

Scheme of work Computer science

Academic year: 2022-2023

Term: I

School:

Subject: Computer science

Teacher's name:

Class + Combination: S₅MCE

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: Fundamental of laptop and portable devices	<ul style="list-style-type: none"> • Portable devices and Laptop • Smartphone, PDAs, tablets • Laptop and portable devices cleaning procedures • Evaluation 	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • Identify common uses of laptops, tablets and smart phones. • Differentiate portable device and cell phones • Explain the difference between laptops and desktop components <p>Skills</p> <ul style="list-style-type: none"> • Describe the use and functions of laptops, tablets, PDAs and Smart phones. • Compare and contrast desktop and laptop components. • Configure power management on laptop • Clean laptop and portable device <p>Attitudes and values</p>	<ul style="list-style-type: none"> • Through group work, teacher provides a laptop ,PDA, mobile cell phone and students will identify and describe parts of them • Through group work, the teacher provides a desktop computer and laptop, students compare components. • Through teacher's guidance students configure laptop power settings • Through teacher's guidance students clean up laptop components 		

			<ul style="list-style-type: none"> Be aware of possible Synchronization between PC, laptops, PDAs and smart phones 			
Key Unit Competency: To be able to identify, use and maintain safely laptops and other portable devices						
Week2 3-7/10/2022	Unit-2: Complex data structure in algorithm	<ul style="list-style-type: none"> Two dimensional Arrays ✓ Declaration ✓ Accessing array elements ✓ Initialization 	Knowledge and understanding <ul style="list-style-type: none"> Identify the use of two-dimension array in algorithm Identify and explain abstract data structures Identify appropriate steps to resolve a complex mathematical problem Skills <ul style="list-style-type: none"> Use Two-dimension array in algorithm Write an algorithm that require the use of complex data structures Design an algorithm and flowchart to resolve complex mathematical problem Attitudes and values <ul style="list-style-type: none"> Appreciate the use of abstract data type in an algorithm 	<ul style="list-style-type: none"> Teacher will give exercise to learners related to 2-dimensional array The teacher will provide written algorithm and ask students to determine the different complex data types present in each algorithm Teacher will provide an exercise that require the use of complex data types and ask students to write the corresponding algorithm Teacher will present any mathematical problem relate to Quadratic equation, Sum, Factorial, GCD etc and learners will write programs using complex data structure 		
Week3 10-14/10/2022		<ul style="list-style-type: none"> Abstract data structure <ul style="list-style-type: none"> List Queue Stack Tree Search and Sorting using complex data structure (list ,Queue ,Stack ,Tree) 				
Week4 17-21/10/2022		<ul style="list-style-type: none"> Apply algorithm to solve complex mathematical functions Evaluation 				
Key Unit Competency: To be able to utilize complex data structure in algorithm						
Week 5 24-28/10/2022	Unit-3: Introduction to computer network	<ul style="list-style-type: none"> Computer Network Computer network concept and technology 	Knowledge and understanding <ul style="list-style-type: none"> Explain properties ,advantage /disadvantages and types of computer network 	<ul style="list-style-type: none"> The teacher asks students to write an essay on computer networks importance in our daily life Teacher provides NIC card, UTP cat 6 cables 		

			<ul style="list-style-type: none"> Identify Network devices, UPT and Optical Fiber as guided media, Radio waves as unguided media Identify network concepts and technology 	<p>and RJ 45 connectors, crimping tools and asks students to install NIC Card to the motherboard and make network cables both cross over and straight using UTP cable</p> <ul style="list-style-type: none"> Teacher provides UTP straight cables ,switch /Hub and ask students to connect computers/host to the switch /Hub assign them IP address ,check connectivity using ping and ipconfig command attach network peripherals to the hosts and share files, folders and peripherals 		
Week6 31/10-4/11/2022		<ul style="list-style-type: none"> Local Area network Physical components 	<p>Skills</p> <ul style="list-style-type: none"> Identify properties ,advantage /disadvantages and types of computer network Differentiate network concepts and technology Connect USB modem to computer and install Configure Smartphone and Laptops for tethering to use as wireless hotspot Configure Wireless router for access control, DHCP Configure a computer as host for Internet Connection Sharing (ICS) 	<ul style="list-style-type: none"> The teacher presents different graphics representing different topologies and ask students to identify them Teacher provides UTP straight and crossover cables ,switch /Hub and ask students to connect 		
Week 7 7-11/11/2022		<ul style="list-style-type: none"> Network devices Network transmission medium 				
Week8 14-18/11/2022		<ul style="list-style-type: none"> IP address 				

