Scheme of work Computer Science

Academic year: 2022-2023 Term: I School: …….. Subject: Computer science
Teacher's name: ……. Class + Combination: S4MCE Number of period per week: 7

Dates	Unit title	Lesson title + Evaluation	Learning objectives (copied or adapted from the syllabus depending on the bunch of lesson) + Key unit competence	Teaching methods & techniques + Evaluation procedures	Resources & References	Observations
Week1 26-30/9/2022	**Unit 1:** Computer fundamental	• Define: o Computer o Computer science • Computer characteristics • Classification of computers	**Knowledge and understanding** • State and explain characteristics of computers • Identify the impact of computers in society. • Explain the evolution of computers. **Skills** • Detect the impact of computers in society. • Classify computers according to their size, processing power, their functions and the data to be processed. • Differentiate different computer generations, technology used in each generation. **Attitudes and values** Appreciate the evolution and the importance of a computer in: • Education • Business • Governance • Health • Communication • Entertainment **Key Unit Competency:** To be able to explain characteristics and evolution of computers and detect the impact of computer in society	• The teacher will ask students to write an essay on the role and evolution of a computer by searching on internet and through books. • In group discussions students detect the impact of computers in their school and outside the school. They also classify the computers that are available in their school.	1. Internet 2. Computer science Book4 3. Other documents	
Week2 3-7/10/2022		• Role of computers in society • History of computers				
Week3 10-14/10/2022		• History of computers Evaluation				

	Unit-2: Computer Architecture, Assembling and Disassembling a Computer	• Computer system • Computer functions • Computer hardware • Port and Connectors Plug and unplug computer Peripherals	**Knowledge and understanding** • Identify computer system, components and function of each component. • Identify computer peripherals , ports and connectors • Differentiate types and purpose of computer case **Skills** • Attach and de- attach computer peripherals • Compare different computer case form factors • Identify elements inside computer cases • Assemble and disassemble desktop computer **Attitudes and values** • Appreciate the guideline of attaching and disconnecting each component of a desktop computer properly **Key Unit Competency** To be able to: • Identify computer components and their functions(input, output, processing and storage) • Assemble and disassemble a computer, do minor maintenance **Knowledge and understanding** • Identify Ergonomic Concept and associated Health Problem • Identify Ethical Issues, Software Licensing, Anti-Piracy, Form of software license agreement (licensed, freeware, shareware, open source)	• Teacher provides computer peripherals and asks students to identify their functions and later students connect them to the computer desktop. • Students follow guidelines from teacher to clean internal and external computer components. • Students explore internal environment of the desktop computer, identify each component, detach it and re-attach it. • Students disassemble available computer desktop and reassemble it. • Teacher give examples of Health related problems and learners try to find cause and solution		
Week4 17-21/10/2022		• Computer case • Components inside computer case				
Week 5 24-28/10/2022		-Assembling a computer desktop -Disassemble a computer desktop Evaluation				
Week6 31/10-4/11/2022	**Unit-3:** Safe and ethical use of computer	• General safety guidelines • Fire safety guidelines Climate • Protect equipment against physical damage				

		• Evaluation	**Skills** • Integrate general computer use safety procedures • Able to protect equipments from physical damage **Values and attitudes** • Show the concern about to work in safe environment to protect computer against physical damage • Identify ergonomic issues and health related risk due to improper use of computer	• Students identify problems arise in their school computer lab which can cause physical damage and with the help of teacher they provide solutions • Teacher ask user to list some software and to identify if they are open source or commercial and belong to which company		
Week 7 **7-11/11/2022**		• Power protection devices • Protect the environment from contamination • Ethical Issues				
Week8 14-18/11/2022	**UNIT 4:** Computer software installation	• Computer Software , System requirement and Disk preparation • Disk management tools, Booting order and Software installation • Evaluation	**Knowledge and understanding** • Explain and differentiate types of computer software. • Identify form of software license agreement. • Identify system required to install any software. **Skills** • Create partitions on hard disk and format a disk. Use disk management tools to manage a disk. • Install some system and application software. **Attitude and values** • Be aware of how to install a piece of software and how to manage a disk.	• Teacher demonstrates all steps of Windows Operating System installation and gives a similar task to groups of students. • Teacher provides a computer and a copy of any necessary software. Individually students identify the system requirements to install any available software and proceed to install it. • Teacher demonstrates how a computer goes through several steps from switching on to when the desktop screen appears. • Teacher demonstrates how to partition, format, and defrag a disk and learners do similar hands-on practice.		

