

### **Software**

Throughout the course the recommended Operating System (OS) is Microsoft Windows 7. Office 2010 or later versions will also be assumed for use to demonstrate word processing (Word), spread sheets (Excel), multimedia, and databases (Access). The programming compilers to be used are Turbo Pascal for Windows, C or , C++ for Windows .

Pascal programming language is a powerful tool for teaching programming language because of its:

1. **Built in Data Types.** This means that the Pascal programming language contains it's own built in data types of Integer, Real, Character, and Boolean.

2. **User defined Data Types**, which gives Pascal the ability to define scalar, types as well as subranges of those data types.
3. **Provision for a defined set of Data Structures**. This means that data structures include Arrays, Records, Files and Sets.
4. **Strong data typing element**. This means that Pascal compilers can diagnose an incompatible assignment of one type to a variable to another type.
5. **Support for Structured Programming**. This is accomplished through the use of subprograms called procedures and functions.
6. **Simplicity and Expressiveness**. The language is simple and expressive in nature and it allows for effective teaching of computer programming techniques.

## TIME AND PERIOD ALLOCATION

This syllabus covers a three-year course in Computer Studies and will require at least four 40-minute periods per week to complete (one double for practical and two single periods for theory). Sequence of the syllabus does not necessarily dictate the order in which topics are to be taught.

## ASSESSMENT SCHEME

The assessment framework utilises various types of continuous assessment strategies. This is meant to determine learners' competences in the CSc. outcomes presented here. It is desired that the teacher utilise assessment strategies that promote active learning by the learner. The case in point includes portfolios, observation sheets (to gauge certain competences), written assignments and reports, presentations, projects and experiments.

Computer Studies is a practical subject and as such this syllabus places a lot of emphasis on the use of common programming languages. Simple object oriented programming languages may be examined at this level. It is therefore the schools' responsibility to ensure that relevant programming software, compilers, equipment and facilities needed by learners to meet the minimum requirements for assessment purposes are acquired.

The teacher may teach learners to dry run simple programs before they actually compile and run them on a compiler. The teacher may choose a programming language for the learners depending on the availability of such 4<sup>th</sup> generation programming language (4GL). However for uniformity purposes the syllabus assumes Turbo Pascal for Windows and C++.

The final assessment of Computer Studies is divided into two sections.

1. Theory (Paper 1) - (External assessment by the examination board): 70%
2. Practical (Paper 2) - (External – Examination board): 30%

Computer Studies assessment at senior secondary school level covers the six categories of Bloom's Taxonomy with their respective weightings as shown below:

	<b>PAPER 1</b>	<b>PAPER 2</b>	
SKILLS	PERCENTAGE (%)	SKILLS	PERCENTAGE (%)
Knowledge	13	Report	5
Comprehension	8	4GL Programming project	15
Application	15	Demonstration	10
Analysis	8		
Synthesis	13		
Evaluation	13		
TOTAL	70		30

It is important that the teacher balances well the teaching of the subject content accordingly. For the full details on paper 2 project work check the appendix (page xiii).

## GRADE 10

<b>General Outcomes</b>	<b>Key Competences</b>
<ul style="list-style-type: none"><li>• Promote an appreciation of the range and power of computer application</li><li>• Develop an interest, confidence and enjoyment in the use of computers</li></ul>	<ul style="list-style-type: none"><li>• Solve problems by using the Help facility in the software application</li><li>• Apply knowledge and skills using software/ programming to solve related problems in spreadsheet, databases, graphics, web pages and software development.</li><li>• Share knowledge and skills</li><li>• Create posters and other advertisement materials for the school events.</li><li>• Collaborate and share knowledge and ideas with others.</li><li>• Understand and apply requirements of ICT ethics and security.</li></ul>

## GRADE 10

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
10.1 Computer career opportunities	10.1.1. Careers in ICT 10.1.2. Further Educational opportunities	10.1.1.1 Describe different careers in ICT. 10.1.1.2 Identify opportunities for further education	<ul style="list-style-type: none"> <li>Careers in ICT(Include: Computer operator, Programmer , Software engineer, Web Designer, Computer Techniiian)</li> <li>Further education (colleges, polytechnics, universities, and research institutions)</li> </ul>	<ul style="list-style-type: none"> <li><b>Interpretation</b> of ICT careers</li> <li><b>Identification</b> of opportunities for further education.</li> </ul>	<ul style="list-style-type: none"> <li><b>Appreciation</b> of ICT careers</li> <li><b>Awareness</b> of ICT careers</li> <li><b>Inquisitiveness</b> in ICT jobs and careers.</li> </ul>
10.2 Application Software	10.2.1 Generic Application Software.	10.2.1.1 Understand the difference between application and system software. 10.2.1.2 Understand how generic application software may be customised by the use of macros and formulae 10.2.1.3 Appreciate the advantages and disadvantages of generic application software compared with bespoke software 10.2.1.4 Classify types of software 10.2.1.5 Outline the usage of different types of software 10.2.1.6 Distinguish between integrated and stand-	<ul style="list-style-type: none"> <li>Difference between application and system software.</li> <li>Word processing and desktop publishing programs</li> <li>Features of Spread sheet programming (Include: logical conditions e.g. IF (C5&gt;300, C5*5%, “No Discount”)</li> <li>Use of different types of software (Include: Special purpose application packages for people with special needs)</li> <li>Integrated and stand-alone software</li> <li>Off- the-shelf and in- house software</li> </ul>	<b>Differentiation</b> between application and system software <b>Application</b> of features of spreadsheet. <b>Appreciation</b> of disadvantages and advantages of application software.	<b>Inquisitiveness</b> in the use of logical conditions in spreadsheet. <b>Teamwork</b> in the application of spreadsheet and use of logical conditions. <b>Understanding</b> between application and system software.