WEEK 9 21-25/11/2022		<ul style="list-style-type: none"> Data and device sharing 	<ul style="list-style-type: none"> Install and configure hub /switch and connect hosts to them <p>Attitudes and values</p> <ul style="list-style-type: none"> Appreciate the use of NIC ,network devices , network peripherals and connection between them 	computers/host to the switch /Hub and make star and extended start topology		
Week10 28/11-2/12/2022		<ul style="list-style-type: none"> LAN topology 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	Unit-4: Introduction to Database	<ul style="list-style-type: none"> Database Concepts(4p) Data independence(3p) 	<p>Knowledge and understanding Describe database concepts, data independence, database models</p> <p>Skills</p> <ul style="list-style-type: none"> Explain data independence, access level and user management Differentiate between logical independence and physical independence <p>Attitudes and values</p> <ul style="list-style-type: none"> Appreciate the role of database and its management <p>Key Unit Competency: To be able to identify concepts of database and differentiate database models</p>	<ul style="list-style-type: none"> Teachers will ask students to research and write an essay on database concepts and DBMS Learners discuss in group about differences between logical independence and physical independence 		
Week 2 16-20/1/2023		<ul style="list-style-type: none"> Database models(6p) Evaluation (1p) 				
Week 3						

<p>Week 3 23-27/1/2023</p>	<p>Unit-5: Database design</p>	<ul style="list-style-type: none"> • Database design levels (3p) • Database design steps(4p) 	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • Describe each levels of database design • Describe meaning and steps of Normalization and various Normal form (1NF, 2NF,3NF, 4NF) <p>Skills</p> <ul style="list-style-type: none"> • Identify important Entities and their Attributes from a given real life situation • Draw an Entity and their associated Attributes • Create a database with several table • Create a relationship between different tables • Create queries using Design View <p>Attitudes and values</p> <ul style="list-style-type: none"> • Have a good understanding on design levels to make a functional database • Identity appropriate database for a given situation 	<ul style="list-style-type: none"> • Teacher and students will identify areas where database can be applied and students will design conceptual , logical and physicals levels of the database • Students will do Individual exercises on Entity Relationship Diagram • Student work on creating tables by defining structure, setting simple or composite primary key, creating relationship among tables, use foreign tables and foreign keys, enforcing referential integrity rule, create query using design view 		
<p>Week 4 30/1-3/2/2023</p>		<ul style="list-style-type: none"> • Types of Relationship (7p) 				
<p>Week 5 6-10/2/2023</p>		<ul style="list-style-type: none"> • Database optimization through Normalization(6p) • Evaluation (1p) 				

			<ul style="list-style-type: none"> Enumerate database design steps starting from Investigation up to Data base management Appreciate use of design view to graphically create new queries 			
Key Unit Competency: To be able to define conceptual, logical and physical levels of a database with database creation and manipulation						
21-25/05/2018	Unit-6: Pointers and Structure in C++	<ul style="list-style-type: none"> Dynamic memory allocation and its advantages over static memory allocation(2p) Pointers (2p) Operation on pointers(1p) Structure as user defined data type(1p) Use of structure(1p) 	Knowledge and understanding <ul style="list-style-type: none"> Describe the use of pointers for dynamic memory allocation with graphical representation Describe the use of Structure as user defined data type and its memory Allocation Skills <ul style="list-style-type: none"> Define , declare and use pointers in C++ programming language Define , declare and use structures in C++ programming language Attitudes and values <ul style="list-style-type: none"> Appreciate the use of Pointers for dynamic memory allocation Appreciate the structure as user defined data type Read and interpret a simple C++ 	<ul style="list-style-type: none"> Teacher will provide some written programs and ask students to identify pointers and structures used in those program Teacher will provide a program containing pointer and ask students to interpret it and give out its output Teacher will provide a program containing structure 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 pointers and structures and execute it 		
Week 6 13-17/2/2023		<ul style="list-style-type: none"> Structure as user defined data type(2p) Use of structure(1p) Use members of a structure ,Global use a structure (1p) Pointer to structure (1p) Nesting structure Structure containing array, Array of structures, Structure containing other structure(1p) Evaluation (1p) 				
Key Unit Competency: To be able to Explain, declare and use structures in C++ programming language						

