Minimum Learning Package
Computer Science

Day	Topic	Time Duration	Process /Activity	Outcome	Feedback
	Identification of Problem Areas		Checking Knowledge acquisition as per the topics taught in class XI . A brief questionnaire will be provided to students. . Question Answer Session	Identification of Problem Areas.	Identifiaction of topics. MLP (Customized Minimum Learning Package)
1	Progamming Basics , Types of Programming Languages ,Common terms used pertaining to Language to be taught (C++/Python/Informatics Practices)	45 min	Presentation to students using e-content . Demonstration using real time problems . Emphasizing on use of programming language and applications in real life.	Students are expected to know about C++/Python	Q/A Session (Objective Type) C++ is Object Oriented Language ? (Y/N) Compiler converts LLL to HLL ? (Y/N) ## Teachers can prepare the Q/A as mentioned .
2	Object Oriented Programming Concepts:Concept of Class,Object,abstraction,Encapsulation,Inheritance,Polumorphism, Advantages and Disadvantages of OOPS. Comparision of Various Programming Languages and different progamming construct.	45 min	Graphical presentation of Various Objects and classes . Dicusssion on Real World Problems and solutions. Co realation of programming language with real world.	Students must be able to differentiate between Class , Object , Methods , Data Members Students must be familiar with OOPS concepts 1) Data abstraction 2) Polymorphism 3) Encapsulation 4) Inheritance	Demonstration using example - Students must be asked to differentiate between Class & Object For eg: Is BUS a Class ? If Yes what can be objects of this Class ? Mention various attributes of this Class "BUS" Mention various Funtions pertaining to this class "BUS"

| 3 | Before Starting theProgramming Session on Third Day Students must be given introduction on the topics mentioned below :
 1) Algorithm
 2) Flowchart
 3) Pseudocode
 4) Dry Run
 General Concepts; Modular approach; Clarity and Simplicity of Expressions, Use of proper
 Names for identifiers, Comments, Indentation; Documentation and Program Maintenance;
 Running and Debugging programs, Syntax Errors, Run-Time Errors, Logical Errors; Problem Solving Methodology and Techniques: Understanding of the problem, Identifying minimum <br> number of inputs required for output, Step by step solution for the problem, breaking down solution <br> into simple steps, Identification of arithmetic and logical operations required for solution, Using Control | 45 min | Students may be asked to write algorithm for simple day to day activities e.g: Preparation of Tea etc. Addition of two nos . Calculation of area of geometrical figures.

 Further students must be asked to preapare flowchart and write pseudocode for the same. Students must be given problems and they must be asked to rectify the problem areas . | Students are expected to learn programming concepts , implementation of program , programming constructs and error debugging techniques. | Students must be introduced to a problem and a solution must be seeked . For Ex: A) Is A+B=C a correct syntax ? B) Is A+B+C; a correct syntax? Students must be asked to rectify the errors . (Most of the students face the problem of debugging the programs) This exercise will help them to improve their concepts . |
| 4 | Operators and Expressions: Operators: Arithmetic operators (-,+,*,/,%), Unary operator (-), Increment and Decrement Operators (- -,++), Relational operators (>,>=,<,<=,= =,!=), Logical operators (!, &&, ||), Conditional operator: <condition>?<if true>:<else>; Precedence of Operators; Expressions; Automatic type conversion in expressions, Type casting; C++ shorthand's (+=, -=, *=, /=, %=); | 45 min | Students must be given expressions to solve and use all types of operators. Must be given presentation using e-contents. | Must be able to diffrentiate between opeartor and operands . Must be able to use opearators in computer based expressions. Effective use of arithmetic , relational and logical operators. Use of Conditioanl Expressions. Must be able to solve expression using opeartor precedence . For eg: x=4*5-2+(2-6) | Students must be given logical problems such as: A) Result of 5>9 ? B) Result of a++ ? C) Result of ++a? D) Result of 5+4-3+(6/2) |