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		10.2.1.7 alone software Distinguish between off-the-shelf and in-house software			
11.3 Programing	10.3.1. Programming languages 10.3.2. Program Structure 10.3.3. Programming Reserved Words 10.3.4. Data Types	10.3.1.1 Illustrate the concept of Programming languages 10.3.2.1 Identify program structure 10.3.3.1 Identify programing reserved words in a Programming language ( Include: Reserved words in Pascal version 7 and C++ for Windows 7 and 8) 10.3.4.1. Identify Pre-defined Data Types 10.3.4.2. Create User Defined Data types 10.3.4.3. Declare the variables 10.3.4.4. Code simple programs in a programming language (Include: Pascal and C++)	<ul style="list-style-type: none"> <li>• Concept of Programming languages</li> <li>• Program Structure (Include: Program name, variable declaration, beginning, main body, ending)</li> <li>• Use of reserved words (Include: begin, read, write, writeln, readln, end)</li> <li>• Pre-defined data types</li> <li>• User-defined Data types</li> <li>• Types of variables (Include: Real, integers, character, Boolean)</li> <li>• Simple programs in a chosen programming language.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulations</b></li> <li>• <b>Identification</b> of reserved words</li> <li>• <b>Problem Solving</b> in programming.</li> <li>• <b>Modelling</b> in finding a solution to a program.</li> <li>• <b>Matching</b> numbers to data type.</li> <li>• <b>Debugging</b> of a computer program.</li> <li>• <b>Application</b> of computer programming to solving simple mathematical and physics problems.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Appreciation</b> of programming.</li> <li>• <b>Awareness</b> of reserved words in programming.</li> <li>• <b>Logical Thinking</b> in programming computer.</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
10.2 Data Representation and processing	10.2.1. Data and information 10.2.2. Data collection and preparation 10.2.3. Analogue-to-digital converters and digital-to-analogue converters. 10.2.4. Types of data representation 10.2.5. Binary arithmetic operations.	10.2.1.1 Explain the difference between Data and information 10.2.2.1 Describe and select methods of data collection and preparation 10.2.3.1 Describe analogue-to-digital converters and digital-to-analogue conversion. 10.2.5.1 Describe concepts of data representation 10.2.5.2 Outline reasons for data representation 10.2.6.1 Describe the terms for data storage/capacity 10.2.6.1 Explain the number systems and their representation of integral values 10.2.6.2 Demonstrate binary addition and subtraction and their use in computing 10.2.6.3 Explain data processing cycle	<ul style="list-style-type: none"> <li>• Difference between Data and information</li> <li>• Methods of data collection and preparation</li> <li>• Analogue-to-digital converters and digital-to-analogue conversion.</li> <li>• Data representation.</li> <li>• Reasons of data representation</li> <li>• Data storage/capacity (Include: bit, byte)</li> <li>• Number systems and their representation of integral values (decimal, binary, octal and hexadecimal</li> <li>• Binary addition and subtraction and their use in computing</li> <li>• Data processing cycle, errors and data integrity</li> <li>• Types of computer processing file</li> <li>• Electronic data processing modes</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Addition</b> and subtraction of binary numbers.</li> <li>• <b>Modelling/analysis of</b> data and information.</li> <li>• <b>Discrimination</b> between data and information</li> <li>• <b>Trouble shooting</b> when converting of analogue to digital and digital to analogue</li> <li>• <b>Interpretation</b> of data and information.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Appreciation</b> of storage capacity</li> <li>• <b>Problem solving converting</b> of analogue to digital and digital to analogue</li> <li>• <b>Accuracy</b> in conversions of data</li> </ul> <p><b>Critical and analytical thinking</b> in the presentation of data.</p>
10.3 Hardware of the computer system	10.3.1. Main hardware components of a general-purpose computer 10.3.2. Computers and	10.3.1.1. Investigate different types of input devices 10.3.1.2. Demonstrate usage of each input device 10.3.2.1. Describe the elements of input stage	<ul style="list-style-type: none"> <li>• Types of input devices (Include: mouse, keyboard, scanner, OCR, MICR, OMR, Special purpose input devices for people with special</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Discrimination</b> of main components of a computer system.</li> <li>• <b>Inputting</b> data</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Critical and creative thinking</b> on how connected the hardware is in a computer</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
	processing power 10.3.3. Input devices and their uses 10.3.4. Output devices and their uses	10.3.2.1. Identify the registers 10.3.2.2. Demonstrate the principle of fetch – execute cycle 10.3.4.1. Identify types of output devices 10.3.4.2. Distinguish between the various types of output devices	needs) and their usage. <ul style="list-style-type: none"> <li>• Elements of process stage (memory , control unit , arithmetic and logic unit—ALU)</li> <li>• Types of registers</li> <li>• Principle of fetch – execute cycle</li> <li>• Types of output devices(printer ,Monitor, LCD projectors, Special purpose out devices for people with special needs)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identification</b> of different components of computer system hardware.</li> <li>• <b>Demonstration</b> on the use of computer system hardware</li> <li>• <b>Distinguishing</b> between various types of input</li> </ul>	system. <ul style="list-style-type: none"> <li>• <b>Problem solving</b> in fetching and executing of a cycle.</li> </ul>
10.4 Operating systems and file management	10.4.1. Types of operating systems 10.4.2. User interface 10.4.3. File management 10.4.4. Peripheral device control	10.4.1.1. Introduction to operating systems 10.4.1.2. Outline different types of operating systems 10.4.1.3. Describe the functions of operating systems 10.4.1.4. Describe different types of user interface 10.4.1.5. Describe types of file organisation and access 10.4.1.6. File management 10.4.1.7. Peripheral device control 10.4.1.8. Explain how folders are structured and how folders and files can be managed	<ul style="list-style-type: none"> <li>• Types of operating system (Include: Command line , Graphic User Interface-GUI)</li> <li>• Different types of operating systems</li> <li>• Functions of operating system (Include: task scheduling, memory management, control of input/output)</li> <li>• Different types of user interface</li> <li>• File organisation and access(Include: sequential, direct, random, and serial)</li> <li>• Principles of backing up</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Discrimination</b> of operating systems</li> <li>• <b>Problem solving</b> in the using of peripheral devices</li> <li>• <b>Identification</b> of functions of operating systems.</li> <li>• <b>Application</b> of computer peripherals</li> <li>• <b>Appreciation</b> of user interface.</li> <li>• <b>Identification</b> of communication</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Maintenance</b> of Data integrity</li> <li>• <b>Responsibility</b> in the use of peripherals.</li> <li>• <b>Awareness</b> of data integrity.</li> <li>• <b>Inquisitiveness</b> in the use of operating systems.</li> </ul>



TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		10.4.1.9. Describe how the operating system communicates with peripheral devices and maintains data integrity.	<ul style="list-style-type: none"> <li>data (backup, restore)</li> <li>Managing folders and files</li> <li>Communication between operating system and peripheral devices and maintenance of data integrity.</li> </ul>	between operating system with peripheral devices and maintenance of data integrity.	
10.5 Presentation Packages	10.5.1. Introduction to Presentation Packages 10.5.2. Creating slides 10.5.3. Adding animations to slides 10.5.4. Formatting Slides	10.5.1.1 Illustrate the general features of a Presentation Package 10.5.2.1 Demonstrate the various methods of creating slides 10.5.3.1 Describe the steps in adding animations to slides 10.5.4.1 Demonstrate how to format slides	<ul style="list-style-type: none"> <li>Features of a Presentation Package</li> <li>Various methods of creating slides.</li> <li>Adding animations to slides.</li> <li>Formatting slides.</li> </ul>	<ul style="list-style-type: none"> <li><b>Manipulation</b> of presentation packages</li> <li><b>Identification</b> of steps needed to create slides.</li> <li>Discrimination</li> <li><b>Ordering</b> slides</li> <li><b>Presentations</b> using presentation package</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem solving</b> in making presentations</li> <li><b>Logical thinking</b> in animating presentations.</li> <li>Productivity</li> <li><b>Accuracy</b> in formatting slides.</li> </ul>
10.7 General computer applications	10.7.1. Introduction to range and scope of computer applications 10.7.2. Communication in systems 10.7.3. Information systems	10.7.2.1 Demonstrate an understanding of computer applications in a home environment, offices, commercial environment communication and information systems, commercial 10.7.3.1 Identify general data processing, industrial, technical	<ul style="list-style-type: none"> <li>Application of computers in a home environment (Include: washing machines, Entertainment appliances), offices (Communication- Internet and Intranet), commercial environment (include: - point of sale, stock controls, traffic control) and in training.</li> <li>Data processing, industrial, technical and</li> </ul>	<ul style="list-style-type: none"> <li><b>Identification</b> of computer applications in homes, offices and commerce.</li> <li>Interpretation of use of computer systems</li> <li><b>Problem solving</b> in finding a suitable application system for a</li> </ul>	<ul style="list-style-type: none"> <li>Appreciation of communication and information systems.</li> <li><b>Critical and analytical thinking</b> in the use of computer systems in a home and information</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		and scientific uses.	scientific uses.	specific task. <ul style="list-style-type: none"> <li>• <b>Application</b> of communication and information systems in a home and workplace.</li> </ul>	
10.8 Computer Security (Assets)	10.8.1. Security terminology 10.8.2. Security layers 10.8.3. Security Concerns 10.8.4. Professional Persons involved in security matters 10.8.5. Surveillance of staff	10.8.1.1 Describe security terminologies 10.8.2.1 Describe the systems security policy structure 10.8.3.1 Describe and resolve various security concerns towards resources 10.8.4.1 Identify computer security Professionals 10.8.1.1. Explain the responsibility of computer security professionals	<ul style="list-style-type: none"> <li>• Security terminologies</li> <li>• System Security policy structure</li> <li>• Resources (Assets) that require security</li> <li>• Various security concerns towards resources</li> <li>• Computer security professionals</li> <li>• Responsibilities of computer security personnel</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identification</b> of security layers.</li> <li>• <b>Comparing</b> and contrasting security layers</li> <li>• <b>Implementation</b> of security measures</li> <li>• <b>Application</b> of security to computers and peripherals.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Appreciation</b> of security layers</li> <li>• <b>Awareness</b> of security professionals.</li> <li>• Problem solving</li> <li>• <b>Responsibility</b> computer and data security.</li> <li>• <b>Inquisitiveness</b> in the security measures of a computer system.</li> </ul>

## GRADE 11

### General Outcomes

- Develop an ability to solve problems using computing techniques and programming
- Develop an awareness on the relevance of computing in contemporary society and issues brought about by computer usage
- Gain firm understanding of basic techniques and knowledge required for computer application
- Foster a desire to use computers within other professions

### Key Competences

- Apply appropriately search techniques such as Boolean logic, use of advanced search features.
- Apply knowledge and skills using software/ programming to solve related problems in spread sheet, databases, graphics, web pages.
- Be innovative by using appropriate software.
- Make correct decisions about the best features to use within chosen application software.
- Understand and apply requirements of ICT ethics and security.
- Carry out a detailed research programme related to computing.

## GRADE 11

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
11.1 Programming and Pseudo Code Algorithms	11.1.1 Computer programming	11.1.1 Identify Programming terminology in Pascal and C++	<ul style="list-style-type: none"> <li>Programming terminology in Pascal and C++(Include: assembler, compiler, interpreter, <i>add, subtract, multiply, divide, calculate</i>)</li> <li>Algorithm for a given problem in pseudocode using a variety of structures and the concepts of totalling and counting.</li> <li>Loops and decision making in a program i.e. conditions and iterations statements (Include: <i>Repeat ... until; if ... then ...else, ... endif, case...of ... otherwise ... endcase, while... do ... endwhile, for ... end for</i>)</li> <li>Dry run with a trace table and test data to understand the behaviour and</li> <li>Work out the purpose of a pseudocode algorithm.</li> <li>Trace table for pseudocode.</li> </ul>	<ul style="list-style-type: none"> <li><b>Identification</b> of reserved words</li> <li><b>Debugging</b> of a computer program.</li> <li><b>Application</b> of computer program</li> <li><b>Manipulation</b> of programming languages</li> <li><b>Identification</b> of components of a programming language</li> </ul>	<ul style="list-style-type: none"> <li><b>Productivity</b> in the use of programming languages</li> <li><b>Creativity</b> in programming.</li> </ul>
	11.1.2	11.1.2 Produce an algorithm for a given problem in pseudo code using a variety of structures and the concepts of totalling and counting			
11.2 Logic gates, circuits and Website designing	11.2.1. Logic gates and circuits	11.2.1.1 Define functions of five types of logic gates and recognise their symbols	<ul style="list-style-type: none"> <li>Elements of logic gates</li> <li>Five types of logic gates and recognise their symbols ( Include: AND, OR , NOR , NAND , NOT)</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem solving</b> in the use of logic gates</li> <li><b>Demonstration</b> on creating web</li> </ul>	<ul style="list-style-type: none"> <li><b>Entrepreneurship</b> in creating simple websites.</li> <li><b>Accuracy</b> in the use of logic gates.</li> </ul>
	11.2.2. Introduction to Web site Design and	11.2.1.2 Write a truth table for			

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT			
			KNOWLEDGE	SKILLS	VALUES	
	Development	<p>a given gate and recognise a gate from its truth table</p> <p>11.2.1.3 Produce a truth table for a given logic circuit</p> <p>11.2.1.4 Design a simple logic circuit to provide a solution to a written logical statement of a problem.</p> <p>11.2.2.1. Create Web Pages using templates (Include: HTML and Design windows in Dreamweaver).</p> <p>11.2.2.2. Import text and pictures in a web designer.</p> <p>11.2.2.3. Use Flash to animate files and pictures in websites.</p>	<ul style="list-style-type: none"> <li>• Truth tables for a given gate.</li> <li>• Logic circuits (Include: Combinational logic circuits with two or three inputs only)</li> <li>• Web Pages</li> <li>• Text and pictures in a web designer.</li> <li>• Flash to animate files and short videos in websites.</li> </ul>	<p>pages using Dreamweaver.</p> <ul style="list-style-type: none"> <li>• <b>Appreciation</b> of web designing.</li> <li>• <b>Previewing</b> a web site design.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inquisitiveness</b> in the use of web designing software.</li> <li>• <b>Modelling</b> in finding a solution to a program.</li> </ul>	
11.3	Networks and Data Communication	<p>11.3.1. Networks Purpose and limitations</p> <p>11.3.2. Elements of Networking</p> <p>11.3.3. Network topologies</p> <p>11.3.4. Analogue-to-digital converters and digital-to-analogue converters</p>	<p>11.3.1.1 Define computer networks and data communication</p> <p>11.1.1.2 Explain the purpose and limitations of networks</p> <p>11.3.2.1 Identify the elements of Networks</p> <p>11.3.3.1 Types of topologies (Include: Star, Bus, Ring, Mesh, Tree)</p> <p>11.3.4.1 Converting</p>	<ul style="list-style-type: none"> <li>• Computer networks and data communication</li> <li>• Purpose (include: resource sharing, remote communication, distributed processing facilities, cost effectiveness and reliability)</li> <li>• Limitations of networking</li> <li>• Elements of a Networks-</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interpretation</b> of various networks</li> <li>• <b>Identification</b> digital converters.</li> <li>• <b>Awareness</b> of data protection legislation.</li> <li>• <b>Awareness</b> of recent developments in the use of the Internet.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Appreciation</b> of the use of networks.</li> <li>• <b>Inquisitiveness</b> of use of networks.</li> <li>• <b>Understanding</b> of various networks and topologies</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
	11.3.5. Data capture and checking 11.3.6. Data protection legislation 11.3.7. Computer crime 11.3.8. Computer viruses 11.3.9. Internet security	analogue-to-digital converters and digital-to-analogue converters 11.3.5.1 Identify Data capture and checking 11.3.6.1 Demonstrate data protection legislation 11.3.7.1 Identify Computer crime 11.3.8.1 Discuss consequences of Computer viruses 11.3.9.1 Identify Internet security.	Data communication media (cables and wireless), Data signal (digital and analogue), Communication devices (modems, network cards and hubs) and Network software (operating systems and protocols) <ul style="list-style-type: none"> <li>• Network topologies (Include: star, bus and ring)</li> <li>• Analogue-to-digital converters and digital-to-analogue converters</li> <li>• Data capture and checking</li> <li>• Data protection legislation</li> <li>• Computer crime</li> <li>• Consequences of Computer viruses (Include: Antiviruses, bad programs)</li> <li>• Internet security</li> <li>• Recent developments in the use of the Internet.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Application</b> of networks to communicate</li> </ul>	
11.4 Computer system	11.4.1. Types of computer systems 11.4.2. Monitoring and control systems 11.4.3. Automation and robotics	11.4.1.1 Distinguish between types of computer system 11.4.2.1 Illustrate what is needed to support various types of computer system	<ul style="list-style-type: none"> <li>• Types of computer system (Include: Batch processing systems, interactive systems, control systems, automated systems).</li> <li>• Information system for on-</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identification</b> of databases and their use.</li> <li>• <b>Awareness</b> of databases concepts.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inquisitiveness</b> in web browsers and their use.</li> <li>• <b>Productivity</b> in the use of web browsers and search engines.</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
	<p>applications</p> <p>11.4.4. Expert systems and artificial intelligence</p> <p>11.4.5. Management of computer systems.</p>	<p>11.4.3.1 Explain the most suitable type of computer system for a given application.</p> <p>11.4.4.1 Explain information systems for on-line services and remote databases</p> <p>11.4.5.1 Describe monitoring and control systems</p> <p>11.4.6.1 Describe the automation and robotics applications</p> <p>11.4.7.1 Describe expert systems and artificial intelligence</p> <p>11.4.8.1 Describe problems in the managements of computer systems.</p>	<p>line services and remote databases.</p> <ul style="list-style-type: none"> <li>Monitoring and control systems</li> <li>Automation and robotics applications</li> <li>Expert systems and artificial intelligence</li> <li>Management of computer systems.</li> </ul>	<ul style="list-style-type: none"> <li><b>Appreciation</b> of multimedia systems.</li> <li><b>Problem solving</b> in management of computer system.</li> </ul>	<ul style="list-style-type: none"> <li><b>Appreciation</b> of expert and artificial intelligence.</li> <li><b>Understanding</b> of automation and robotics application.</li> <li><b>Inquisitiveness</b> in automation and robotics.</li> <li><b>Curiosity</b> in expert systems and artificial intelligence.</li> </ul>
11.5 Databases	<p>11.5.1 Design Databases</p> <p>11.5.2 Manipulating databases</p>	<p>11.5.1.1. Build a database</p> <p>11.5.1.2. Illustrate Data entry and edit</p> <p>11.5.1.3. Searching for records</p> <p>11.5.1.4. Describe Relationships</p> <p>11.5.1.5. Designing and redesigning a database form.</p> <p>11.5.1.6. Working with database</p> <p>11.5.1.7. Database reports.</p> <p>11.5.1.8. Database security.</p>	<ul style="list-style-type: none"> <li>Databases (Include: creating a new data base, new table, auto number field, fields, primary key, tables, records, reports)</li> <li>Data entry and edit</li> <li>Relationships (Include: Making the relationship, Form wizard, checking relationships)</li> <li>Database form. (Include: design view</li> <li>Tables (Include: Adding and deleting fields)</li> <li>Databases (Include: sorting, filtering, copying</li> </ul>	<ul style="list-style-type: none"> <li><b>Application</b> of databases and multimedia systems.</li> </ul>	<ul style="list-style-type: none"> <li><b>Inquisitiveness</b> in use of databases.</li> <li><b>Curiosity</b> in the use of databases.</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
			<ul style="list-style-type: none"> <li>and moving records, creating and running queries)</li> <li>• Generating database reports (Include: Using wizards)</li> <li>• Printing reports and labels.</li> <li>• Database security.(Include: security, confidentiality, data integrity)</li> <li>• Threats to data security.</li> </ul>		
11.6 Social and economic impact of computers	11.6.1. Effects of Computer use on people and organisation 11.6.2. Maintenance of integrity of data and privacy. 11.6.3. Data protection legislation. 11.6.4. Threats to computer security and measures to combat them.	11.6.1.1. Introduction to understanding of some social and economic effects of computer use on people and organisations 11.6.1.2. Demonstrate an understanding of some social and economic effects of computer use on people and organisation 11.6.1.3. Describe measures to maintain integrity of data and privacy. 11.6.3.1. Describe features expected in data protection legislation. 11.6.4.1. Demonstrate an understanding of threats to security and	<ul style="list-style-type: none"> <li>• Social and economic effects of computer use on people and organisation (include: emissions, pollution, job loses and gains, health issues, cultural implications)</li> <li>• Data integrity and privacy.</li> <li>• Data protection legislation.</li> <li>• Threats to security and measures to combat them (Include: hacking and other computer crime, computer viruses, internet security).</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Differentiation</b> of risk threats and controls.</li> <li>• <b>Implementation</b> of security systems.</li> <li>• <b>Planning</b> security for a system.</li> <li>• <b>Awareness</b> of security and access to computer systems.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Appreciation</b> of security controls.</li> <li>• <b>Security consciousness</b></li> <li>• <b>Security management</b> of the systems.</li> <li>• <b>Inquisitiveness</b> in keeping hackers away from computer systems.</li> </ul>



TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		measures to combat them.			
11.7 Specific computer applications	11.7.1. Education 11.7.2. Health 11.7.3. Agriculture 11.7.4. Banking 11.7.5. Retailing 11.7.6. Industry 11.7.7. Library systems 11.7.8. Transport 11.7.9. Office automation 11.7.10. Commercial and general data processing.	11.7.1.1 Describe the use of computers in education 11.7.2.1 Describe the use of computers in health 11.7.3.1 Describe the use of computers in agricultural. 11.7.4.1 Describe the use of computers in banking 11.7.5.1 Describe the use of computers in retailing 11.7.6.1 Describe the use of computers in industry. 11.7.7.1 Describe Library systems 11.7.8.1 Describe the use of computers in transport. 11.7.9.1 Identify Office automation 11.7.10.1 Define Commercial and general data processing.	<ul style="list-style-type: none"> <li>Computers in education (Include: e-learning, e-books, on-line application)</li> <li>Computers in health (Include: medical expert systems, tele-medicine, health research, record keeping, medical diagnosis)</li> <li>Computers in banking (Include: Electronic fund transfer, automated teller machines, credit cards, online banking)</li> <li>Computers in retailing (Include: electronic point of sale, stock management.)</li> <li>Library systems.</li> <li>Office automation</li> <li>Define Commercial and general data processing.</li> </ul>	<ul style="list-style-type: none"> <li><b>Application</b> of computers in library systems.</li> <li><b>Searching</b> for books using a library system</li> <li><b>Researching</b> in commercial and general data processing.</li> <li><b>Application</b> of computers in retailing.</li> <li><b>Understanding</b> of computer systems in library and retailing.</li> </ul>	<ul style="list-style-type: none"> <li><b>Appreciation</b> of use of computer system in a library.</li> <li><b>Awareness</b> of use of computers in a library.</li> <li><b>Entrepreneurship</b> in tracking of sales using a computer system.</li> <li><b>Problem solving</b> in a library system and banking.</li> <li><b>Innovativeness</b> in the use of computers in a data processing system.</li> </ul>

## GRADE 12

<b>General Outcomes</b> <ul style="list-style-type: none"><li>• Develop an ability to solve problems using computing techniques</li><li>• Develop an awareness on the relevance of computing in contemporary society and issues brought about by computer usage</li><li>• Gain firm understanding of basic techniques and knowledge required for computer application</li><li>• Foster a desire to use computers within other professions</li></ul>	<b>Key Competences</b> <ul style="list-style-type: none"><li>• Apply appropriately search techniques such as Boolean logic, use of advanced search features.</li><li>• Apply knowledge and skills using software/ programming to solve databases, graphics, web pages and software development.</li><li>• Be innovative by using appropriate software.</li><li>• Make correct decisions about the best features to use within chosen application software.</li><li>• Understand and apply requirements of ICT ethics and security.</li><li>• Carry out a detailed research programme related to computing.</li><li>• Collaborate and share knowledge and ideas with others.</li></ul>
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## GRADE 12

