

SANTHIRAM ENGINEERING COLLEGE**(AUTONOMOUS)****DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS**

MCA I Sem.

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(23F00102) C PROGRAMMING AND DATA STRUCTURES

Course Category	Professional Core course (PC)
Course Enrichment Relevance	Employability

COURSE OBJECTIVES:

1. To illustrate the basic concepts of C programming language.
2. To discuss the concepts of Functions, Arrays, Pointers and Structures.
3. To familiarize with Stack, Queue and Linked lists data structures.
4. To explain the concepts of non-linear data structures like graphs and trees.
5. To learn different types of searching techniques.
6. To learn different types of sorting techniques.

UNIT-I INTRODUCTION TO C LANGUAGE

C language elements, variable declarations and data types, operators and expressions, decision statements - If and switch statements, loop control statements - while, for, do-while statements, array

UNIT-II FUNCTIONS

Functions, types of functions, Recursion and argument passing, pointers, storage allocation, pointers to functions, expressions involving pointers, Storage classes - auto, register, static, extern, Structures, Unions, Strings, string handling functions, and Command line arguments.

UNIT-III DATA STRUCTURES

Overview of data structures, stacks and queues, representation of a stack, stack related terms, operations on a stack, implementation of a stack, evaluation of arithmetic expressions, infix, prefix, and postfix notations, evaluation of postfix expression, conversion of expression from infix to postfix, recursion, queues - various positions of queue, representation of queue, insertion, deletion, searching operations.

UNIT-IV LINKED LISTS

Linked Lists - Singly linked list, dynamically linked stacks and queues, polynomials using singly linked lists, using circularly linked lists, insertion, deletion and searching operations, doubly linked lists and its operations, circular linked lists and its operations.

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UNIT-V TREES AND GRAPHS

Trees - Tree terminology, representation, Binary trees, representation, binary tree traversals. binary tree operations,

Graphs - graph terminology, graph representation, elementary graph operations,

Breadth First Search (BFS) and Depth First Search (DFS), connected components, spanning trees.

UNIT-VI Searching and Sorting Techniques

Sorting Techniques - Insertion sort, Selection sort, Bubble sort, Quick sort, Heap sort, and Merge sort

Searching Techniques - Linear Search, Binary Search

At the end of this unit, the students will be able to

- Design the different sorting techniques (L6)
- Apply programming to solve searching and sorting problems. (L3)

TEXT BOOKS:

1. The C Programming Language, Brian W Kernighan and Dennis M Ritchie, Second Edition, Prentice Hall Publication.
2. Fundamentals of Data Structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Computer Science Press.
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
4. B.A. Forouzon and R.F. Gilberg, COMPUTER SCIENCE: A Structured Programming Approach Using C, Third edition, CENGAGE Learning, 2016.
5. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E. Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K. Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T. Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

e-Resources and Digital Material:

1. https://onlinecourses.nptel.ac.in/noc20_cs06/preview

COURSE OUTCOMES:

1. Analyse the basic concepts of C Programming language.
2. Design applications in C, using functions, arrays, pointers and structures.
3. Apply the concepts of Stacks and Queues in solving the problems.
4. Explore various operations on Linked lists.

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