CP-1-02T: Computer Programming

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 6
Pass Percentage: 40%

Course: Computer Programming	
Course Code: CP-1-02T	
Course Outcomes (COs) After the completion of this course, the students will be able to:	
CO1	Develop the ability to analyze problems, design algorithms, and implement solutions using C/C++ programming, showcasing proficiency in algorithmic problem-solving skills.
CO2	Implement and manipulate fundamental data structures such as arrays, linked lists, stacks, queues, trees, and hash tables in C/C++, demonstrating competence in choosing and utilizing appropriate data structures for different scenarios.
CO3	Gain expertise in handling exceptions, debugging C/C++ code, and implementing error-handling strategies to create robust and reliable programs.
CO4	Understand and apply principles of multithreading and concurrency in C/C++, including synchronization mechanisms, thread communication, and concurrent programming, showcasing the ability to develop efficient and responsive applications.
CO5	Familiarize oneself with common C++ frameworks gaining an understanding of how frameworks can streamline development and improve code organization and maintainability.

Detailed Contents:

Module No.	Module Name	Module Contents
Module I	**Problem Solving with Computers**	**Problem Solving with Computers:** Evolution of C Language, Character Set in C, Tokens, Keywords, Identifier, Constants, Variables, Rules for defining Variables, Data Types in C Language: Basic data type, Derived data type and Enum data type, Operators in C: Types of Operator: Arithmetic, Relational, Logical, Comma, Conditional, Assignment, Operator Precedence and Associativity in C, Input and Output Statements, Assignment statements.
Module II	**Control Structure**	**Control Structure:** Sequential Flow Statement, Conditional Flow Statement, Decision Control statements: if, if-else, nested-if, else-if ladder. Loop control statements: While, do-while, for loop, Nested of Loops. Case Control Statements:

		Switch Statement, goto Statement, Break Statement, Continue Statement
Module III	**Arrays and Pointers in C**	**Arrays and Pointers in C**: Arrays, Characteristic of Arrays, Representation, Declaration and Initialization of an Array, Types of Arrays: one dimensional, multi-dimensional arrays. Pointer, Pointers Declaration and Initialization, Types of Pointers, Pointer Expressions and Pointer Arithmetic.
Module IV	**Functions**	**Functions:** Function in C, Function Declaration and Definition, Types of Functions, Library Vs. User-defined Functions, Function Calling Methods, Function Parameters: Actual Parameter, Formal Parameter, Parameter Passing Techniques: Call by Value and Call by Reference, Recursive Function, Pointers and Functions.
Module V	**Strings and User Defined Data Types**	**Strings:** C Strings, Difference between char array and string literal, Traversing String, Accepting string as the input, Pointers with strings, String Functions **User Defined Data types:** Structure, Structure Variables Declaration, Accessing Structure Data Members, Array of Structures, Nested of Structure, Passing structure to function, Structures Limitations, Union, Difference between Structure and Union in C.
Module VI	**Object Oriented Programming**	**Object Oriented Programming:** Need of an Object-Oriented Programming, C++ and its Applications, OOPs Concepts in C++: Class, Objects, Encapsulation, Abstraction, Polymorphism, Inheritance, Dynamic Binding and Message Passing. Access Specifiers in C++: Private, Protected and Public.

Books

1. E. Balagurusamy, "Programming in C", Tata McGraw Hill.
2. Kamthane, "Programming with ANSI and Turbo C", Pearson Education
3. Rajaraman,V, "Fundamentals of Computers", PHI
4. Kanetkar, "Let Us C", BPB Publications.
5. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill.
6. Deiteland Deitel, "C++ How to Program", Pearson Education.
7. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications.
8. Bjarne Strautrup, "The C++ Programming Language", Addition-Wesley Publication Co.
9. Stanley B. Lippman, Josee Lajoie, "C++ Primer", Pearson Education.
10. E. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill