MINISTRY OF EDUCATION

Republic of Ghana

TEACHING SYLLABUS FOR INFORMATION AND COMMUNICATIONS TECHNOLOGY (ELECTIVE)

(SENIOR HIGH SCHOOL 1-3)

Enquiries and comments on this syllabus should be addressed to:

The Director
Curriculum Research and Development Division (CRDD)
P. O. Box 2739
Accra
Ghana.

Tel: 0302-683668
0302-683651

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RATIONALE FOR TEACHING AND LEARNING ICT (ELECTIVE)

This syllabus is designed to provide advanced skills in Information and Communications Technology (ICT) for Senior High School (SHS) students. It is expected that the knowledge and skills gained in this course will prepare students to pursue ICT courses in years ahead and provide them with the basic skills needed for the ICT job market. The syllabus covers selected topics in ICT which offer hands-on activities to help students acquire the required ICT skills.

GENERAL AIMS

The syllabus is designed to help the student to:

1. acquire advanced ICT literacy
2. develop enough interest to pursue ICT as a course at the tertiary level
3. acquire proficiency in the use of ICT tools
4. use ICT as a tool for learning other subjects
5. acquire the basic skills needed for the ICT job market

SCOPE OF CONTENT

This syllabus has been planned at a higher content level than the ICT content at the Core ICT level. This has been done to equip students with the necessary knowledge and skills for the job market and for pursuing further ICT course. The themes of this course are as follows:

- Information and Communications Technology
- Hardware
- Introduction to software development
- PC Hardware Maintenance and Software Installation
- Desktop Publishing Software and its functionality
- Word Processing
- Spreadsheet
- Introduction to Data Processing Systems
- Introduction to Programming
- Basic Networking
- Data Communications
- Introduction to Educational Technology

The twelve themes are to be covered in Years 1, 2 and 3 of Senior High School education.

STRUCTURE AND ORGANISATION OF THE ICT ELECTIVE SYLLABUS

SHS 1	SHS 2	SHS 3
SECTION ONE **INFORMATION AND COMMUNICATIONS TECHNOLOGY IN EVERYDAY LIFE** Unit 1: Introduction to Information System Unit 2: Introduction to Digital Technology and Culture **SECTION TWO** **COMPUTER HARDWARE** Unit 1: Hardware Components. Unit 2: Primary and Secondary Storage Media and their Devices Unit 3: Data Representation **SECTION THREE** **COMPUTER SOFTWARE** Unit 1: Introduction to Computer Software Unit 2: Utility Programs Unit 3: Application Programs	**SECTION ONE** **SPREADSHEET** Unit 1: Editing Worksheet Unit 2: Formatting Worksheet Unit 3: Data Handling Unit 4: Data Security Unit 5: Using Function Unit 6: Basic Analysis **SECTION TWO** **INTRODUCTION TO DATA PROCESSING SYSTEMS** Unit 1: Concept, Principles and Terminologies of Database Application Unit 2: Creating a Database Unit 3: Managing Data in a Database Unit 4: Working with Queries Unit 5: Working with Forms Unit 6: Working with Reports, Unit 7: Designing a Class Database System	**SECTION ONE** **NETWORKING** Unit 1: Networking Concepts Unit 2: Types of Network Unit 3: Network Topology Unit 4: Network Transmission media Unit 5: Network Configuration Unit 6: Data communication Unit 7 Data Security and Control **SECTION TWO** **INTRODUCTION TO WEBSITE DESIGNING** Unit 1: Introduction to HTML. Unit 2: Basic HTML Tags. Unit 3: Designing Website Using HTML

SHS 1	SHS 2	SHS 3
SECTION FOUR **PERSONAL COMPUTER, HARDWARE MAINTENANCE AND SOFTWARE INSTALLATION** Unit 1: Personal Computer (PC) Diagnostic and Maintenance **SECTION FIVE** **USING ICT TO LEARN** Unit 1: Technology in Education • Concepts and Terminologies Unit 2: Multimedia in Education	**SECTION THREE** **INTRODUCTION TO PROGRAMMING** Unit 1: Introduction to Programming Languages Unit 2: Features of Programming Languages Unit 3: Program Development Life Cycle Unit 4: Algorithms Unit 5: Flow Charts **SECTION FOUR** **DESKTOP PUBLISHING APPLICATION** Unit 1: Desktop Publishing Application Window Unit 2: Principles of Designing Publication Unit 3: Designing Publication Unit 4: Editing Publication Unit 5: Formatting Publication Unit 6: Printing Publication	**SECTION THREE** **SECTION FOUR** **PROJECT-BASED ACTIVITY** Unit 1: Project Work: - Desktop Publishing - Database - Programming - Website Designing

TIME ALLOCATION

A minimum of six (6) periods a week each of 40 minutes is recommended for teaching SHS Elective ICT (as shown in the table below). As per the teaching arrangements and SBA it is expected that there will be 10 weeks for effective teaching per term. This results in 60 periods per term and subsequently180 periods per school year (1st and 2nd years). However due to the final exams in the third term of the third year, the there will be 120 periods for that year. **Appendix A** is a guide for allocation of periods to each unit.

CLASS	TOTAL NUMBER OF PERIODS PER WEEK
SHS 1	6
SHS 2	6
SHS 3	6

GENERAL OBJECTIVES

General Objectives have been listed at the beginning of each section of the syllabus. The general objectives specify the skills and behaviours the student should acquire after learning the units of a section. Read the general objectives very carefully before you start teaching. After teaching all the units, go back and read the general aims and general objectives again to be sure you have covered both of them adequately in the course of your teaching.

To make it user friendly, the syllabus has been structured into five columns. Column one is the Unit topic, Column two consists of the Specific Objectives of each units, Column three provides the content to be covered , Column four provides Teaching Learning Activities for the achievement of the Specific Objectives, while Column five provides some exercises that will be useful for assessing the knowledge and skills gained in the lesson.

COLUMN 1 - UNITS

This column presents the sub topics of the major topic(s) of the section. The unit topics have been arranged sequentially to facilitate skill building. However if a teacher finds at some point that teaching and learning in his/her class will be more effective if he/she skipped to another unit, he/she can do so and come back later to the unit.

COLUMN 2 - SPECIFIC OBJECTIVES

Column 2 shows the Specific Objectives for each unit. The specific objectives begin with numbers such as 1.3.5 or 2.2.1. These numbers are referred to as "Syllabus Reference Numbers". The first digit in the syllabus reference number refers to the section; the second digit refers to the unit, while the third digit refers to the rank order of the specific objective. For instance, 1.3.5 means: Section 1, Unit 3 (of Section 1) and Specific Objective 5. In other words, 1.3.5 refers to Specific Objective 5 of Unit 3 of Section 1. Similarly, the syllabus reference number 2.2.1 simply means Specific Objective number 1 of Unit 2 of Section 2. Using syllabus reference numbers provides an easy way for communication among teachers and other educators. It further provides an easy way for selecting objectives for test construction. Let's say for instance, that Unit 2 of Section 2 has five specific objectives: 2.2.1 - 2.2.5. A teacher may want to base his/her test items/questions on objectives 2.2.3 and 2.2.4 and not use the other three objectives. In this way, a teacher would sample the objectives within units and within sections to be able to develop a test that accurately reflects the importance of the various skills taught in class.

You will note also that specific objectives have been stated in terms of the student i.e., *what the student will be able to do after instruction and learning in the unit*. Each specific objective hence starts with the following, "The student will be able to." This in effect, means that you have to address the learning problems of each

individual student. It means individualizing your instruction as much as possible such that the majority of students will be able to master the objectives of each unit of the syllabus.

PROFILE DIMENSIONS

A central aspect of this syllabus is the concept of profile dimensions that should be the basis for instruction and assessment. A 'dimension' is a psychological unit for describing a particular learning behaviour. More than one dimension constitutes a profile of dimensions. A specific objective as follows, "The student will be able to describe…etc.", contains an action verb, "describe" that indicates what the student will be able to do after teaching and learning had taken place. Being able to "describe" something after the instruction has been completed means that the student has acquired "knowledge". Being able to explain, summarise, give examples etc. means that the student has understood the lesson taught. Similarly, being able to develop, plan, construct etc. means that the student can "apply" the knowledge acquired in some new context. You will note that each of the specific objectives in this syllabus contains an "action verb" that describes the behaviour the student will be able to display after the instruction. "Knowledge", "Application" etc. are dimensions that should be the prime focus of teaching and learning in schools. Instruction in most cases has tended to stress knowledge acquisition to the detriment of other higher level behaviours such as application, analysis etc. Education in the present time and in the future requires that students apply their knowledge, develop analytical thinking skills, synthesize information, and use their knowledge in a variety of ways to deal with learning problems, and with problems and issues in their lives. The new type of education aims at producing problem solving persons. Each action verb indicates the underlying profile dimension of each particular specific objective. Read each objective carefully to know the profile dimension toward which you have to teach.

COLUMN 3 - CONTENT

The "content" column of the syllabus presents a selected body of information, skills and competencies that you will need in teaching the particular unit.