WEEK 9 21-25/11/2022	**Unit5:** Number system	• Bit, Byte, Base, Weight-by-Position, Number Base Systems: Decimal base ,binary, octal , hexadecimal, Conversion between base systems Repeated division by-N method, Replacing 3 bit in binary to octal conversion • Weight-N Method, Replacing 3 bit in binary to octal conversion	**Knowledge and understanding** • Differentiate number base systems. • Explain the conversion and use of arithmetic operations in different base systems. **Skills** • Convert a given positive number from one base system to another. • Convert fractional numbers. • Convert a given negative decimal number to binary base. • Apply arithmetic operations to binary numbers. **Attitudes and values** • Appreciate number base conversion and the use of arithmetic operators in binary base systems. • **Key Unit Competency:** To be able to compute numbers in different base systems and to do arithmetic operations based on binary numbers.	• Teacher provides numbers from one base system and asks students to convert it into other base systems. • Teacher provides exercises in which students apply arithmetic operations in different base systems.		
Week10 **28/11-2/12/2022**		• Replacing 4 bit in binary to hexa-decimal conversion, Hexadecimal to binary, octal, decimal • Conversion of fractional numbers, Conversion of negative decimal numbers to binary, Arithmetic operators on binary numbers • Evaluation				
Week 11 **5-9/12/2022**	**Revision**					
Week 12 **12-16/12/2022**	**Examination period**					
Week 13 **19-23/12/2022**	**Preparing school reports**					

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Week 1 9-13/1/2023 **Week 2 16-20/1/2023**	**Unit6:** Boolean algebra and logic gates.	Logic operators and truth tables Logic Gates Boolean Algebra Build a simple circuit and its truth table Sum-of-product form, Product-of-sum form and represent their logic circuit Evaluation	**Knowledge and understanding** • Identify logic operators, truth tables and evaluate Boolean expression using Boolean laws. • Describe the use of logic gates and apply Boolean laws on logic gates **Skills** • Apply laws of Boolean algebra on Boolean expressions. • Draw graphical representation of different logic gates and construct and evaluate a logic circuit. **Attitudes and values** • Appreciate the logical reasoning while using Boolean operators and laws applied on Boolean numbers. • Appreciate logic gates and laws applied on logic circuit. **Key Unit Competency:** To be able to • Identify different logic gates, theorems of Boolean algebra and	• Teacher provides exercises containing Boolean expression and students provide results. • Students generate truth tables of a given Boolean operator and Boolean expression. • Teacher provides a logic circuit containing different logic gates and students provide the output. • The teacher provides a Boolean expression and asks students to construct a corresponding logic circuit.		

			evaluate Boolean expressions • Utilize laws of Boolean algebra on Boolean expressions and draw a simple logic circuit using logic gates.			
Week 3 **23-27/1/2023**	**Unit-7:** Introduction to Computer Algorithm	• Algorithm concept • Expressing algorithm • Variables	**Knowledge and understanding** • Identify and explain the role, characteristics and structure of computer algorithm • Identify Flowchart symbols and their meaning • Distinguish between variable and a constant • Differentiate different data type used in computer algorithm and identify memory size for each data type • Identify how data is stored in computer memory • Manipulate expressions in algorithm writing • Use reading and writing functions in algorithm writing **Skills** • Trace an algorithm and predict output for a given input • Represent graphically the logic for a computer problem using Flowchart • Use variable ,constant and reading, writing functions in computer algorithm	• Teacher provides an simple problem ,students provide appropriate steps to resolve it and draw flowchart for it • The teacher provides written algorithm and ask students to determine the different variables , constants and their data types present in each algorithm and to precise the size of each • Teacher provide an simple exercise that require the use of variables , and ask students to write the corresponding algorithm		
Week 4 **30/1-3/2/2023**		• Constants • Expression and operators • Reading and writing				

		• Functions	• Able to evaluate an expression **Attitudes and values** • Show concern in understanding steps to resolve computer problem using algorithm **Key Unit Competency** **To be able to**: • Identify appropriate steps to solve a problem. • Identify an appropriate algorithm for a given problem Represent graphically algorithm using Flowchart			
Week 5 6-10/2/2023	**Unit-8:** Control statements and one dimension array	• Control structure • Iteration/ Loops statement • One dimension table/ array	**Knowledge and understanding** • Identify and explain control statement in algorithm • Explain the use of one dimension array data structure in algorithm **Skills** • Able to use control statements in algorithm • Able to use one dimension array data structure in algorithm **Attitudes and values** • Appreciate the use of and control statement in writing an algorithm	• Teacher provides written algorithm containing control statement and one dimension array and students analyze it and provide output. • Teacher will provide an simple exercise that require the use control statements and one dimension array and ask students to write the corresponding algorithm		
Week 6 **13-17/2/2023**						

	IDEM		**Key Unit Competency:** To be able to derive logic in algorithm which include Control Statements and to handle one dimension array in algorithm.			
Week 7 **20-24/2/2023**	**Unit 9:** Introduction to computer programming	• **Programming language** Definition, Role ,Features of a good programming language • **Evolution of programming languages** Low level language ,High level language • **Programming Paradigms** Imperative ,Procedural/ Functional ,Logical , Object Oriented	**Knowledge and understanding** • Classify different programming language generations. • Outline different programming language paradigms.-Point out features of good programming language. **Skills** • Differentiate levels characteristics of programming language. • Classify programming languages according to their generations. • Explain features of programming language paradigms. • Outline characteristics of good programming languages. **Attitudes and values:** • Understand different perspectives of programming techniques. **Key Unit Competency:** To be able to explain programming paradigms	• Teacher will ask students to write an essay on evolution/history of programming languages. • Teacher will ask students to compare features of the different programming paradigms.		

Week 8 27/2- 3/3/2023	**Unit-10:** Introduction to C++ programming	• C++ programming language • Input/output streams • Variables • Constant • Write a sample C ++ program and run it • **Evaluation**	**Knowledge and understanding** • Describe the evolution of C++ language • Familiarize with C++ compiler environment • Identify steps followed to write a C++ program • Identify the use of input/ output streams in C++ program • Differentiate different data type used in C++ program • Differentiate variable and constant in C ++ program • Recall steps to execute a C++ program **Skills** • Apply the syntax of C++ language while writing a C++ program • Use cout and cin streams • Utilize variables and constants in C++ program • Write a sample C ++ program and run it **Attitudes and values** • Derive algorithm for a given problem and implement the solution logic into C++ programming language. • Read and interpret a simple C++ program containing Input/output stream, variables and constant and provide the intended results.	• Teacher will provide a written program and ask students to identify different parts of the program and variables with their type and constants. • Teacher will provide a program and ask students to interpret it and give the output of it • Teacher will ask students to write a program according to a given exercise and execute to write a program according to a given exercise requiring use of different operators and execute it		

Week 9 **6-10/3/2023**	**Unit- 11-:** Expression and Operator in C++ language	Operators • Arithmetic operators • Logical operators :(“!”, “&&”, “//”) • Assignment operator : (=) , Compound assignment operators (+=, -=, *=, /=, %=) • Relational or Comparison operators: (==, !=, >, <, >=, <=)	**Knowledge and understanding** • Use different operators in C++ program • Understand the use of operators into expression and their precedence order **Skills** • Use different operators in C++ program • Understand the use of operators into expression and their precedence order	• Teacher will provide a written program and ask students to identify different operators used in the program • Teacher will provide a program containing operators and expressions and ask students to interpret it and give the output of it • Teacher will ask students to write a program according to a given exercise requiring use of different operators and execute it		
		• CAST operator , sizeof ( ) operator ,& (address of operator), • Conditional operators: (? :), • Bitwise operators :(&, |, ^, ~, <<, >>) , comma operators : (,) • Evaluation				

