C PROGRAMMING FOR ENGINEERS

B.Tech. I Year

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Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in Program development.
3. To learn the syntax and semantics of C Programming Language.
4. To learn the usage of structured programming approach in solving problems.

Course Outcomes: Upon completing this course, the students will be able to

1. Draw flowcharts for solving arithmetic and logical problems
2. Develop modular reusable code by understanding concepts of functions.
3. Formulate algorithms and programs using arrays, pointers, strings and structures.
4. Write a programs using Searching and sorting algorithms

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	1	-	-	-	-	-	1
CO2	3	2	3	2	-	2	-	-	-	-	-	1
CO3	3	3	2	1	-	2	-	1	-	-	-	1
CO4	3	3	3	2		1	-	1				

UNIT- I

Introduction to Computer Algorithms and Programming

Components of a computer system: Memory, processor, I/O devices, storage, operating system, the concept of assembler, compiler, interpreter, loader, and linker.

From algorithm to program: Representation of an algorithm, flowchart, Pseudocode with examples, converting algorithms to programs.

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, data types, variables and constants, memory storage, and storage classes.

UNIT – II

Expressions and Statements

Expressions and their evaluation: Operands and Operators, formation of expressions using arithmetic, relational, logical, and bitwise operators, precedence and associativity rules, mixed operands, type conversion, and evaluation of expressions.

Statements: Simple and compound statements, Conditional Branching: if and switch statements, nested if-else, dangling else problem, use of break and default with switch. Iteration and loops: use of while, do-while and for loops, nested loops, use of break and continue statements.

UNIT - III

Functions and Arrays

Designing Structured Programs: Introduction to functions, advantages of modularizing a program into functions, types of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, recursion with example programs.

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays, character arrays, C strings, string input/output functions, Array of strings, string manipulation functions with example programs.

UNIT – IV

Pointers and File handling

Pointers: Introduction, declaration, applications, dynamic memory allocation (malloc, calloc, realloc, free), use of pointers in self-referential structures.

File handling: File I/O functions, standard C pre-processors, defining and calling macros, command-line arguments.

UNIT – V

Derived types And Basic Algorithms:

Structures, Union, Enums and Bit-fields: Defining, declaring, and usage of structures, unions, and their arrays, passing structures, and unions to functions, introduction to enums and bit-fields.

Basic Algorithms: Searching and Sorting Algorithms (Bubble, Insertion, and Selection), finding roots of equations, notion of order of complexity through example programs.

TEXT BOOKS:

1. B. A. Forouzan and R. F. Gilberg -Programming & Data Structures, 3rd Ed., Cengage Learning`
2. Byron Gottfried - Schaum's Outline of Programming with C, McGraw-Hill

REFERENCE BOOKS:

1. Ajay Mittal - Programming in C: A practical approach, Pearson Education, 2010
2. Kernighan Brian W. and Ritchie Dennis M.- The C programming, Pearson Education.
3. J. R. Hanlyand, E. B. Koffman -Problem Solving and Program Design, 5th Ed., Pearson Education.
4. H. Cheng - C for Engineers and Scientists, McGraw-Hill International Edition
5. V. Rajaraman - Computer Basics and C Programming, PHI Learning, 2015.