COLUMN 4 - TEACHING AND LEARNING ACTIVITIES (TLA)

T/L activities that will ensure maximum student participation in the lessons are presented in Column four. You are encouraged to re-order the suggested teaching and learning activities and also add to them where necessary in order to achieve optimum student learning. As we have implied already, the major purpose of teaching and learning ICT is to make students acquire competent skills in ICT and use their skills in doing a variety of practical work and solve many ICT related problems.

COLUMN 5 - EVALUATION

Suggestions and exercises for evaluating the lessons of some units are indicated in Column 5. Evaluation exercises can be in the form of oral questions, quizzes, class exercises and assignments, project work etc. Try to ask questions and set tasks and assignments that will challenge your students to apply their knowledge and skills to issues and problems. The suggested evaluation tasks are not exhaustive. You are encouraged to develop other creative evaluation tasks to ensure that students have mastered the skills implied in the specific objective(s) of each unit. For evaluation during class lessons, determine the mastery level you want students to achieve in their answers and responses. If for instance, you take 80% as the mastery level, ensure that each student's answer to questions asked in class achieve this level of mastery.

DEFINITION OF PROFILE DIMENSIONS

ICT is a practical subject and the learning required is best achieved by application of the skills learnt. The profile dimensions required at the SHS level are as follows:

Knowledge and understanding	35%
Application of knowledge	65%

At the SHS level, students should be involved in solving problems using the various ICT techniques they have learnt. The application dimension has now been given a weight of 65%.

The explanation of the key words involved in each of the profile dimensions is as follows:

Knowledge and Understanding (KU)

knowledge	The ability to: Remember, recall, identify, define, describe, list, name, match, state principles facts and concepts. Knowledge is simply the ability to remember or recall material already learned and constitutes the lowest level of learning.
understanding	The ability to: explain, summarise, translate, rewrite, paraphrase, give examples, generalise, estimate or predict consequences based upon a trend. Understanding is generally the ability to grasp the meaning of some material that may be verbal, pictorial, or symbolic.

Use of Knowledge (UK)

The ability to use knowledge or apply knowledge, as implied in this syllabus, has a number of learning/behaviour levels. These levels include application, analysis, synthesis, and evaluation. These may be considered and taught separately, paying attention to reflect each of them equally in your teaching. The dimension "Use of Knowledge", is a summary dimension for all four learning levels. Details of each of the four sub levels are as follows:

application	The ability to: apply rules, methods, principles, theories, etc. to concrete situations that are new and unfamiliar. It also involves the ability to produce, solve, operate, plan, demonstrate, discover etc.
analysis	The ability to: break d own a piece of material into its component parts; to differentiate, compare, distinguish, outline, separate, identify significant points etc., recognise unstated assumptions and logical fallacies, recognize inferences from facts etc. Analytical ability underlies discriminative thinking.
synthesis	The ability to: put parts together to form a new whole. It involves the ability to combine, compile, compose, devise, suggest (an idea, possible ways), plan, revise, design, organize, create, and generate new ideas and solutions. The ability to synthesize underlies convergent thinking.
evaluation	he ability to judge the worth or value of some material based on some criteria. It also involves the ability to: appraise, compare features of different things and make comments or judgment, contrast, criticize, justify, support, discuss, conclude, make recommendations etc.

A number of examination questions at the secondary school level begin with the word "Discuss". Discuss belongs to the evaluation thinking skill and implies the ability to analyze, compare, contrast, make a judgment etc. The word "discuss" asks for a variety of thinking skills and is obviously a higher order thinking behaviour. Students consequently do poorly on examination questions that start with "Discuss". For this reason, and also for the reason that discussion of issues, discussion of reports etc., are some of the major intellectual activities students will be engaged in, in work situations and at higher levels of learning after they have left secondary school, it will be very helpful if teachers would emphasize discussion questions etc. both in class and in the tests you set.

The action verbs provided under the various profile dimensions should help the teacher to structure teaching such as to achieve the effects needed. Select from the action verbs provided for teaching, in evaluating learning before, during and after the instruction. Use the action verbs also in writing test questions. This will give students the chance to develop good thinking skills, and the capacity for excellent performance in examinations and in practical life situations. .

Teachers should note that the emerging trend in ICT learning is to refer to Bloom's Digital Taxonomy. For more information on this phenomenon refer to Appendix A.

PRACTICAL SKILLS
Practical skills involve demonstration of manipulative skills using equipment and materials to carry out practical operations for solving problems. The teaching and assessment of practical skills should involve projects and creative practical tasks. Skills required for effective practical work include:

HANDLING EQUIPMENT/MATERIALS:
The learner should be able to handle and use of ICT equipment and materials efficiently.

OBSERVATION
The learner should be able to use the senses to make accurate observation of skills and techniques during teacher demonstrations. The learner should be able to apply the techniques observed for performing other tasks.

PERCEPTION
The learner should be able to coordinate most of the senses (touch, feel, sight etc) for every project or task undertaken.

COMMUNICATION
The learner should be guided to develop effective oral and written communication skills necessary for work production.

COMMITMENT
The learner should be encouraged to uphold the ethical standards in the use of technology e.g. netiquette

FORM OF ASSESSMENT

The assessment of ICT should be based on more practical work than theory. In developing assessment procedures, try to select specific objectives in such a way that you will be able to assess a representative sample of the syllabus objectives. Each specific objective in the syllabus is considered a criterion to be achieved by the students. The assessment procedure you use, i.e. class tests, homework, projects etc. must be developed in such a way that it will consist of a sample of the important objectives taught over a period.

The assessment will be based on a two-paper scored over 100%. Paper 1 which will test the practical skills will carry 40 marks. Paper 2 will be in two sections (Section A and B). Section A will consist of 40 compulsory multiple choice objective questions and carry 20 marks; Section B will comprise six (6) questions out of which students will answer four (4). This will carry 40 marks. The assessment should be a practical test based essentially on knowledge and skills acquired. Students will be expected to solve problems using the following;

- Information and Communications Technology
- Word Processing
- Desktop Publishing Software and its functionality
- Spreadsheet
- Hardware
- Introduction to software development
- PC Hardware Maintenance and Software Installation
- Data Communications
- Basic Networking
- Introduction to Data Processing Systems
- Introduction to Programming
- Introduction to Educational Technology

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NOTE:
The questions should reflect **high order thinking.**

GUIDELINES FOR SCHOOL BASED ASSESSMENT
A new School Based Assessment system (SBA), formally referred to as Continuous Assessment, will be introduced into the school system from September 2008. SBA is a very effective system for teaching and learning if carried out properly. The new SBA system is designed to provide schools with an internal assessment system that will help schools to achieve the following purposes:

- Standardize the practice of internal school-based assessment in all schools in the country
- Provide reduced assessment tasks for each of the primary school subjects
- Provide teachers with guidelines for constructing assessment items/questions and other assessment tasks
- Introduce standards of achievement in each subject and in each class of the school system
- Provide guidance in marking and grading of test items/questions and other assessment tasks
- Introduce a system of moderation that will ensure accuracy and reliability of teachers' marks
- Provide teachers with advice on how to conduct remedial instruction on difficult areas of the syllabus to improve student performance

The new SBA system will consist of 12 assessments a year instead of the 33 assessments in the previous continuous assessment system. This will mean a reduction by 64% of the work load compared to the previous continuous assessment system. The 12 assessments are labeled as Task 1, Task 2, Task 3 and Task 4. Task 1-4 will be administered in Term 1; Tasks 5-8 will be administered in Term 2, and Tasks 9-12 administered in Term 3. Task 1 will be administered as an individual test coming at the end of the first month of the term. The equivalent of Task 1 will be Task 5 and Task 9 to the administered in Term 2 and Term 3 respectively. Task 2 will be administered as a Group Exercise and will consist of two or three instructional objectives that the teacher considers difficult to teach

and learn. The selected objectives could also be those objectives considered very important and which therefore need students to put in more practice. Task 2 will be administered at the end of the second month in the term. Task 3 will also be administered as individual test under the supervision of the class teacher at the end of the 11th or 12 week of the term.

Task 4 (and also Task 8 and Task 12) will be a project to be undertaken throughout the term and submitted at the end of the term. Schools will be supplied with 9 project topics divided into three topics for each term. A student is expected to select one project topic for each term. Projects for the second term will be undertaken by teams of students as Group Projects. Projects are intended to encourage students to apply knowledge and skills acquired in the term to write an analytic or investigative paper, write a poem 9 (as may be required in English and Ghanaian Languages), use science and mathematics to solve a problem or produce a physical three-dimensional product as may be required in Creative Arts and in Natural Science.

Apart from the SBA, teachers are expected to use class exercises and home work as processes for continually evaluating students' class performance, and as a means for encouraging improvements in learning performance.

The marks derived from projects, the end of month tests and home work specifically designed for the SBA should together constitute the School Based Assessment component marked out of 60 per cent. The emphasis is to improve students' learning by encouraging them to do more practice in ICT. The SBA will hence consist of:

- End-of-month tests
- Home work assignments (specially designed for SBA)
- Project

Other regulations for the conduct of SBA will reach schools from GES.

Combining SBA marks and End-of-Term Examination Marks

The new SBA system is important for raising students' school performance. For this reason, the 60 marks for the SBA will be scaled to 50. The total marks for the end of term test will also be scaled to 50 before adding the SBA marks and end-of-term examination marks to determine students' end of term results. The SBA and the end-of-term test marks will hence be combined in equal proportions of 50:50. The equal proportions will affect only assessment in the school system.

GRADING PROCEDURE

In marking your class examination scripts, it is very important that you develop a marking scheme. A marking scheme, as you may be aware, consists of the points for the best answer you expect for each essay question or structured question, and the mark(s) allocated for each point raised by the student as well as the total marks for the question. For instance, if a question carries 10 marks and you expect 4 points in the best answer, you could allocate 2 marks (or part of it, depending upon the quality of the point raised by the student) to each point raised, totaling 8 marks, and then give the remaining 2 marks or part of it, for organization of answer. For objective test papers, you may develop an answer key to speed up the marking.

To improve assessment and grading and also introduce uniformity in schools, it is recommended that schools adopt the following grade boundaries for assigning grades:

Grade A:	80 - 100%	-	Excellent
Grade B:	70 - 79%	-	Very Good
Grade C:	60 - 69%	-	Good
Grade D:	45 - 59%	-	Credit (Satisfactory)
Grade E:	35 - 44%	-	Pass
Grade F:	≤ 34%	-	Fail

The grading system presented above shows the letter grade system and equivalent grade boundaries. In assigning grades to students' test results, or any form of evaluation, you may apply the above grade boundaries and the descriptors. The descriptors (Excellent, Very Good etc) indicate the meaning of each grade. For instance, the grade boundary for "Excellent" consists of scores between 80- 89. Writing "80%" for instance, without writing the meaning of the grade, or the descriptor for the grade i.e. "Excellent", does not provide the student with enough information to evaluate his/her performance in the assessment. You therefore have to write the meaning of the grade alongside the score you write. Apart from the score and the grade descriptor, it will be important also to write a short diagnosis of the points the student should consider in order to do better in future tests etc. Comments such as the following may also be added to the grades:

Keep it up
Has improved
Could do better
Hardworking
Not serious in class
More room for improvement, etc.

Note that, the grade boundaries above are also referred to as grade cut-off scores. When you adopt a fixed cut-off score grading system as in this example, you are using the criterion-referenced grading system. By this system a student must make a specified score to earn the appropriate grade. This system of grading challenges students to study harder to earn better grades. It is hence very useful for achievement testing and grading.

SENIOR HIGH SCHOOL - YEAR ONE

SECTION ONE

INFORMATION AND COMMUNICATIONS TECHNOLOGY IN EVERYDAY LIFE

General Objective(s): The student will:

1. understand how information is generated and managed.
2. be aware of the role of information technology in the development of society.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **INTRODUCTION TO INFORMATION SYSTEMS**	The student will be able to: 1.1.1 explain the term Information system. 1.1.2 discuss the media types in presenting information 1.1.3 distinguish between manual and computerised Information. 1.1.4 discuss the types of information systems.	**Information System e.g.** Definition : A set of interrelated component working together to collect, retrieve, process, store and disseminate information for the purpose of facilitating planning, controlling, coordination and decision making. **Media Types Used in Presenting Information** e.g. • text, • pictures – both still and moving, • sound, • graphics, • statistics, • animation Differences Between Manual and Computerise Information System **Types of Information Systems** • Transaction Processing Systems • Office Automation Systems • Knowledge Work Systems • Decision Support Systems	Let students brainstorm and come out with the explanation of Information system NOTE Teacher to note that there are other definitions of information system. Discuss with students the media types used to present information. Put students into groups to brainstorm and report on the differences between manual and computerise information system Discuss the types of information systems	Students to give more definitions of ICT. **Exercise** Students to conduct a research on the internet on different definitions of information systems and media types

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **INTRODUCTION TO INFORMATION SYSTEMS**	The student will be able to: 1.1.5 describe the attributes of a good information system. 1.1.6 outline the processes (building blocks) for the development of Information. 1.1.7 distinguish among different types of information.	• Management Information Systems • Executive Support Systems **Attributes of a Good Information System** • Completeness and Timeliness • Accuracy • Clarity and concise • Relevance • Trustworthiness • Cost • Relevant for its purpose **Processes (building blocks)for the development and presentation of information** - Creating - Collecting - Organising - Manipulating - storing (saving), retrieving, communicating **Types of Information** ▪ By framework within which data is used - International - National - Corporate - Departmental - Individual ▪ By Business categorisation - Strategic - Tactical - Operational ▪ By Time - Past - Present - Future ▪ By Quantifiable - Quantitative - Qualitative	Guide students to describe the attributes of a good information system Let students revise information processing cycle and the relationship between data and information Assist students to determine the processes for the development and presentation of information NOTE: (highlighting the role technology plays at each stage). Students to brainstorm and come out with the differences among the types of information and their features	. **<u>Assignment</u>** Describe three attributes of good information system. **<u>Exercise</u>** Students to describe the process for the development of information Differentiate between types of information

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 (CONT'D) **INTRODUCTION TO INFORMATION SYSTEMS**	The student will be able to: 1.1.8 indicate the role of information in society.	**The Role of Information in Society** e.g. keeps people informed on current issues, enables people have facts for decision making etc.	Lead students to discuss the role played by information in our society Discuss general issues: - on the use of Technology, especially the Internet and computers - of computers and crime, plagiarism - of changing the mind set with regards to the use of Information Technology	
UNIT 2 **INTRODUCTION TO DIGITAL TECHNOLOGY CULTURE**	1.2.1 explain general issues concerning Information Technology. 1.2.3 analyse the role and impact of Information Technology on everyday life.	**The role and impact of Information Technology on everyday life** e.g. • The digital culture: - The internet - Computer Crime • Role and impact - e-business, - e-learning, - e-governance, - e-health, - e-mail - Computer Based Training (CBT) - Computer Assisted Learning (CAL), - Computer Aided Design (CAD, - Computer Assisted Manufacturing (CAM)	In groups, students to discuss and report on the main uses of information technology in everyday life. Assist students to analyse the contributions of information technology in everyday life	**<u>Assignment</u>** Discuss the impact of information technology on - education - Business - Health and - Society

SECTION TWO

COMPUTER HARDWARE

General Objective(s): The student will:

1. be able to recognise the importance of backup storage media devices.
2. understand the working of the Central Processing Unit.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **HARDWARE COMPONENTS**	The student will be able to: 2.1.1 describe functions of hardware components of a computer system.	**The Hardware Components of a Computer System and Their Functions**	Lead students in the revision of the various hardware components.	
	2.1.2 identify the types of Input and Output devices	**Types of Input and Output (I/O) Devices** • Input devices e.g. - Keyboards, - Pointing devices - Source data entry • Output device - Printers - Monitors - Plotters	Teacher displays the types of input and output devices for students to identify and report. Discuss the technology that drives the Input and Output devices This activity can be done in groups.	**Assignment** Identify and describe the different technology that drives various types of the same I/O devices. Students to determine when it is appropriate to use particular types of specific I/O devices **Exercise** Describe the processes involved in the machine cycle.
	2.1.3 identify the main parts of the CPU.	**The Main Parts of a Central Processing Unit (CPU) - The Processor** • Control unit • Arithmetic Logic Unit (ALU)	Assist students to identify the parts of the CPU.	
	2.1.4 describe the processes involved in the machine cycle	**How the CPU Works (Machine Cycle)** e.g. 1 fetching 2 decoding 3 executing 4 storing	Guides students to find out the processes involved in the machine cycle e.g. Data stored on the main memory is fetched, decoded and given to the ALU to work on. It is then sent back to the main memory for temporal storage before giving it out as information	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 **PRIMARY AND SECONDARY STORAGE MEDIA AND THEIR DEVICES**	The student will be able to: 2.1.5 define the terms associated with the workings of the CPU. 2.2.1 identify the main and backup storage media and their devices. 2.2.2 discuss the functions of the primary and secondary storage media and their devices 2.2.3 distinguish between the primary and secondary storage media. 2.2.4 describe the disk filing system and hierarchical directory structure.	**Terms Associated with the workings of CPU** • Main memory and addresses • Address bus and address space • Data bus and word length • The instruction set • Processor speed etc. **Primary and Secondary Storage Media and their Devices** Primary storage media e.g. • Random Access Memory (RAM) • Cache memory Secondary storage media e.g. • Magnetic disk - hard disk • Optical disc – DVD/CD ROM Devices e.g. • Hard disk drive • DVD/CD drive • Floppy disk drive Functions of the Primary and Secondary Storage Media and their Devices Differences between the Primary and secondary storage media **The Disk Filing System and Hierarchical Directory Structure** e.g. • Storage blocks, • Disk directory, • File allocation	Guide students to understand the terminologies associated with the workings of the CPU. Discuss with students the Primary and Secondary Storage Media and their Devices Lead student to discuss and come out with the differences between the devices and their media e.g. • Media are the hardware component on which data or information is stored • Devices are the hardware component that read or write data or information on the media Students to discuss and come out with the functions of Primary and Secondary Storage Media and their Devices Assist students to identify primary and secondary storage media in terms of Speed, capacity and storing of data Discuss the disk filing system and structure.	**Exercise** Discuss the differences between: 1. optical and magnetic storage devices and media 2. Primary and secondary media devices and their media.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 DATA REPRESENTATION	The student will be able to: 2.3.1 identify data types.	**Data Types and Representation** e.g. integers, real numbers, strings.	Discuss the different data types.	**Exercise** Mention 3 types of data and explain how they are represented by computer system.
	2.3.2 explain units of storage	**Units of data storage** E.g. bits and bytes	Discuss unit of data storage e.g. bits and bytes	
	2.3.3 explain how characters are represented.	Characters Representation	Discuss the various ways data is represented	
	2.3.4 explain coding information using a bit pattern.	Coding Information Using a Bit Pattern	Discuss how characters are represented	
	2.3.5 perform binary arithmetic.	Performing Binary Arithmetic.	Coding information using a bit pattern.	
	2.3.6 convert from decimals to binary coded decimal and vice versa.	Converting From Decimals to Binary Coded Decimal and Vice Versa	Explain and demonstrate the working of binary arithmetic and let students work binary arithmetic.	
	2.3.7 convert octal and hexadecimal numbers to binary, and vice versa. .	Converting octal and hexadecimal numbers to binary, and vice versa	Assist students convert from decimals to binary coded decimal and vice versa. Assist students to convert octal and hexadecimal numbers to binary, and vice versa.	