WEEK 10 **13-17/3/2023**	**Unit-12:** Control Statements in C++	• Branching • Looping • Jumping statement • Evaluation	**Knowledge and understanding** • Describe various control statements used to implement conditions and iterations in C++ program **Skills** • Derive algorithm for a given problem and implement the solution logic into C++ programming language using operators in correct place and in correct order • Read and interpret a simple C++ program containing conditional branching and looping statements and provide the intended results **Attitudes and values** • Derive algorithm for a given problem and implement the solution logic into C++ programming language using operators in correct place and in correct order • Read and interpret a simple C++ program containing conditional branching and looping statements and provide the intended results **Key Unit Competency:** To be able to use control statements in C++ program to implement branching and iterations	• Teacher will provide a written program and ask students to identify different control statements used in the program • Teacher will provide a program containing conditional branching and looping statements and ask students to interpret it and give its output • Teacher will ask students to write a program according to a given exercise requiring the use of control statements and execute it • Teacher describes example where nested loops can be used. For example, to print following pattern - • 1 • 12 • 123 • 1234 • 12345 • 1234 • 123 • 12 • 1 • -Learners also calculate the total number of times in which the loop was executed.		

WEEK11 20-24/3/2023	**Examination period**
WEEK11 27-31/3/2023	**Preparing school reports**

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Week 1 17-21/4/2023	**Unit-13:** Function in C++ language	• Definition of functions in C ++ program • Advantages of functions • Type of functions • Scope of variables • Functions with no arguments and no return value.	**Knowledge and understanding** • Describe different predefined function in C ++ programming language Describe the steps of using functions in C++ program **Skills** • Define a function in C++ language • Declare a function in C++ language • Call a function in C++ language **Attitudes and values** • Appreciate the importance of functions for reusability and modular design **Key unit competence:** to be able to define and use functions in c++	• Teacher will provide a written program and ask students to identify different functions used in the program • Teacher will provide a program containing functions and ask students to interpret it and give its output • Teacher will ask students to write a program according to a given exercise requiring the use of functions and execute it		
Week 2 24-28/4/2023		• Functions with arguments and no return value. • Functions with arguments and return value. • Functions with no arguments and return value. • Recursive functions examples (Factorial, GCD) • **Evaluation**				

Week3 **1-5/5/2023**	**Unit-14:** Arrays in C++	• Array • Strin**)** • **Evaluation**	**Knowledge and understanding** • Describe use of Array and Strings and their memory representation **Skills** • Define , declare and use arrays in C++ programming language • Define , declare and use a string in C++ programming language • Manipulate array in a C++ program • Manipulate a strings in a C++ program **Attitudes and values** • Appreciate the importance of arrays and string • Read and interpret a simple C++ program containing arrays and strings and provide the intended results	• Teacher will provide a written program and ask students to identify type arrays and their sizes used in the program • Teacher will provide a program containing array and ask students to interpret it and give out its output • Teacher will ask students to write a program according to a given exercise requiring the use of arrays and execute it		
Week4 **8-12/5/2023**	**Unit-15:** Introduction to Operating System.	• Operating System • Components of the operating system • system resources, Common OS • Smartphone • Operating System • Types of operating systems • **Evaluation**	**Knowledge and understanding** • Explain functions, characteristics and components of the operating system • List and explain different operating system	• Through a homework teacher will ask students to make a research on operating system • Teacher provides a list of MS-DOS Commands to students and learners use command prompts to write commands and become familiar		

