# BCS101 / BCS201: PROGRAMMING FOR PROBLEM SOLVING

| Content | Contact Hours |
|---|---|
| **Unit -1:** | 8 |
| **Introduction to Components of a Computer System:** Memory, Processor, I/O Devices, Storage, Operating System, Concept of Assembler, Compiler, Interpreter, Loader and Linker. <br> **Idea of Algorithm:** Representation of Algorithm, Flowchart, Pseudo Code with Examples, From Algorithms to Programs, Source Code. <br> **Programming Basics:** Structure of C Program, Writing and Executing the First C Program, Syntax and Logical Errors in Compilation, Object and Executable Code. Components of C Language. Standard I/O in C , Fundamental Data types, Variables and Memory Locations, Storage Classes. | |
| **Unit-2:** | 8 |
| **Arithmetic Expressions and Precedence :** Operators and Expression Using Numeric and Relational Operators, Mixed Operands, Type Conversion, Logical Operators, Bit Operations, Assignment Operator, Operator precedence and Associatively. <br> **Conditional Branching:** Applying if and Switch Statements, Nesting if and Else and Switch. | |
| **Unit-3:** | 8 |
| **Iteration and Loops:** Use of While, do While and for Loops, Multiple Loop Variables, Use of Break , Goto and Continue Statements. <br> **Arrays:** Array Notation and Representation, Manipulating Array Elements, using Multi Dimensional Arrays. Character Arrays and Strings, Structure, union, Enumerated Data types, Array of Structures, Passing Arrays to Functions. | |
| **Unit-4:** | 8 |
| **Functions:** Introduction, Types of Functions, Functions with Array, Passing Parameters to Functions, Call by Value, Call by Reference, Recursive Functions. <br> **Basic of searching and Sorting Algorithms:** Searching & Sorting Algorithms ( Linear Search , Binary search , Bubble Sort, Insertion and Selection Sort) | |
| **Unit-5:** | 8 |
| **Pointers:** Introduction, Declaration, Applications, Introduction to Dynamic Memory Allocation (Malloc, Calloc, Realloc, Free),  String and String functions , Use of Pointers in Self-Referential Structures, Notion of Linked List (No Implementation) <br> **File Handling:** File I/O Functions, Standard C Preprocessors, Defining and Calling Macros  and Command-Line Arguments. | |

## Course Outcome:

| Course Outcome ( CO) | | Bloom's Level |
|---|---|---|
| At the End of Course , the Student will be Able to Understand | | |
| CO 1 | To Develop Simple Algorithms for Arithmetic and Logical Problems. | $K_2$, $K_3$ |
| CO 2 | To Translate the Algorithms to Programs & Execution (in C Language). | $K_3$ |
| CO 3 | To Implement Conditional Branching, Iteration and Recursion. | $K_3$ |
| CO 4 | To Decompose a Problem into Functions and Synthesize a Complete Program Using Divide and Conquer Approach. | $K_4$ |
| CO 5 | To Use Arrays, Pointers and Structures to Develop Algorithms and Programs. | $K_2$, $K_3$ |

$K_1$- Remember, $K_2$- Understand, $K_3$- Apply, $K_4$- Analyze , $K_5$- Evaluate ,  $K_6$- Create

## Text Books:
1. Schaum's Outline of Programming with C by Byron Gottfried , McGraw-Hill
2. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education .
3. Computer Basics and C Programming by V.Rajaraman , PHI Learning Pvt. Limited, 2015.
4. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
5. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning - 2007.
6. Let Us C By Yashwant P. Kanetkar.
7. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
8. Programming in C by Kochan Stephen G. Pearson Education – 2015.
9. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication.
10. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication
11. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
12. Computer Fundamentals and Programming in C. Reema Thareja, Oxford Publication