SECTION THREE

COMPUTER SOFTWARE

General Objective(s): The student will:

1. acquire an in-depth knowledge of the workings of computer software.
2. be aware of the rudiments in computer software.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **INTRODUCTION TO COMPUTER SOFTWARE**	The student will be able to: 3.1.1 distinguish among the various types of computer software	**Types of Computer Software** • System software e.g. Operating System and Utility Programs • Application software e.g. Productivity and Educational software	Assist students to distinguish among various types of computer software and give examples of each.	.
	3.1.2 discuss the types of Operating System	**Types of Operating Systems e.g.** • Single-user or personal user • Multi-user • Networked • Single programming • Multi-programming.	Discuss the types of operating systems and give examples of each	Students to discuss the various types of computer software and give examples.
	3.1.3 explain the functions of the Operating System (OS).	**Functions of Operating System.** e.g. • Resource management Functions - Virtual storage/ memory - Paging - Real time OS - Batch OS - Time sharing OS - Multitasking/multi processing • Supporting modes and Configurations - Text editor - Library programs - Language translators - Utility programs	Lead students to discuss the functions of the Operating System.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 **UTILITY PROGRAMS**	The student will be able to: 3.2.1 identify and state the uses of Utility Programs.	• File management - Copy - Delete - Folders etc - Check Disk (Chsdsk), Defrag Disk **Utility Programs and their Uses** e.g. scandisk	Guide students to come out with various utility programs and their uses	**Exercise:** Distinguish between Operating System and Application Software. Give at least 2 examples in each case.
UNIT 3 **APPLICATION SOFTWARE**	3.3.1 distinguish among the different types of Application software.	**Types of Application Software** e.g. • Productivity – Word Processing, Spreadsheet etc • Education/Reference – e-books, e-libraries etc	Assist students to distinguish among the types of Application software and give examples of each	
	3.3.2 discuss the functions of the Application software	Functions of Application Software	Group students to brainstorm and report on the functions of Application Software	

SECTION FOUR

PERSONAL COMPUTERS (PC) HARDWARE MAINTENANCE AND SOFTWARE INSTALLATION

General Objective: The student will:

1. acquire the skills in software PC maintenance.
2. acquire the skills in software installation and upgrading.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **PERSONAL COMPUTER (PC) DIAGNOSTIC AND MAINTENANCE**	The student will be able to: 4.1.1 identify common problems associated with PCs and their suggested solutions. 4.1.2 perform routine PC maintenances. 4.1.3 perform basic computer system Trouble Shooting. 4.1.4 mount and set up a computer. 4.1.5 install and/upgrade software on a computer	**Common Problems Associated with PCs and Their Suggested Solutions** **PC Maintenance Routine e.g.** ▪ Blowing dust from computer ▪ Scan for virus ▪ Defragment hard disk **System Trouble Shooting Skills. e.g.** ▪ Finding out why computer slows down ▪ Why a computer is not booting ▪ Why monitor is not displaying ▪ Why a printer is not printing Setting up a computer Installation and Upgrading of Computer Software	Assist students to identify common problems associated with PCs and their associated solutions. Demonstrate how to carry out a routine PC maintenance for students to practise. Demonstrate trouble shooting skills for students to practice. Demonstrate how to setup a computer for students to practise. Demonstrate the installation and upgrading of computer software. Give students some software to install.	<u>Exercise</u> Analyse why computers slow down their processing speed and suggest solution to solve the problems

SECTION FIVE

USING ICT TO LEARN

General Objective: The student will:

1. understand the concept of educational technology and apply to learning.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 CONCEPTS AND TERMINOLOGIES IN INTEGRATING ICT IN EDUCATION	The student will be able to: 5.1.1 explain concepts associated with ICT in education	**Concepts of Terminologies used in Integrating ICT in Education** e.g. • Multimedia, • Instructional design • Linear • Non linear	In groups, students to brainstorm and come out with terminologies used in ICT in Education.	**<u>Project Work</u>** **Preparation of Multimedia Packages** Students to design, create and use multimedia packages based on topics from other subject using known ICT tools such as Presentation, Desktop Publishing and Graphic Packages.
UNIT 2 MULTIMEDIA IN EDUCATION	5.2.1 state the requirements for designing, creating and using multimedia in education.	Requirements for Integrating Multimedia in Education.	Assist students to discuss requirements needed to integrate multimedia in education.	
:	5.2.2 list the advantages of using multimedia in education.	Advantages of Using Multimedia in Education e.g. • Computer aided learning (CAL) • Virtual reality (training of doctors, flight simulation,) • Computer-aided design (CAD): engineering drawing	Let students come out with the advantages or disadvantages of using multimedia in education.	

SENIOR HIGH SCHOOL - YEAR TWO

SECTION ONE

SPREADSHEET APPLICATION

General Objective(s): The student will:

1. acquire the skills in formatting and editing worksheet
2. acquire skills in generating and managing data.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **EDITING WORKSHEET**	The student will be able to: 1.1.1 enter and save data.	**Entering and saving data**	Teacher to give students data to enter, edit and save as revision	.
	1.1.2 edit data	**Editing Data** • Unconditional formatting • Custom number format • Import text file • Paste special option etc.	Guide students to apply various editing tools such as those listed under content to edit worksheet	**Exercise** Students to be given a data to type and perform the following operations: • Rename the worksheet used • Freeze the row containing the heading • Apply boarders to the active cells • Save it on the desktop.
	1.1.3 demonstrate the various ways of displaying data	**Displaying Data** • Freeze row, column, title • What-if tables	Students to practise various ways of displaying data	
	1.1.4 apply protection techniques to data	**Data Protection** • Adding and removing password	Guide student to apply protection to data	
UNIT 2 **FORMATTING WORKSHEET**	1.2.1 format numbers, decimal points, dates, times.	Formatting Numbers, Decimal Points, Date, Time.	Give students data which contains decimals, date and time to enter.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 **DATA HANDLING**	The student will be able to: 1.2.2 highlighting values that meet specified conditions. 1.2.3 merge and split cell . 1.3.1 sort and query for information. 1.3.2 create graphs and charts to represent data. 1.3.3 edit and format charts	Highlighting Values That Meet Specified Conditions Merging and Splitting Cells Columns and Rows **Sorting and Querying for Information** e.g. • Sorting data by multiple columns. • Performing custom sorts. • Creating a single or multiple criteria query using available options. • Using advanced query/filter • Using graphs and charts to represent data in a worksheet. **Creating Graphs and Charts to Represent Data in a Worksheet.** **Editing and Formatting Charts** • Adding and changing text and data in charts, • Changing placement of charts, etc. • Formatting legends and details in charts, • Changing scales of charts, • Presenting alternative charts for data including pie charts, bar charts.	Assist students to highlight values that meet specific condition Guide students to practise merging and splitting cells, column and rows NOTE: Editing and formatting tools mentioned in this syllabus are not exhaustive. Teacher should expose students to more editing tools Guide students to practice sorting, filtering and querying data in a worksheet Students to enter data and use it to create chart of graphs Guide students through the process of creating chart. e.g. 1 Select data 2 Click on Insert and select Chart 3 Select a chart of your choice 4 Click Next to follow the next steps to complete the chart. Assist students to format the chart	**Exercise** Type the given data and to apply the following editing and formatting : • apply 2 decimal places to the figures • Merge and centre the main heading • Wrap text in some selected cells **Exercise** Students to create a chart on a given data. The chart should be created as a new sheet on the worksheet bar

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION

	The student will be able to:			
UNIT 4 **DATA SECURITY**	1.4.1 protect data and worksheets.	**Providing Security for Data and Worksheets e.g.** • Protecting a workbook, worksheet or designated cells in a worksheet. e.g. <u>Protecting a worksheet</u> 1. Open worksheet 2. Click on Tools on the Menu bar 3. Select Protect and click 4. Type Password and click on OK 5. Retype Password to confirm 6 Click on OK Removing protection from a workbook, worksheet. or designated cell in a worksheet. <u>Removing worksheet protection</u> 1. open worksheet 2. click on Tools on the Menu bar 3. click on Unprotect 4. Type Password and click on OK	Discuss the importance of protecting documents. Assist students to create password and secure worksheets and data. Students to create data and protect it with a password and save it. Students to remove the protection and re-create.	**<u>Exercise</u>** Students to create a data and save it with a password.
UNIT 5 **USING FUNCTIONS**	1.5.1 work with functions in spreadsheet applications.	**Working with Functions in Spreadsheet Application e.g.** • Date and time functions: e.g. TODAY; DAY; MONTH; YEAR. • Mathematical functions: e.g. SUMIF; SUMPOSITIVE; ROUND. • Statistical functions: e.g. COUNT; PURECOUNT; COUNTA; COUNTIF. • Text functions: e.g. PROPER; UPPER; LOWER; CONCATENATE.	Discuss the different functions used in Spreadsheet Application. Demonstrate and assist students to practise the various functions in Spreadsheet Application Give students more exercises to do to practise the functions.	Give students more exercises involving the use of different functions

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION

UNIT 5 **USING FUNCTIONS** (CONT'D)	The student will be able to:	• Financial functions: e.g. FV; NPV; PMT; PV; RATE. • Lookup and reference functions: e.g. LOOKUP; VLOOKUP. • Logical functions: e.g. IF; AND; OR; IFERROR. • available database functions: e.g.DSUM; DMIN;DMAX and DCOUNT		**<u>Exercise</u>** Students to be given data to type and apply some given functions.
	1.5.2 state the importance of the "Help Facility" in Spreadsheet Application.	Importance of the "Help Facility" in Spreadsheet Application.	Let students apply the "Help" facility and encourage them to use it when in difficulty.	
UNIT 6 **BASIC ANALYSIS**	1.6.1 analyse data in a worksheet using pivot tables/dynamic crosstab.	**Analysing Data Using Pivot Tables/Dynamic Crosstab** e.g. • Create pivot table / crosstab • Modify data source and refresh pivot table / crosstab • Display data in a pivot table / • crosstab by a defined criterion	Assist students to analyse data by: e.g. - Creating pivot table / crosstab - Modifying data source and refreshing pivot table / crosstab - Displaying data in a pivot table / crosstab by a defined criterion	

SECTION TWO

INTRODUCTION TO DATA PROCESSING SYSTEMS

General Objective: The student will:

1. be able to use Database application to create and manage data in database.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **CONCEPT AND TERMINOLOGIES OF DATABASE APPLICATION**	The student will be able to: 2.1.1 explain concepts and terminologies associated with databases.	**Database concepts and terminologies** • Data • Relationship • Views • Primary key • Fields • Tables • Forms • Queries etc.	Discuss concepts and terminologies associated with databases Let students come out with the definition of the terms.	**Exercise** - Create a table for a class database and save in a folder. - Populate the table created. - Sort data, find and delete duplicate records and index the table. - Print the table in data sheet view.
UNIT 2 **CREATING A DATABASE**	2.2.1 design and create a database using a variety of ways.	**Creating a data base** • Proper planning • Working with tables (defining table structure) • Assigning primary key • Entering data • Printing tables • Modifying table structure	Students to load Database application. Demonstrate how to design and create a database	
UNIT 3 **MANAGING DATA IN A DATABASE**	2.3.1 administer a database.	**Administering a database** ▪ Add, delete and edit data, ▪ Select, copy and move data, ▪ Sort data, ▪ Find data using filters, using expressions in filters, ▪ Index a table,	Guide students to administer a database. Teacher should let students practise the processes thoroughly to acquire the skills	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION

UNIT 3 (CONT'D) MANAGING DATA IN A DATABASE	The student will be able to:	▪ Find and delete duplicate records, ▪ Rename table	NOTE Data could be information about the class and it should contain duplicate records.	**<u>Exercise</u>** Teacher to give data to students to do the following exercise:
UNIT 4 **WORKING WITH QUERIES,**	2.4.1 create and use a query.	**Creating Queries Using a Variety of Ways e.g.** - auto wizard - design view	Guide students to: ▪ Use the auto wizard and the design view to design and create queries ▪ Create queries using complex criteria expressions ▪ Query multiple table	Design a form and use the form to update the database created in the previous exercise
UNIT 5 **WORKING WITH FORMS**	2.5.1 create and use forms.	Creating Forms.	Students to ▪ Design and create forms ▪ Create forms based on multiple tables ▪ Update a database using forms ▪ Format forms ▪ Print a form	Query the database created in the previous exercise and produce reports. NOTE: Queries and reports For this particular exercise could be based on: ▪ List of boys ▪ List of girls ▪ Age group ▪ Houses etc
UNIT 6 **WORKING WITH REPORTS**	2.6.1 design and manage reports.	Designing and Managing Reports.	Assist students to ▪ Create reports based on tables, queries ▪ Sort and group records within a report, ▪ Create mailing lists and mailing labels, ▪ Calculate totals and using expressions ▪ Print reports	**<u>Project Work</u>** design, create and manage a database for the school with not less than 100 and not more than 150 record NOTE: The project work should form part of the term's work.

SECTION THREE

INTRODUCTION TO PROGRAMMING

General Objective: The student will:

1. be able to understand the different Programming Languages, their features and terms.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **INTRODUCTION TO PROGRAMMING LANGUAGES**	The student will be able to: 3.1.1 explain Programming Language.	**Programming Language** • a standardized communication technique for expressing instructions to a compute**.**	Students to brainstorm to come out with the definition for Programming Language.	
	3.1.2 trace the development of programming languages from 1954 to date.	The Development of Programming Language.	Discuss the development of Programming Language since 1954	**Exercise** Students to carry out a research on the Internet on the development of Programming Languages.
	3.1.3 identify the categories of programming of languages.	**Categories of Programming Language e.g** • High-Level Programming Language - JAVA, - C++ • Low-Level Language e.g - Machine Language - Assembly Language	Guide students to identify the different categories of Programming languages	Students are to present their findings using a three column table which should include: - Name of programme - Originators of the Language - Year/Period of release
	3.1.4 state the differences between the categories of Programming Language.	Differences Between the Categories of Programming Languages.	Guide students to differentiate between the various categories of Programming Language	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 2 **FEATURES OF PROGRAMMING LANGUAGES**	The student will be able to: 3.2.1. describe the features of particular Programming Languages.	**Features of Programming Languages** The features to be looked at include but are not limited to the following: • Data types, • Constants and variables, • Expressions and assignments, • Operators and precedence, • Input/output statements, • Built-in functions, • Sequential and conditional execution, • Looping constructs, • Single dimensional arrays. • Nested Loops	Guide students to discuss at least 3 popular Programming Languages based on the features indicated in the content column. Some of the languages that could be discussed include the following 1. Visual Basic 2. C++. 3. Ruby	**<u>Exercise</u>** Students are to state 3 differences and 3 similarities among 3 programming languages they are familiar with
	3.2.2 explain common terminologies associated with programming.	**Terminologies Associated with Programming**. E.g. • High-Level Language, • Machine Language/Code • Source Code • Boolean Expression • Class • Comment • Compiler • Debugging • Event Procedure • Syntax • Variables Compile-Time Error • Syntax Errors • Runtime Errors • Coding • OOP	Students discuss and come out with common definitions for common terminologies associated with programming	**<u>Assignment</u>** Students to carry out research on the Internet before class on common terminologies associated with programming. Students are to present their findings to the class for discussion.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 **PROGRAMME DEVELOPMENT LIFE CYCLE**	The student will be able to: 3.3.1 state the basic steps involved in the development of a computer program.	**Program development life cycle** • Problem Definition • Problem Analysis • Algorithm design and representation • Actual coding • Testing and debugging • Complete documentation and operator procedures ready for implementation	Students are to discuss the basic steps involved in the development of a program.	**<u>Assignment</u>** Students are to write a short essay explaining the steps involved in developing a computer program.
UNIT 4 **ALGORITHMS**	3.4.1 explain the concept of Algorithms.	**The Algorithm Concept** • They are a sequence of steps • They are a set of instructions(method) which if faithfully followed will produce a solution to a given problem	Assist students to discuss the concept of Algorithms.	
	3.4.2 explain the techniques used for representing them.	**Techniques for Representing Algorithms** • Pseudo code • Flowcharts • Actual code	Discuss the techniques for representing Algorithms.	
	3.4.3 state the Algorithm building blocks.	**Algorithm Building Blocks** • All problems can be solved by employing any one of the following building blocks or their combinations. • **Sequences** A sequence of instructions that are executed in the precise order they are written in: *statement block 1* *statement block 2* *statement block 3*	Guide students to identify the Algorithm building blocks.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION

UNIT 4 (CONT'D)
 	
ALGORITHMS
	The student will be able to:	• **Conditionals**
		Select between alternate courses of action depending upon the evaluation of a condition
		
		If (condition = true)
		statement block 1
		Else
		statement block 2
		End if
		
		• **Loops**
		Loop through a set of statements as long as a condition is true
		
		Loop while (condition = true)
		statement block
		End Loop
				.
				
