SHORT SYLLABUS

BCSE102L Structured and Object-Oriented Programming
2 Credits (2-0-0)
C Programming fundamentals. Arrays and Functions. Pointers, Structures and Unions. Overview of Object-Oriented Programming. Inheritance and Polymorphism. Generic Programming.

BCSE102L	Structured and Object-Oriented Programming	L	T	P	C
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Pre-requisite	**NIL**	**Syllabus version**			
		1.0			

Course Objectives

1. To impart the basic constructs in structured programming and object-oriented programming paradigms.
2. To inculcate the insights and benefits in accessing memory locations by implementing real world problems.
3. To help solving real world problems through appropriate programming paradigms.

Course Outcome

At the end of the course, students should be able to:

1. Understand different programming language constructs and decision-making statements; manipulate data as a group.
2. Recognize the application of modular programming approach; create user defined data types and idealize the role of pointers.
3. Comprehend various elements of object-oriented programing paradigm; propose solutions through inheritance and polymorphism; identify the appropriate data structure for the given problem and devise solution using generic programming techniques.

Module:1	**C Programming Fundamentals**	**2 hours**

Variables - Reserved words – Data Types – Operators – Operator Precedence - Expressions - Type Conversions - I/O statements - Branching and Looping: if, if-else, nested if, if-else ladder, switch statement, goto statement - Loops: for, while and do…while – break and continue statements.

Module:2	**Arrays and Functions**	**4 hours**

Arrays: One Dimensional array - Two-Dimensional Array – Strings and its operations. User Defined Functions: Declaration – Definition – call by value and call by reference - Types of Functions - Recursive functions - Storage Classes - Scope, Visibility and Lifetime of Variables.

Module:3	**Pointers**	**4 hours**

Declaration and Access of Pointer Variables, Pointer arithmetic – Dynamic memory allocation – Pointers and arrays - Pointers and functions.

Module:4	**Structure and Union**	**2 hours**

Declaration, Initialization, Access of Structure Variables - Arrays of Structure - Arrays within Structure - Structure within Structures - Structures and Functions – Pointers to Structure - Union

Module:5	**Overview of Object-Oriented Programming**	**5 hours**

Features of OOP - Classes and Objects - “this” pointer - Constructors and Destructors - Static Data Members, Static Member Functions and Objects - Inline Functions – Call by reference - Functions with default Arguments - Functions with Objects as Arguments - Friend Functions and Friend Classes.

Module:6	**Inheritance**	**5 hours**

Inheritance - Types of Inheritance: Single inheritance, Multiple Inheritance, Multi-level

Inheritance, Hierarchical Inheritance - Multipath Inheritance - Inheritance and constructors.		
Module:7	**Polymorphism**	**4 hours**
Function Overloading - Operator Overloading – Dynamic Polymorphism - Virtual Functions - Pure virtual Functions - Abstract Classes.		
Module:8	**Generic Programming**	**4 hours**
Function templates and class templates, Standard Template Library.		
	Total Lecture hours:	**30 hours**

Text Book(s)	
1.	Herbert Schildt, C: The Complete Reference, 4th Edition, McGraw Hill Education, 2017
2.	Herbert Schildt, C++: The Complete Reference, 4th Edition, McGraw Hill Education, 2017.
Reference Books	
1.	Yashavant Kanetkar, Let Us C: 17th Edition, BPB Publicaitons, 2020.
2.	Stanley Lippman and Josee Lajoie, C++ Primer, 5th Edition, Addison-Wesley publishers, 2012.
Mode of Evaluation: CAT / Written Assignment / Quiz / FAT / Project.	

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