			• Identify different type of operating system • Describe the use of different MS DOS and Linux commands **Skills:** • Define operating system • Explain different types of operating system • Use MS DOS commands • Use GUI and commands in Linux **Attitudes and values** • Appreciate the operating system running in any electronic device	• Teacher demonstrate Android operating system interface on Smartphone or tablet and learners do hands on exercise		
Week5 15-19/5/2023	**Unit-16:** HTML	• HTML • Types of HTML elements • HTML attributes • HTML Versions	**Knowledge and understanding** • Explain HTM, XHTML, HTML5 web technologies • Differentiate open/empty and closed tags in HTML • Explain the use of XHTML entities • Differentiate POST and GET method in HTML form • Use appropriately open/empty tags and closed tags **Skills** • Create a static web site using HTML web	• Students write HTML page and use the formatting features (bold, italic, superscript, subscript, strike through, heading, blockquote and text alignment and break tags) Format text and page background using color Design a table in HTML and using <table>, table header<th>, table data<td>colspan and rowspan features. • Students load different images on HTML page, Write using ordered and unordered lists the items • indicated.(Examples: List of provinces and their respective districts).		
Week 6 22-26/5/2023		• XHTML • Design HTMLpages • XHTML Entities • HTML forms				

Week 7 **29/5-2/6/2023**		• HTML5 • Migration from HTML5 to HTM4 • Evaluation	technologies by formatting text, images and page using HTML tags and their attributes, linking pages • Use appropriately open/empty tags and closed tags • Load and format images, audio, and video to a web page **Attitudes and values** • Design a web page and arrange correctly HTML elements • Be able to manage open/empty tags and closed tags • Evaluate the use of POST and GET when choosing a correct method to send data. **Key Unit Competency:** To be able to build standards compliant web pages using HTML	• Write character entities: Less than, greater than, copyright, ampersands(&) and card suites • Students link more pages related to their root page. • Students create pages containing music both audio and video using appropriately <embed> attributes like autostart, height, width and loop. • Students build a form for a person identification and teacher emphasize on the use of inputs, radio, check boxes, select, textarea and file form control • Analyze the difference between GET and POST after form submission. • Students design a form using HTML5 emphasizing on the use of new tags not available in HTML4 • Students conduct research on internet to improve their pages with more HTML features and to identify deprecated elements in • HTML5(http://www.w3schoo ls.org) • Students conduct research on the internet on deprecated elements in HTML5		
Week 8 **5-9/6/2023**	**Unit-17:** Cascading style sheet	• Introduction to CSS	**Knowledge and understanding** • Differentiate html styling and CSS styling.	Students create an external CSS file		

Week 9 **12-16/6/2023**		• Advantages of CSS (presentation, content)	• Identify the correct use of a given selector, how to set a selector and how to name different elements to match one CSS selector.	• Students discuss advantages of CSS over html styles		
Week 10 **26-30/6/2023**		• HTML Styling and disadvantages	Differentiate html styling and CSS styling.	• Students create an internal style sheet and use font styles, text decoration, class, background images and colors, borders and grouping to html elements.		
Week 11 **3-7/7/2023**		• Comparison of CSS and HTML styling • CSS Syntax • Add CSS to web pages and Styles • Evaluation	• Differentiate priorities of styles in a web page namely external CSS, internal CSS and inline CSS • Identify basic properties for different selectors **Skills** • Give selectors to html elements (classes, ID) and use html tags to set up their styles. **Attitudes and values** Differentiate the content and its presentation using cascading style sheets	• and use layers(div and span in a document and apply margins, borders, padding and background styles • Use float to div and images to allow text wrapping • Students in a html page set classes and ID selectors to html elements[div, span, images, paragraph, tables] and apply styles suggested by teacher • Students apply styling events to html links(Focus, hover, visited) • Use float/display to lists to make horizontal menus After individual use of each styles to html elements students are given tasks to design a homepage having header, navbar, content, sidebar and footer to their school.		
Week12 **10-14-7/2023**	**Examination period**					
Week 13 **17-21/7/2023**	**Preparing school reports**					