				<u>Research work</u>
				Students are to research on Algorithms (concepts and building blocks) and share their findings with their colleagues using a presentation package

UNIT 5 **FLOW CHARTS**	3.5.1 explain the concept of flow chart.	**Flow chart concept** Flowcharting is one method of pictorially representing a procedural (step-by- step) solution to a problem before you actually start to write the computer instructions required to produce the desired results.	Assist students to discuss the concept of using flowcharts in programming	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 5(CONT'D) **FLOW CHARTS**	The student will be able to: 3.5.2 explain the factors to consider in constructing flowcharts. 3.5.3 construct a flow chart. 3.5.4 identify flowchart symbols 3.5.5 identify types of flowchart	**Factors to Consider in Constructing Flowcharts** • think through the problem solution step-by- step. • analyse the specifications in terms of - the required inputs - the output desired - the operations and procedures required to produce the output • clarify the problem by having a narrative definition of the problem definition • develop a flowchart showing the logic, steps, and sequence of steps you want the computer to execute in order to solve the problem. **Constructing a Flow Chart:** • This should be made up of a number of flowchart project) **Flowchart Symbols** • They are graphic symbols used to specify arithmetic operations and relational conditions. **Types of flow Charts** e.g. System (data) flowcharts defines the major phases of the processing, as well as the various data media used	. Let students brainstorm and come out with the factors that need to be considered in constructing flowcharts Demonstrate how to construct a flow chart. Guide students to logically analyse a problem and construct a flowchart based on the analysis. Provide opportunities for students to familiarize themselves with the flowchart symbols. (Refer to Appendix B) Assist students to identify types of flowchart and discuss	.

SECTION FOUR

INTRODUCTION TO DESKTOP PUBLISHING APLPLICATION

General Objective(s): The student will:
1. acquire skills in using appropriate Desk Top Publishing application
2. acquire skills in producing textual and graphical publications

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **DESKTOP PUBLISHING APPLICATION WINDOW**	The student will be able to: 4.1.1 identify the types of Desktop Publishing application Package	**Types of Desktop Publishing Application package** e.g. • PageMaker • QuarkXpress • Publisher	Lead students to discuss Desktop Publishing application package	
	4.1.2 identify the features of the Desktop Publishing application	**Features of the Desktop Publishing Application.** Features: • Toolbars : object, ruler, standard, formatting, connect boxes • Task pane • Colour scheme • Font scheme • Publication option	Let students open Desktop Publishing application window and discuss the features with them.	**Assignment** Students to write a report on the field trip.
	4.1.3 explain the terminologies in Desktop Publishing application.	**Terminologies in Desktop Publishing Application e.g.** Publication gallery - task pane that display all the designs available for publication type Design checker – a tool that checks publications for design consistency and alerts the user to a potential problems Frames **-** holds objects such as text, pictures and graphics	Discuss the terminologies associated with Desktop Publishing application Assist students to identify some the feature that could be seen in the window. **Field Trip** Teacher should organise a field trip to a commercial printing house for students to actively observe the processes involved in publishing	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
	The student will be able to:	**Colour scheme** - Pane which displays colours		.
UNIT 2 **PRINCIPLES OF DESIGINNING PUBLICATIONS**	4.2.1 explain the principles of designing publications.	**Principles of Designing Publications:** e.g. <u>Principles</u> • Balance • Unity • Harmony • Emphasis • Variety • Rhythm • Contrast	Group students to brainstorm and report on the principles and terminologies in designing publications.	
UNIT 3 **DESIGNING PUBLICATION**	4.3.1 plan a publication for designing.	**Planning a Publication for Designing :** • Design • Paper size • Format • Colours etc	Using illustrations, discuss with students how to plan a publication.	**<u>Exercise</u>** **D**esign: 1. A business card for your parent. 2. A success card for your friend.
	43.2 design publications.	**Designing publication** e.g. Greeting cards, Invitation Cards, Posters, Business Cards, Letterheads, Certificates Banners, Brochures, Post card	Guide students to design a publication using either Microsoft Publish or Corel Draw Let students setup the margins before designing Students to save the publication for subsequent exercises	**<u>Project work</u>** Topics for the term's project should be given to students to start planning.
UNIT 4 **EDITING PUBLICATION**	4.4.1 edit publication.	**Editing Publication e.g.** - fonts ,typefaces and images - adjust point sizes, headings, and alignment etc.	Assist students to edit the publication designed.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 5 **FORMATTING PUBLICATION**	The student will be able to: 4.5.1 format background of publication.	**Formatting Background of Publication:** e.g. - apply texture, pattern shadows watermark etc to background	Guide students to format the background and the text in the publications designed , applying background options	**Exercise** Use the following tools to format a document.: • WordArt • Text orientation • Text colour • Shadow
	4.5.2 format text in a publication.	**Formatting text in a publication.** - Word Art, Text orientation, colour. etc	Students to format text in the publication designed.	**Project Work** In groups of 3 design the one of the following publication and print: ▪ Brochure for the school ▪ Business card ▪ School letterhead
UNIT 6 **PRINTING PUBLICATION**	4.6.1 print publication.	**Printing a publication**	Guide students to select print option and print publication e.g. Paper size, 2 sided or single sided, paper orientation etc.	

SENIOR HIGH SCHOOL - YEAR 3

SECTION ONE

NETWORKING

General Objective: The student will:

1. acquire the skills in setting up a network
2. recognise the forms and components of data communication

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
	The student will be able to:			
UNIT 1 **NETWORK CONCEPTS**	1.1.1 explain concepts of networking.	**Concepts of Networking** ▪ Terminologies associated with networking e.g. topology, gateway router, server, client.	Discuss the concept of networking.	
UNIT 2 **TYPES OF NETWORKS**	1.2.1 state the types of networks.	**Types of Networks** e.g - LAN - MAN - WAN	Assist students to discuss the various network types and their features (similarities, differences advantages and disadvantages).	**Exercise:** Students to state the types of networks and discuss their differences.
UNIT 3 **NETWORK TOPOLOGY**	1.3.1 identify types of network topology.	**Types of Network Topology** e.g. ring, star, tree etc. Securing data transmission • backup • ethical and legal issues physical security -password, fire wall, anti-virus, monitoring	Discuss the characteristics of various network topologies.	.
	1.3.2 identify various Network Architecture.	**Network Architecture** • Peer –to- peer • Client – server • File- server	Assist students to discuss the various network architecture and their features.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 4 **NETWORK TRANSMISSION MEDIA**	The student will be able to: 1.4.1 discuss the media used in network transmission	**Types of Network Transmission Media** • wireless system – Bluetooth, infra red, Wireless Fidelity (WiFi), satellite etc. dish • cabling system – twisted pair, coaxial cable. Fibre optic etc	In groups students to brainstorm and report on the types of network transmission media	.
UNIT 5 **NETWORK CONFIGURATION**	1.5.1 configure a simple network.	**Configuring a Network** • Network Protocols and Standards.	Demonstrate how to set up a simple network Students to practise what has been demonstrated.	**Exercise**: Students to setup network and configure
UNIT 6 **DATA COMMUNICATION**	1.6.1 explain data communication and its related concepts	**Concepts of Data Communication** Data communication is the sending of data between geographically separated computers.	Discuss the concepts of data communication.	
	1.6.2 discuss the role of hardware, software and communication channels play in data communication.	**Components of Data Communication** • Hardware Components of Data Communication e. g. Servers, bridges, modems, v-sat, cables	Display hardware components and assist students to identify the components of data communication and state their uses.	
		• Software Component of Data Communication e.g. Communication Software	Assist students identify software components of data communication and the role they play in data communication.	
		• Communication Channels e.g. physical structure	Let students identify the various communication channels and their components.	
	1.6.3 discuss the various directions for transmitting data	**Direction of Data Transmission** • Simplex • Half duplex • Full duplex	Discuss the various directions for data transmitting data	**Exercise** Discuss the forms of data transmission signals..
	1.6.4 discuss the various forms of data transmission signals	**Forms of Data Transmission Signals** • Analog • Digital	Lead students to brainstorm and come out with the forms of transmission signals.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 7 **DATA SECURITY AND CONTROL**	The student will be able to: 1.6.5 discuss the various forms of data communication . . 2.5.1 discuss the ways of data security over a transmission media	**Forms of Data Communication** e.g. • Information Services • Electronic Funds Transfer • Telecommuting • The Internet services • E-mail (Electronic Mail) **Data Transmission Security** e.g. - Password - Data encryption - Error code - Destination code	Lead students to discuss the various forms of data communication Discuss the steps to be taken to ensure secured data transmission.	**Group Project Activity** Design a simple network Lay network cables Correctly terminate the ends of a network cable using the appropriate connectors Configure a simple network Troubleshoot a simple network NOTE: Teacher should make necessary materials and tools available for students to use.