<p>Week 7 20-24/2/2023</p>	<p>Unit-7: Object Oriented Programming in C++</p>	<ul style="list-style-type: none"> • Definition of Object Oriented Programming (1p) • Basic concepts of Object Oriented Programming(2p) • Encapsulation (2p) • Defining Class in C++ (3p) • Object (2p) 	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • Describe basic Object Oriented Programming concepts • Describe different object oriented syntaxes applied in C++ program <p>Skills</p> <ul style="list-style-type: none"> • Explain basic Object Oriented Programming concept • Define a class with data members and some function members defined inside or outside class definition 	<ul style="list-style-type: none"> • Teacher will ask students to do research and write an essay on Object Oriented concepts and principles • Teacher will provide a written program and ask students to identify classes and objects used in the program • Teacher will provide a program containing classes and objects and ask students to interpret it and give out its output 		
<p>Week 8 27/2-3/3/2023</p>		<ul style="list-style-type: none"> • Objects in C++ (3p) • Passing object to function(3p) • Friend Function Polymorphism in C++ (2p) 	<ul style="list-style-type: none"> • Derive a new class from base class in various mode of derivation: public, protected, private • Define constructor and destructor • Create objects in main program from a class and access object data and object functions, constructor and destructor and friend function 	<ul style="list-style-type: none"> • Teacher will ask students to write a program according to a given exercise requiring the use of classes and objects and execute it • Teacher will give several C++ program exercises to students to implement 		

Week 9 6-10/3/2023		<ul style="list-style-type: none"> • Constructors in C++ (2p) • Destructors in C++ (2p) • Inheritance in C++ (2p) • Evaluation (1p) 	Attitudes and values <ul style="list-style-type: none"> • Appreciate the use of classes and objects in programming 	Constructor, Destructor and Inheritance		
Key Unit Competency: To be able to explain common concepts of Object Oriented Programming(OOP) and implement them in C++						
25-29/06/2018	Unit-8: introduction to Visual basic	<ul style="list-style-type: none"> • Definitions <ul style="list-style-type: none"> ✓ Graphical User Interface, ✓ Desktop Application, ✓ Event oriented programming using Visual Basic • Visual Basic Integrated Development Environment (VB-IDE), 	Knowledge and understanding <ul style="list-style-type: none"> • Describe Visual Basic and its Integrated development environment(IDE) features • List components of Visual basic IDE such as Form, Label, Input Box, Radio Button, • Check Box, Command Button, DAO, ADO, File and Folder, Image, Timer, Calendar, ComboBox, ListBox control Skills <ul style="list-style-type: none"> • Work in Visual Basic environment (open , write codes ,compile, close) • Drag and drop control from a tool box on a form(Form designing) • Write Visual Basic code on various events of controls dragged on form 	<ul style="list-style-type: none"> • Using a printed out screenshot of the main interface of Visual Basic environment allow learners to identify each component of the Visual Basic interface • Teacher sets a practical work of designing a form using various controls such as labels, textbox and 		

			<ul style="list-style-type: none"> • Run and debug a program in Visual Basic 			
WEEK 10 13-17/3/2023		<ul style="list-style-type: none"> • Visual Basic environment • Visual Basic Controls • Developing a User Interface with menus and Sub-menus using Visual Basic • Evaluation 	Attitudes and values <ul style="list-style-type: none"> • Appreciate contribution of visual basic programming to create software with Graphical User Interface(GUI) over Command User Interface(CUI) 			
Key Unit Competency: To be able to describe a Visual Basic Integrated Development Environment (VB-IDE) and write a program in Visual Basic.						
WEEK11 20-24/3/2023	Examination period					
WEEK12 27-31/3/2023	Preparing school reports					

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Week 1 17-21/4/2023	Unit-9: Variables, Operators, Expressions and Control structures	<ul style="list-style-type: none"> Types of Visual Basic Data Variables 	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> Explain the role and importance of variables in Visual Basic program Describe the use of operators and evaluate expression in Visual Basic program Explain the use of control structures in Visual Basic program 	<ul style="list-style-type: none"> With the help of a written program in Visual Basic, teacher asks students to list and describe variables and operators used in the program Teacher gives an exercise in Visual Basic requiring students to apply operators and evaluate expression 		
Week 2 24-28/4/2023		<ul style="list-style-type: none"> Scope of a variable Operators 	<p>Skills</p> <ul style="list-style-type: none"> Declare, Analyze and manipulate variables in Visual Basic program Use operators and evaluate expression in Visual Basic program Write a program in Visual Basic using different types of decision structures 	<ul style="list-style-type: none"> Students creates a simple arithmetic calculator using operators and expressions With the help of a written program containing control structure, teacher asks students to analyze the program and generate an output 		

Week3 1-5/5/2023		<ul style="list-style-type: none"> • Decision structures • Repetition structures: • Evaluation 	<ul style="list-style-type: none"> • Write a program in Visual Basic using different types of loop structures <p>Attitudes and values</p> <ul style="list-style-type: none"> • Appreciate the use of variables, operators, expressions and control structure in Visual Basic Program 	<ul style="list-style-type: none"> • Teacher gives exercise requiring students to apply decision and repetition structures 		
Key Unit Competency: To be able to use variables, operators, expressions and control structure in a Visual Basic program						
Week4 8-12/5/2023	Unit-10: Introduction to Java	<ul style="list-style-type: none"> • Introduction(Definition and invention) • Platforms(Java Runtime Environment-JRE, Java Development Kit-JDK) • Advantages of JAVA Program. 	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • Describe local and global identifiers, constants and variables in Java program • Describe integer, floating point, character, Boolean, and object data types. • Describe data structures or types (e.g., arrays, strings, linked lists, trees, hash tables, records, files, stacks, queues, sets, maps). <p>Skills</p>	<ul style="list-style-type: none"> • Students write a program that prints a word, concatenated words, sentences and values of different variables to the console. 		
Week5 15-19/5/2023		<ul style="list-style-type: none"> • Compile and run a java Program • Elements of Java source file • Primitive Types 		<ul style="list-style-type: none"> • Write a program in which two integer values are declared and basic calculator operators are used to print the sum, difference, product and division to the console 		
Week 6 22-26/5/2023		<ul style="list-style-type: none"> • Objects • Equality • Naming convention in Java • Flow control • Evaluation 		<ul style="list-style-type: none"> • Students execute a requested program using suggested key elements such as 		

			<ul style="list-style-type: none"> • Transform an algorithm into a java program • Write, compile and run a java program • Predict the output of a given program containing sequential, conditional, or iteration statements. • Complete a program segment for a specified output given an incomplete program containing conditionals. • Debug a program containing an error involving conditional and iteration statements. <p>Attitudes and values</p> <ul style="list-style-type: none"> • Appreciate how Java program are strongly typed 	<p>kind of data types, methods, methods with arguments and print the result to the console</p> <ul style="list-style-type: none"> • Students write programs that contains flow controls and print the result to the console • Students predict the output of a given program or a section of program. • Students evaluate errors in a given section of code or the entire program • Students use EQUALITY(==)to compare two objects to see if the variables reference the same object in memory. 		
<p>Key Unit Competency: To be able to create, build and run a java console program</p>						

Week 7 29/5- 2/6/2023	Unit-11: OOP and Java	<ul style="list-style-type: none"> • Class vs. Objects • Constructor • <i>"new" and "this"</i> 	Knowledge and understanding <ul style="list-style-type: none"> • Describe instance, class, and local (method) variables in an object-oriented program. • Describe public and private • Describe key features of object-oriented programs (i.e., encapsulation, inheritance, and polymorphism). Skills <ul style="list-style-type: none"> • Create and instantiate a class using main method. • Use constructor to initialize instance variable of a given object • Debug a program containing an error involving arrays, objects Attitudes and values <ul style="list-style-type: none"> • Appreciate the use of objects in programming languages. 	<ul style="list-style-type: none"> • Create a class with a method that print a given message and create another with main method to instantiate objects and call the method of first class to print the message. • Student extends a class with nother class and calls the method objects of parent and child classes. • Override the method in child class and print again result of two classes objects. • Create a class that have more than one properties, encapsulate these properties by creating getters and setters, constructors then create a class with main method to instantiate the first class using constructor and use getter and setter to access values of class properties 				
Week 8 5-9/6/2023		<ul style="list-style-type: none"> • Reference variable • Arrays vs. Objects • Inheritance <ul style="list-style-type: none"> o Extends a class o Casting primitive and Objects o Access Modifiers (Public, protected, private, package-private) 						
Week 9 12-16/6/2023		<p>Overriding methods and variables, final and super keywords</p> <ul style="list-style-type: none"> ✓ Encapsulation[Getter and setter) ✓ Abstract classes and methods <p>Evaluation</p>						
Key Unit Competency: To be able to use objects to manipulate data in Java program								

Week 10 26-30/6/2023	Unit-12: IO and Java	<ul style="list-style-type: none"> • IO streams • InputStream and OutputStreamFileStreams 	Knowledge and understanding <ul style="list-style-type: none"> • Describe streams, readers and writers • Describe the importance of streams, readers and writers in manipulation of files Skills <ul style="list-style-type: none"> • Read, manipulate and display user inputs to the console . • Catch Input/Output Exceptions while reading data to the console. • Read and display data of text file Attitudes and values <ul style="list-style-type: none"> • Appreciate the manipulation user's inputs and of files using streams, readers and writers 	<ul style="list-style-type: none"> • Students write a program that prompt their name, read it from the console, and then display it in a message • Create a program which allows to input two values (x and y) and then calculate the sum, difference, product and division • Students write a program which evaluate prime numbers and quit if a specific letter is pressed. • Students build a program that read a .text file and display the content to the console. 		
Week 11 3-7/7/2023		<ul style="list-style-type: none"> • Readers • Evaluation 	<ul style="list-style-type: none"> • Appreciate the manipulation user's inputs and of files using streams, readers and writers 			
Key Unit Competency: To be able to use streams, readers and writers in Java						
Week12 10-14-7/2023	Examination period					
Week 13 17-21/7/2023	Preparing school reports					

