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| **B. TECH 1st SEMESTER** | **L** | **T** | **P** | **C** |
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| **19CS1T01: PROBLEM SOLVING AND PROGRAMMING USING C** | | | | |

**Course Objectives:**

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| * To impart adequate knowledge on the need of programming languages and problem solving techniques and develop programming skills. |
| * To enable effective usage of Control Structures and Implement different operations on arrays. |
| * To demonstrate the use of Strings and Functions. |
| * To impart the knowledge of pointers and understand the principles of dynamic memory allocation. * To understand structures and unions and illustrate the file concepts and its operations. * To impart the Knowledge Searching and Sorting Techniques. |

**UNIT-I**

**Introduction to Computer Problem Solving:** Programs and Algorithms, Computer Problem Solving Requirements, Phases of Problem Solving, Problem Solving Strategies, Top-Down Approach, Algorithm Designing, Program Verification, Improving Efficiency, Algorithm Analysis and Notations.

**UNIT-II**

**Introduction to C Programming:** Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/output Statements, Operators, Type Conversion.

**Control Flow, Relational Expressions:** Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto statement.

**UNIT-III**

**Arrays:** Introduction, Operations on Arrays, Arrays as Function Arguments, Two dimensional Arrays, Multi-dimensional arrays.

**Pointers:** Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function Arguments, Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command Line Arguments.

**UNIT-IV**

**Functions:** Introduction, Function Declaration, Function Definition, Function Call, Categories of Functions, Passing Parameters to Functions, Scope of Variables, Variable Storage Classes, Recursion.

**Strings:** String Fundamentals, String Processing with and without Library Functions, Pointers and Strings.

**UNIT-V**

**Structures, Unions, Bit Fields:** Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields.

**Files:** Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

**Course Outcomes:**

At the end of the Course, Student will be able to:

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| * Illustrate the Fundamental concepts of Computers and basics of computer programming. |
| * Use Control Structures and Arrays in solving complex problems. |
| * Develop modular program aspects and Strings fundamentals. |
| * Demonstrate the ideas of pointers usage. |
| * Solve real world problems using the concept of Structures, Unions and File operations. |

**Text Books:**

1. R. G. Dromey, How to solve it by Computer, Pearson Education.

2. Reema Thareja, Computer Programming, Oxford University Press.

**Reference Books:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

2. Ajay Mittal, Programming In C A-Practial Approach, Pearson.

3. Forouzan, Gilberg, C Programming – A Problem Solving Approach, Cengage.

4. Dennis Richie And Brian Kernighan, The C Programming Language, Pearson Education.

5. Ashok Kamthane, Programming In C, Second Edition, Pearson Publication.

6. Yaswanth Kanetkar, Let us C, 16th Edition, BPB Publication.

**Web Links:**

1. http://www.c4learn.com/

2. http://www.geeksforgeeks.org/c/

3. http://nptel.ac.in/courses/122104019/

4. http://www.learn-c.org/

5. https://www.tutorialspoint.com/cprogramming/