SECTION TWO

WEBSITE DESIGNING

General Objective: The student will:

1. be able to design a personal website using a coding language (HTML)

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **INTRODUCTION TO HTML**	The student will be able to: 2.1.1 explain the term HTML.	**Understanding the term HTML** Definition Hyper Text Mark Up Language	Students to research on the meaning of HTML on the Internet and to share their findings with their classmates.	**Project Work** Teacher should let students start their terms project work (see Unit of this section).
	2.1.2 state the basic structure for HTML coding.	**Basic structure of HTML coding** Basic Structure <html> <head> <title> < title > <Body> </Body> </html>	Discuss the basic structure of HTML coding.	
UNIT 2 **BASIC HTML TAGS**	2.2.1 use basic HTML tags.	**Using Basic HTML Tags e.g** -line break </br> bold <u> underline </u> italics <hr>-Horizontal rule/line </hr> <p>-paragraphs </	Teacher to demonstrate the use of common basic HTML tags, for Students to practise. NOTE: Give students ample time for the practise.	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 DESIGNING A WEBSITE USING HTML	The student will be able to: 2.3.1 explain some best practices in website designing.	**Best Practices in Website Designing** e.g. • Thorough Planning (on paper) • Choice of colours • Using images in website development	Students in groups, to research on the internet for best practises in website designing and share with their classmates. **NOTE:** Use notepad as the text editor to do the coding. When saving the files relate to one website in the same folder. Save the files with the extension html.	**Exercise** Students to create a table with three rows and four columns.
	2.3.2 create Tables using HTML code	**Creating Tables Using HTML** Code table> <tr> <td> </td> </tr> </table>	Assist student to create tables using the appropriate HTML code(s).	
	2.3.3 format tables (width, height, cell padding, boarder).	Formatting Table Using HTML • Width Code <table width=”300”> (the table width in the example above is 300) • Height Code <table height=”300”> • Cell padding Code <table cell padding=”3”> • Boarder Code <table border=”3”>	Student to format tables using the appropriate HTML code(s). .	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) **DESIGNING A WEBSITE USING HTML**	The student will be able to:	**Example of a Table Created Using HTML** <table> <table height="300"width="300" border="2" cell padding="3"> <tr> <td width="210">A</td> <td width="45>B</td> <td width="45>C</td> </tr> </table>		
	2.3.4 insert text into table.	**Inserting Text into Table** <table> <table height="300"width="300" border="2" cell padding="3"> <tr> <td width="210">My personal website. You are most welcome</td> </tr> </table>	Students to insert text in tables	
	2.3.5 format text using HTML code.	**Formatting Text Using HTML Code** • Heading Heading Heading Heading Heading Heading Heading • Colour • Font size and face	Assist students to format text using HTML code (heading, colour, font face, size, alignment)	

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) **DESIGNING A WEBSITE USING HTML**	The student will be able to:	 • Alignment Aligning text to the center **Example of text formatted using HTML** <html> <head> <title>Formatting Text</title> </head> <body> Aligning text to the center This line is shown in the normal font. Up 3 to change the font size to 6. Changing the font face Text color changes to red. </body> </html>	. .	.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) **DESIGNING A WEBSITE USING HTML**	The student will be able to: 2.3.6 create an ordered and unordered list.	**Preparing a List Using HTML** • Ordered list <html> <head> <title>Bulletin</title> </head> Learn about bulletin. <Menu> - Breakfast:Porridge - Lunch:Red Red - Super:Akple and okro soup </Menu> </body> </html> • **Ordinary list** <html> <head> <title>Bulletin</title> </head> Learn about list. <Menu> Breakfast: Porridge Lunch: Red Red Super: Akple and Okro soup </Menu> </body> </html>	Assist student to create ordered and unordered lists using the appropriate HTML code(s)	.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 3 (CONT'D) DESIGNING A WEBSITE USING HTML	The student will be able to: 2.3.7 insert images. 2.3.8 insert hyperlinks.	Inserting images **Note:** image to be inserted should be in the same folder together with the other files associated with the website Hyperlinks <a href="skoool.com.gh> **Note:** skoool.com.gh is the name of the website being linked.	Assist student to insert images using the appropriate HTML code(s) Assist student to insert hyperlinks using the appropriate HTML code(s) Students are to demonstrate the ability to design a simple website using the skills learnt. .	. **Project work:** In groups of 4 students to design a website The information on the website should include. • Information about themselves with pictures • Information about school with pictures • Brief description about projects/ research work they have undertaken • Find resources on a chosen topic in a subject area • Links the website to skoool.com.gh The project work should form part of the terms work. Project should be introduced to students early in the term

SENIOR HIGH SCHOOL - YEAR THREE

SECTION THREE

PROJECT-BASED ACTIVITY

General Objective: The student will:

1. be able to apply the ICT skills learnt (Presentation, Desktop Publishing, Database, Graphic packages etc.) in practical situations.

UNIT	SPECIFIC OBJECTIVES	CONTENT	TEACHING AND LEARNING ACTIVITIES	EVALUATION
UNIT 1 **PROJECT WORK:** **- DESKTOP PUBLISHING** **- DATABASE** **- WEBSITE DESIGN**	The student will be able to: 4.1.1 create a published document, database or website applying all the skills learnt on this course.	**Production of a** - published document, - simple database or a - simple website.	Teacher to provide a number of project topics. Students to select one of the topics and either produce a published document, a simple database or a simple website.	.
	4.1.2 write a report using skills learnt in using Word Processing applications.	Writing a project report using a word processing application.	Students to write a report on the project using a Word Processing application.	
	4.1.3 prepare a simple project budget using skills learnt in using spread sheet applications.	Preparing a Budget Using a Spreadsheet Application**.**	Students to prepare a simple budget using a spread sheet application.	

APPENDIX A

GUIDE FOR ALLOCATING PERIODS TO EACH UNIT

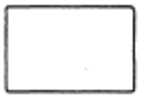
Year 1 (180 Periods)				Year 2 (180 Periods)				Year 3 (120 Periods)			
Section	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**	**Section**	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**	**Section**	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**
1	1	12		1	1	8		1	1	6	
	2	12			2	6			2	6	
			24		3	8			3	6	
2	1	12			4	6			4	6	
	2	12			5	12			5	9	
	3	12			6	6			6	9	
			36				44		7	24	
3	1	12		2	1	6					66
	2	12			2	6			1	6	
	3	14			3	6		2	2	6	
			38		4	8			3	9	
4	1	9			5	8			4	9	
			9		6	26					30
5	1	6					60				
	2	6		3	1	6		4	1	18	
			12		2	6					18
					3	6					
					4	12					
					5	6					
				4	1	4					
					2	4					
					3	4					

Year 1 (180 Periods)				Year 2 (180 Periods)				Year 3 (120 Periods)			
Section	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**	**Section**	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**	**Section**	**Unit**	**Suggested No. Of Periods Needed To Teach Unit**	**Total**
					3	4					
					4	4					
					5	12					
							22				
Total Periods			119	Total Periods			164	Total Periods			96
Extra Left For Contingencies			61	Extra Left For Contingencies			16	Extra Left For Contingencies			24
Total			180	Total			180	Total			120

APPENDIX B

FLOW CHART SYMBOLS

+	plus, add
−	minus, subtract
*	multiply
/	divide
±	plus or minus
=	equal to
>	greater than
<	less than
≥	greater than or equal to
≤	less than or equal to
≠	not equal to
≯	not greater than
≮	not less than
YES or Y	Yes
NO or N	No
TRUE or T	True
FALSE or F	False



PROCESS SYMBOL is used to
represent general processing functions not represented by other symbols. It depicts the process of operations resulting in a change of value, form, or location of information.

INPUT/OUTPUT SYMBOL is
used to represent any function of an I/O device. Making information available for processing is an Input function; recording processed information is an Output function.

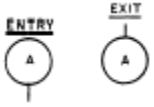
DECISION SYMBOL is used to depict a point in a program at which a branch to one of two or more alternate paths is possible.

TERMINAL, INTERRUPT SYMBOL start, stop, halt, delay, or interrupt.

CONNECTOR SYMBOL represents a junction in a line of flow to another part of the flowchart. A common identifier, such as an alphabetic character, number, or mnemonic label, is placed within the exit and its associated entry.

FLOWLINE SYMBOL is used to represent flow direction by lines drawn between symbols. Normal direction of flow is left to right and top to bottom. If the direction of flow is other than normal, arrowheads are required at the point of entry.