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
12.1 System Development	11.7.1 Introduction to System analysis and development	12.7.1.1. State the stages of the system life cycle in a logical order. 12.7.1.2. Justify the choice of suitable methods for fact finding. 12.7.1.3. Described feasibility study. 12.7.1.4. Describe analysis 12.7.1.5. Use dataflow diagrams and system flow charts as tools. 12.7.1.6. Produce a plan for a project using a Gantt chart 12.7.1.7. Describe design 12.7.1.8. Explain top down design and use structure diagrams as tools. 12.7.1.9. Describe appropriate testing strategies and choose suitable data for testing. 12.7.1.10. State items that should be included in technical and use documentation. 12.7.1.11. Justify the choice of a method of changeover 12.7.1.12. Describe how a system should be	<ul style="list-style-type: none"> <li>Stages of the system life cycle in a logical order (Include: fact finding, feasibility study, analysis, design, building and testing, documentation, implementation (changeover), evaluation, maintenance.</li> <li>Methods for fact finding.</li> <li>Feasibility study.</li> <li>System analysis</li> <li>Dataflow diagrams and system flow charts as tools.</li> <li>Project plan using a Gantt chart</li> <li>System design</li> <li>Top-down design and use structure diagrams as tools.</li> <li>System testing strategies</li> <li>Items to be included in technical and use documentation.</li> <li>Method of changeover</li> <li>System evaluation</li> <li>System maintenance.</li> </ul>	<ul style="list-style-type: none"> <li><b>Understanding</b> system life cycle.</li> <li><b>Identification</b> of stages of a system life cycle.</li> <li><b>Communication</b> through flow charts and diagrams.</li> <li><b>Designing</b> of a system life cycle.</li> <li><b>Researching</b> of a system life cycle</li> <li><b>Analysis</b> of various stages of a system life cycle.</li> </ul>	<ul style="list-style-type: none"> <li><b>Team work</b> in the system life cycle.</li> <li><b>Skilfulness</b> of identifying system life cycle.</li> <li><b>Analytical and critical thinking</b> in constructing a system life cycle.</li> <li><b>Logical thinking</b> in constructing Gantt Charts and flowcharts.</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		12.7.1.13. Describe how a system should be maintained.			
12.1 Algorithms	12.1.1 Algorithm planning and design	<p>12.1.1.1. Describe the stages in making an overall plan to solve a problem.</p> <p>12.1.1.2. Explain algorithms and their relationship to a larger system.</p> <p>12.1.1.3. Describe and use tools to design programs and algorithms.</p> <p>12.1.1.4. Design, interpret and test algorithms.</p>	<ul style="list-style-type: none"> <li>• Stages in making an overall plan to solve a problem.</li> <li>• Algorithms and their relationship to a larger system.</li> <li>• Tools to design programs and algorithms.</li> <li>• Algorithms.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Planning</b> how to solve a problem.</li> <li>• <b>Identification</b> of stages in making an overall plan to solve a problem.</li> <li>• <b>Application</b> of algorithms in a larger system.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inquisitiveness</b> in algorithms planning.</li> <li>• <b>Understanding</b> of the role algorithms play in a major program.</li> <li>• <b>Appreciation</b> of use of algorithms in a program.</li> </ul>
12.2 Programming and Structure Query language (SQL)	<p>12.2.1. Describe the elements of Structured Query Language (SQL).</p> <p>12.2.2. Design a SQL application architecture.</p> <p>12.2.3. Manage databases.</p>	<p>12.2.1.1. Introduction to SQL and Databases</p> <p>12.2.1.2. Install, Run &amp; Write SQL Statement</p> <p>12.2.3.1. Draw and Display Data Sets</p> <p>12.2.3.2. Modify Data base</p> <p>12.2.3.3. Generate Queries &amp; Lists</p> <p>12.2.3.4. Display data sheets (Include: Gridlines, hiding and showing columns, Fonts, Print preview, page setup)</p> <p>12.2.3.5. Sort and search a database (Include: Find, filter by selection, multi-table queries, setting the</p>	<ul style="list-style-type: none"> <li>• SQL and Databases</li> <li>• Database Installation</li> <li>• Databases and Tables</li> <li>• Filtering Records</li> <li>• DML: Data Manipulation Language, (Include: Insert, Update, and Delete)</li> <li>• Joins –Querying Data from Multiple Tables</li> <li>• Using Views</li> <li>• Reusing queries.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Manipulation</b> of databases</li> <li>• <b>Application</b> of databases to real life situations.</li> <li>• <b>Creating</b> databases from given situations.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Understanding</b> use of structured query language</li> <li>• <b>Inquisitiveness</b> of use of databases.</li> <li>• <b>Productivity</b> in use of databases.</li> <li>• <b>Appreciation</b> of use of databases and SQL.</li> </ul>

TOPIC	SUB TOPIC	SPECIFIC OUTCOME	CONTENT		
			KNOWLEDGE	SKILLS	VALUES
		Query criteria)			
12.3 Computer Project	12.3.1 Project planning, database development and systems development.	12.3.1.1. Demonstrate the skills in project planning, 12.3.1.2. Use simple programming to develop database systems 12.3.1.3. Comprehensively write a computer system Report (Relate it to stages of a system analysis and design). 12.3.1.4. Demonstrate System Product.	<ul style="list-style-type: none"> <li>• Project planning</li> <li>• Database development</li> <li>• System development</li> <li>• System product.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Planning</b> of projects</li> <li>• <b>Monitoring</b> of projects</li> <li>• <b>Designing</b> of the final project report</li> <li>• <b>Demonstration</b> of system product.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Efficiency</b> in the use of system development.</li> <li>• <b>Productivity</b> in the use of databases.</li> <li>• <b>Appreciation</b> of the use of system product.</li> </ul>
12.4 Types of computer systems	12.4.1. Batch processing systems 12.4.2. Interactive systems 12.4.3. Network systems 12.4.4. Control systems 12.4.5. Automated systems 12.4.6. Multimedia systems and applications	12.4.2.1. Describe concepts of Batch processing systems 12.4.2.2. Describe Interactive systems 12.4.2.3. Demonstrate Network systems 12.4.2.4. Describe Control systems 12.4.2.5. Describe Automated systems 12.4.2.6. Demonstrate Multimedia systems and their applications	<ul style="list-style-type: none"> <li>• Batch processing systems</li> <li>• Interactive systems</li> <li>• Network systems</li> <li>• Control systems</li> <li>• Automated systems</li> <li>• Multimedia systems and applications</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identification</b> of Batch processing systems</li> <li>• <b>Application</b> of Networks, Control systems, automated systems, Multimedia systems.</li> <li>• <b>Demonstrate</b> use of multimedia systems.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Inquisitiveness</b> of automated systems usage.</li> <li>• <b>Appreciation</b> of networks or systems.</li> <li>• <b>Awareness</b> of batch processing systems.</li> </ul>

## Grades 10 to 12 Computer Studies Scope and Sequence

The table below shows the coverage of the syllabus in Computer Studies from Grades 10 to 12. It is important for a teacher to refer to this table from time to time to know the knowledge that the learners already have or need to have at various levels of learning of the subject.

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
<ul style="list-style-type: none"> <li>Computer career opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Describe different careers in ICT.</li> <li>Identify opportunities for further education</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>Programming and Pseudocode Algorithms</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Identify Programming terminology in Pascal and C++</li> <li>Produce an algorithm for a given problem in pseudocode using a variety of structures and the concepts of totalling and counting</li> <li>Produce loops and decision making in a program.</li> <li>Use a dry run with a trace table and test data to understand the behaviour.</li> <li>Work out the purpose of a pseudo code algorithm.</li> <li>Construct trace table for pseudocode.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
<ul style="list-style-type: none"> <li>System Development</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>State the stages of the system life cycle in a logical order.</li> <li>Justify the choice of suitable methods for fact finding.</li> <li>Described feasibility study.</li> <li>Describe analysis</li> <li>Use dataflow diagrams and system flow charts as tools.</li> <li>Produce a plan for a project using a Gantt chart</li> <li>Describe design</li> <li>Explain top down design and use structure diagrams as tools.</li> <li>Describe appropriate testing strategies and choose suitable data for testing.</li> <li>State items that should be included in technical and use documentation.</li> <li>Justify the choice of a method of changeover</li> <li>Describe how a system should be evaluated</li> <li>Describe how a system should be maintained.</li> </ul>
<ul style="list-style-type: none"> <li>Application Software</li> </ul>	<ul style="list-style-type: none"> <li>Understand the difference between application and system software.</li> <li>Understand how generic application software may be customised by the use of macros and formulae</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
	<ul style="list-style-type: none"> <li>• Appreciate the advantages and disadvantages of generic application software compared with bespoke software</li> <li>• Classify types of software</li> <li>• Outline the usage of different types of software</li> <li>• Distinguish between integrated and stand-alone software</li> <li>• Distinguish between off-the-shelf and in-house software</li> </ul>		
<ul style="list-style-type: none"> <li>• Logic gates, algorithms, circuits and Website designing</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Define functions of five types of logic gates and recognise their symbols</li> <li>• Write a truth table for a given gate and recognise a gate from its truth table</li> <li>• Produce a truth table for a given logic circuit</li> <li>• Design a simple logic circuit to provide a solution to a written logical statement of a problem.</li> <li>• Create Web Pages using templates (Include: HTML and Design windows in Dreamweaver, ).</li> <li>• Import text and pictures in a web designer.</li> <li>• Use Flash to animate files and</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the stages in making an overall plan to solve a problem.</li> <li>• Explain algorithms and their relationship to a larger system.</li> <li>• Describe and use tools to design programs and algorithms.</li> <li>• Design, interpret and test algorithms.</li> </ul>



TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
		pictures in websites.	
<ul style="list-style-type: none"> <li>Programming and Structured Query Language (SQL)</li> </ul>	<ul style="list-style-type: none"> <li>Illustrate the concept of Programming languages</li> <li>Identify program structure</li> <li>Identify programming reserved words in a Programming language ( Include: Reserved words in Pascal and C++)</li> <li>Identify Pre-defined Data Types</li> <li>Create User Defined Data types</li> <li>Declare the variables</li> <li>Code simple programs in a programming language (Include: Pascal for Windows and C++)</li> </ul>	<ul style="list-style-type: none"> <li>Build a database</li> <li>Describe Relationships</li> <li>Illustrate Data entry and edit</li> <li>Redesigning a table</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to SQL and Databases</li> <li>Install, Run &amp; Write SQL Statement</li> <li>Create Database</li> <li>Draw and Display Data Sets</li> <li>Modify Data base</li> <li>Generate Queries and Lists</li> </ul>
<ul style="list-style-type: none"> <li>Networks and Data Representation and processing</li> </ul>	<ul style="list-style-type: none"> <li>Explain the difference between Data and information</li> <li>Describe and select methods of data collection and preparation</li> <li>Describe analogue-to-digital converters and digital-to-analogue conversion.</li> </ul>	<ul style="list-style-type: none"> <li>Define computer networks and data communication</li> <li>Explain the purpose and limitations of networks</li> <li>Identify the elements of Networks</li> <li>Name the types of networks and topologies</li> <li>Converting analogue-to-digital</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
	<ul style="list-style-type: none"> <li>Describe concepts of data representation</li> <li>Outline reasons for data representation</li> <li>Describe the terms for data storage/capacity</li> <li>Explain the number systems and their representation of integral values</li> <li>Demonstrate binary addition and subtraction and their use in computing</li> <li>Explain data processing cycle</li> </ul>	<ul style="list-style-type: none"> <li>converters and digital-to-analogue converters</li> <li>Identify Data capture and checking</li> <li>Demonstrate data protection legislation</li> <li>Identify Computer crime</li> <li>Discuss consequences of Computer viruses</li> <li>Identify Internet security</li> <li>Discus recent developments in the use of the Internet</li> </ul>	
<ul style="list-style-type: none"> <li>Types of Computer system</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Distinguish between types of computer system</li> <li>Illustrate what is needed to support various types of computer system</li> <li>Explain the most suitable type of computer system for a given application.</li> <li>Explain information systems for on-line services and remote databases</li> <li>Design Databases</li> <li>Describe monitoring and control systems</li> <li>Describe the automation and robotics applications</li> </ul>	<ul style="list-style-type: none"> <li>Describe concepts of Batch processing systems</li> <li>Describe Interactive systems</li> <li>Demonstrate Network systems</li> <li>Describe Control systems</li> <li>Describe Automated systems</li> <li>Demonstrate Multimedia systems and their applications</li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
		<ul style="list-style-type: none"> <li>Describe expert systems and artificial intelligence</li> <li>Describe problems in the managements of computer systems.</li> </ul>	
<ul style="list-style-type: none"> <li>Computer Project</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the skills in project planning,</li> <li>Use simple programming to develop database systems</li> <li>Comprehensively write a computer system Report (Relate it to stages of a system analysis and design).</li> <li>Demonstrate System Product.</li> </ul>
<ul style="list-style-type: none"> <li>Hardware of the computer system</li> </ul>	<ul style="list-style-type: none"> <li>Investigate different types of input devices</li> <li>Demonstrate usage of each input device</li> <li>Describe the elements of input stage</li> <li>Identify the registers</li> <li>Demonstrate the principle of fetch – execute cycle</li> <li>Identify types of output devices</li> <li>Distinguish between the various types of output devices</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>Operating systems and file management</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to operating systems</li> <li>Outline different</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to understanding of some social and economic effects of computer use on</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
	types of operating systems <ul style="list-style-type: none"> <li>• Describe the functions of operating systems</li> <li>• Describe different types of user interface</li> <li>• Describe types of file organisation and access</li> <li>• File management</li> <li>• Peripheral device control</li> <li>• Explain how folders are structured and how folders and files can be managed</li> <li>• Describe how the operating system communicates with peripheral devices and maintains data integrity.</li> </ul>	people and organisation <ul style="list-style-type: none"> <li>• Demonstrate an understanding of some social and economic effects of computer use on people and organisation</li> <li>• Describe measures to maintain integrity of data and privacy.</li> <li>• Describe features expected in data protection legislation.</li> <li>• Demonstrate an understanding of threats to security and measures to combat them.</li> </ul>	
<ul style="list-style-type: none"> <li>• Presentation Packages</li> </ul>	<ul style="list-style-type: none"> <li>• Illustrate the general features of a Presentation Package</li> <li>• Demonstrate the various methods of creating slides</li> <li>• Describe the steps in adding animations to slides</li> <li>• Demonstrate how to format slides</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
<ul style="list-style-type: none"> <li>• Specific computer applications</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the use of computers in education</li> <li>• Describe the use of computers in health</li> <li>• Describe the use of computers</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

TOPIC	SPECIFIC OUTCOMES		
	GRADE 10	GRADE 11	GRADE 12
		in banking <ul style="list-style-type: none"> <li>Describe the use of computers in retailing</li> <li>Describe Library systems</li> <li>Identify Office automation</li> <li>Define Commercial and general data processing.</li> </ul>	
<ul style="list-style-type: none"> <li>General Computer Applications</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate an understanding of computer applications in a home environment, offices, commercial environment communication and information systems, commercial</li> <li>Identify general data processing, industrial, technical and scientific uses.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Describe how computers are used to control processes in an industry</li> <li>Identify positives and negatives of computers in employment</li> <li>Describe the effects of computers on people's rights to privacy</li> <li>Describe effects of electronic transactions</li> <li>Describe social effects of computers</li> </ul>
<ul style="list-style-type: none"> <li>Computer Security (Assets)</li> </ul>	<ul style="list-style-type: none"> <li>Describe security terminologies</li> <li>Describe the systems security policy structure</li> <li>Describe and resolve various security concerns towards resources</li> <li>Identify computer security Professionals</li> <li>Explain the responsibility of computer security professionals</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

## Project Work

The examiner may not recommend the use of any specific programming language; the Centre should choose the language according to the resources available and the ability of the learners to use that particular programming language. Pascal and C++ may be recommended but learners may use any other language to do their projects. However the choice of language must allow them to construct their programs using a structured modular approach.

Centre Number Centre Name:.....

Candidate Number Candidate:.....

DOMAIN	SUB DOMAIN	DETAILS	Maximum Mark	Mark obtained
ANALYSIS	Description of the Problem	Includes the nature of the problem to be solve	3	
	Objectives	To be stated within the context of the project	3	
	Description of existing solution	Description of the current solution, including data input requirements and output methods.	1	
	Evaluation of existing solution	Evaluation of the current solution highlighting advantages, disadvantages.	1	
	Description of possible solutions	Description of the proposed solution to the problem description after evaluating the existing problem	1	
DESIGN	Action plan	Detailed action plan, including Gant Chart	1	

DOMAIN	SUB DOMAIN	DETAILS	Maximum Mark	Mark obtained
	Systems Flowchart	Full solution represented in system flowchart with correct use of symbols	2	
	Description of method of solution	Relevant to the problem relevant to the problem.	2	
	Hardware	Specification of hardware that can do the job OR A list of hardware giving at least two reasons why such hardware is needed in the context of the proposed solution	1	
	Software	A list or description of software and why the software can work on the intended system.	2	
IMPLEMENTATION	Method of solution related to problem identified.	Method of solution related to the problem by suitable means of solving the problem, including 4GL programming and coding, spreadsheet formulas, database programming and tables, site plans of website using Dreamweaver or other website design software.	2	
	Accurate method of solution	Demonstration of accuracy of the methods used and software.	1	
	Programming code	Accurate use of a 4GL language with good comments and annotations.	1	
TESTING	Test strategy	Complete test strategy, which must include the data to be tested together with the expected results	1	
	Test results	The system developed should be able to test acceptable (normal), Unacceptable (abnormal) and boundary (extreme data). Full credit if all can be tested adequately.	3	

DOMAIN	SUB DOMAIN	DETAILS	Maximum Mark	Mark obtained
DOCUMENTAION	Technical documentation	Overall report (should include: contents page and clear and complete Documentation.)	1	
	User guide	User guide should be clear and complete user guide	1	
System Development and Evaluation.	Evaluation	Reasonable evaluation linked to the computer Objectives testing	1	
	Developments	Meaningful suggestions and improvements for development of the system.	2	
	<b>FINAL TOTAL</b>		<b>30%</b>	

Name of examiner: ..... School Date Stamp:

Signature of examiner: .....