5	Flow of control: Conditional statements: if-else, Nested if, switch..case..default, Nested switch..case, break statement (to be used in switch..case only); Loops: while, do - while , for and Nested loops.	45 min	Students can be given situations to use this programming constructs. They must be given the problem to devise the solution. For ex: Use of Counters , Placing of Counters etc.	Flow of Controls . Must be able to differentiate between different type of controls. Must be able to identify the situation for placing various kinds of contructs. Must be able to interchange among different type of looping constructs. Must be able to nest the constructs .	1) What are loops? 2) What are conditional statement.
6	Structured Data Type: Array Declaratrion/initialisation of One-dimensional array, Inputting array elements, Accessing array elements, Manipulation of Array elements (sum of elements, product of elements, average of elements, linear search, finding maximum/minimum value); Declaration/Initialization of a String, string manipulations (counting vowels/consonants/digits/ special characters, case conversion, reversing a string, reversing each word of a string) Two-dimensional Array : Declaration/initialisation of a two-dimensional array, inputting array elements, Accessing array elements, Manipulation of Array elements (sum of row element, column elements, diagonal elements, finding maximum/minimum values)	45 min	An activity can be conducted in class rooms regarding the use of data structure and various methods of using it. Implementation of Arrays using practical methodology also a dry run must be shown for better understanding.	Use and implementation of Array. Arrangement of data in linear datastructure. Arrangement of data in 2D and 1D array. Student must be able to solve various other application based on arrays. Address calculation mechanism.	Arrangement of elements in array ? Logic building by reversing the array elements and other operations on array .
7	User Defined Functions: Defining a function; function prototype, Invoking/calling a function, passing arguments to function, specifying argument data types, default argument, constant argument, call by value, call by reference returning values from a function, calling functions with arrays, scope rules of functions and variables; local and global variables.	45 min	Use of passing values among functions . Why do we use Functions ? Uses and Advantages of Functions. Differentiation between User Defined and In build Functions.	Student must be able to implement procedure oriented programming with use of FUNCTIONS. Student are expected to know Function Prototype 1) Return type of function 2) Naming Function 3) Types of Arguments (Constant,default) Passing of values mechanism * Pass by Value * Pass by Reference	Call by Value and Reference . Must be able to pass the values .

8	Pointers Declaration and Initialization of Pointers; Dynamic memory allocation/deallocation operators: new, delete; Pointers and Arrays: Array of Pointers, Pointer to an array (1 dimensional array),	45 min	Explanation of the topic by giving an example of pointers from real world and there on correlating it with programming aspect. To make them understand that that we can reuse our code by using pointers by giving them demonstration on board.	Students must be able to know : A) Use of Pointers B) Pointer Arithmetic C) Strings D) Use of pointers in Arrays E) Double Pointer F) Triple Pointer	Must be able to evaluate pointer arithmetic . ++ptr ptr ++.
9	Relational data model: Concept of domain, tuple, relation, key, primary key, alternate key,candidate key; Relational algebra: Selection, Projection, Union and Cartesian product.	45 min	Students will be explained about data by illustrating example there by giving students an investigatory project to collect data from various sources. Project will given to students to represent data in various forms such as tabular from, using graphs etc. and will be asked them to solve various queries based on data collected by the students. The concept of three layer architecture of Data Base Management system will be introduced and concept of schema and instance will be explained.	Students must have a concept of 3 Schema Architecture of DBMS. Constraints (Entity Integrity, Referential Integrity, Table Level , Column Level) Implementation of Constraint. Use of simple SQL Commands and Aggregate Operators.	Students will complete the project and thereby they will know how to collect data using various methods, various sources of data i.e. Primary and Secondary, also they will have better understanding about data. Project will help students to understand the collection, storage and data representation mechanism. They will be able to solve queries and thus they will understand about queries and will be able to differentiate between data and information. Students will be able to understand concept of Data Abstraction through three schema architecture of DBMS.
10	Data Communication , Networks and types , Internet Tools	45 min	To explain about Network and its importance. To make them understand about different topologies of network and their advantages and disadvantages both. Seven layers of Network which helps in data communication and role of each of these layers.	Students must be able to design a network architecture . Use of communiaction devices . Various topologies and protocols. Use of e-contents , IT applications , Netwoking Websites , Blog , E commerce websites .	Student must be asked to design network Use of Communication devices They must asked to differentiate among different types of wire and other devices.