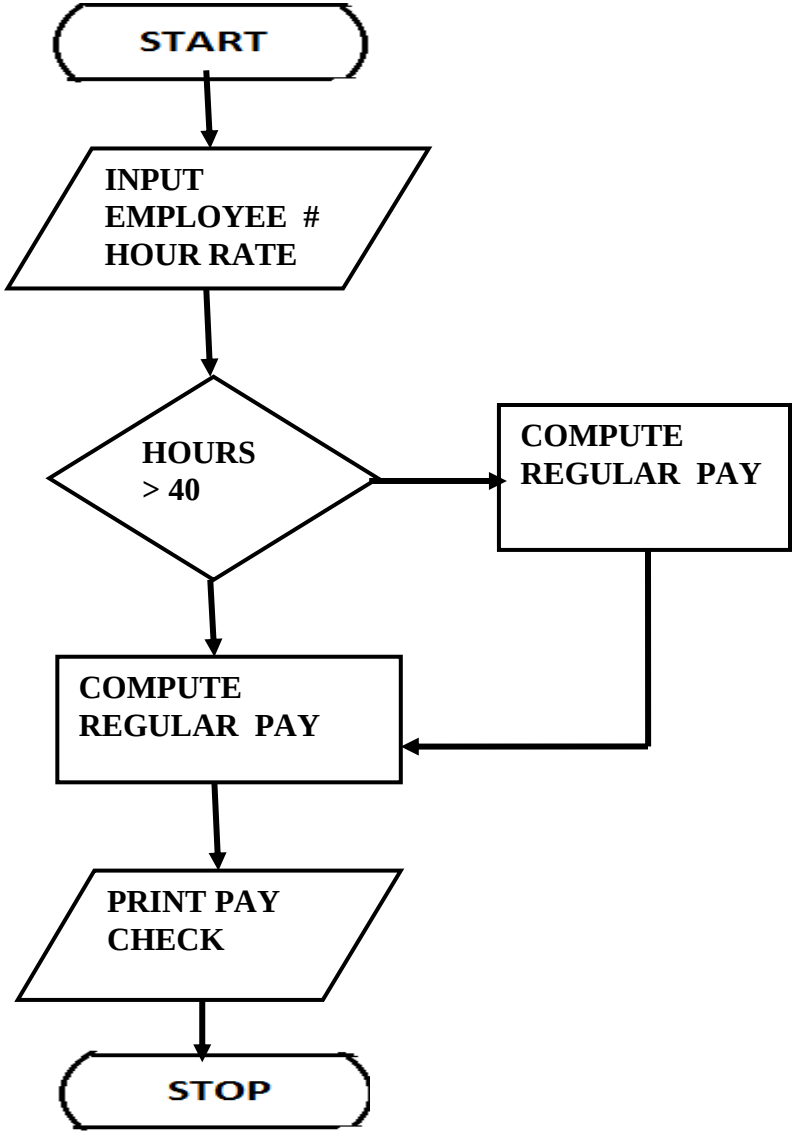
START/STOP flow chart at this point.



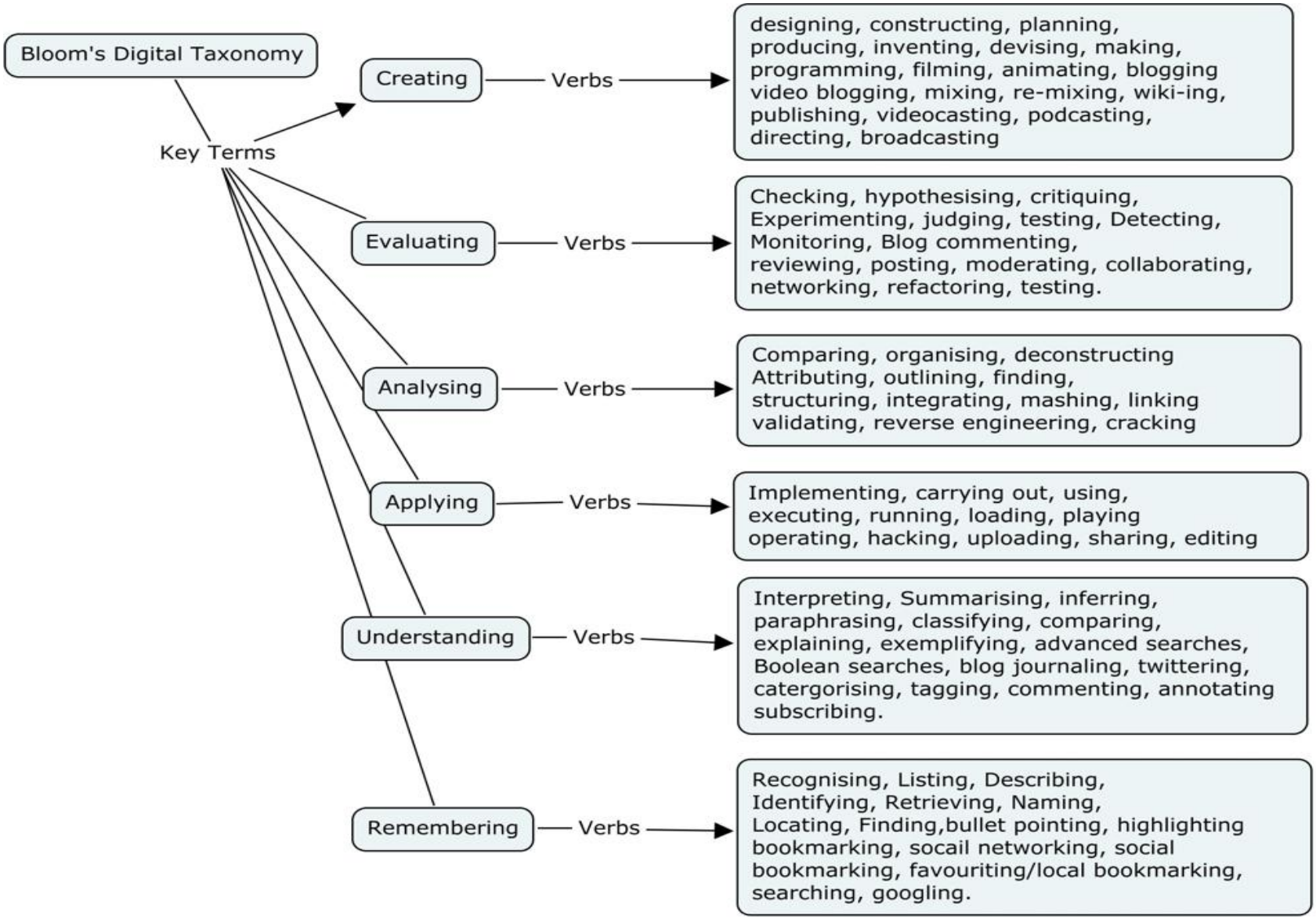
This represents the EXIT point and the ENTRY point in a flowchart.

APPENDIX D

FLOW CHART



Blooms Digital Taxonomy



Source: Churches A, 2007, Edorigami, blooms taxonomy and digital approaches
http://edorigami.wikispaces.com/Bloom%27s+and+ICT+tools

21st Century Skills

The 21st century skills as identified by the Partnership for 21st Century Skills

LEARNING AND INNOVATION SKILLS

Creativity and Innovation

- Demonstrating originality and inventiveness in work
- Developing, implementing and communicating new ideas to others
- Being open and responsive to new and diverse perspectives
- Acting on creative ideas to make a tangible and useful contribution to the domain in which the innovation occurs

Critical Thinking and Problem Solving

- Exercising sound reasoning in understanding
- Making complex choices and decisions
- Understanding the interconnections among systems
- Identifying and asking significant questions that clarify various points of view and lead to better solutions
- Framing, analyzing and synthesizing information in order to solve problems and answer questions

Communication and Collaboration

- Articulating thoughts and ideas clearly and effectively through speaking and writing
- Demonstrating ability to work effectively with diverse teams
- Exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
- Assuming shared responsibility for collaborative work

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

Information Literacy

- Accessing information efficiently and effectively, evaluating information critically and competently and using information accurately and creatively for the issue or problem at hand
- Possessing a fundamental understanding of the ethical/legal issues surrounding the access and use of information

Media Literacy

- Understanding how media messages are constructed, for what purposes and using which tools, characteristics and conventions
- Examining how individuals interpret messages differently, how values and points of view are included or excluded and how media can influence beliefs and behaviors
- Possessing a fundamental understanding of the ethical/legal issues surrounding the access and use of information

ICT (Information, Communications and Technology) Literacy

- Using digital technology, communication tools and/or networks appropriately to access, manage, integrate, evaluate and create information in order to function in a knowledge economy
- Using technology as a tool to research, organize, evaluate and communicate information, and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information

LIFE AND CAREER SKILLS

Flexibility and Adaptability

- Adapting to varied roles and responsibilities
- Working effectively in a climate of ambiguity and changing priorities

Initiative and Self-Direction

- Monitoring one's own understanding and learning needs
- Going beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
- Demonstrating initiative to advance skill levels towards a professional level
- Defining, prioritizing and completing tasks without direct oversight
- Utilizing time efficiently and managing workload
- Demonstrating commitment to learning as a lifelong process

Social and Cross-Cultural Skills

- Working appropriately and productively with others
- Leveraging the collective intelligence of groups when appropriate
- Bridging cultural differences and using differing perspectives to increase innovation and the quality of work

Productivity and Accountability

- Setting and meeting high standards and goals for delivering quality work on time
- Demonstrating diligence and a positive work ethic (e.g., being punctual and reliable)

Leadership and Responsibility

- Using interpersonal and problem-solving skills to influence and guide others toward a goal
- Leveraging strengths of others to accomplish a common goal
- Demonstrating integrity and ethical behavior
- Acting responsibly with the interests of the larger community in mind

Source: Partnership for 21st Century Skills (www.21stcenturyskills.org).