MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - II SEM (Common to all branches)

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COMPUTER PROGRAMMING
(14CSU12T01)

Course Objectives:

- To make the student understand problem solving techniques and their applications
- Students will be able to understand the syntax and semantics of C programming language
- Get acquaintances with data structures, searching and sorting techniques using C++ generic programming.

Learning Outcomes:

After Completion of this course students will be able to

- Student can effectively apply problem solving techniques in designing the solutions for a wide-range of problems
- Student can choose appropriate data structure and control structure depending on the problem to be solved
- Student can effectively use existing data structures and design new data structures appropriate to the problem to be solved
- Student can modularize the problem and also solution
- Student can use appropriate searching and sorting technique to suit the application

UNIT-I

C Programming: Structure of C Program, C Tokens: Variables, Data types, Constants, Identifiers, key words and Operators, Expressions. **Control Structures**: Conditional Statements (Simple if, if-else, Nested -if-else, Switch). Iterative Statements (for, While, Do-While), Jump Statements (break, Continue).

UNIT-II

Functions: Functions Introduction, User defined function, accessing a function, Function prototypes, storage classes **Arrays**: Defining an array, processing an array, one dimensional arrays, two dimensional arrays **Searching:** Linear and Binary. **Sorting:** Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, and Quick Sort. **Pointers**: Fundamentals, Pointer Declarations, Pointers and one dimensional array, Dynamic memory allocation.

UNIT-III

Strings: Declaring and Defining a string, Initialization of strings, , Strings Library functions **Structures:** Defining a structure, Processing a structure **Files**: File Definition, Opening and closing a data file, Reading and Writing a data file, Files I/O Functions.

UNIT-IV

C++ Programming: Objects, Class Definition, Class Members, Access Control, Constructors and destructors, parameter passing methods, , dynamic memory allocation and deal location

(new and delete), Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control

UNIT-V

Data Structures: Classification of Data Structures. **Stacks and Queues**: Stacks, Stacks Operations, Stack Implementation by using arrays, Queues, Queues Implementation by using arrays, Types of Queues . **Linked Lists**: Single Linked lists, Operations

TEXT BOOKS:

1) The C Programming Language, Kernighan and Ritchie, 2 nd Edition, Prentice Hall, India, 1988.(UNITS-I, II, III)
2) C++: The Complete Reference. Third Edition. Herbert Schildt. Osborne McGraw-Hill. Berkeley New York St. Louis San Francisco. Auckland Bogotá Hamburg .(UNIT-IV)
3) Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.(UNIT-V)

REFERENCES:

1) Programming in ANSI C, E. Balagurusamy, Sixth Edition, Tata Mc-Graw Hill Publishing Co.Ltd.-New Delhi
2) Problem Solving & Program Design in C, Hanly, Jeri R and Elliot. B Koffman, Pearson Education, 5 th edition, 20007.
3) Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
4) Lipmen C++ Book

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - II SEM (Common to all branches)

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COMPUTER PROGRAMMING PRACTICALS
(14CSU12P02)

Course Objectives:

- To make the student learn C Programming language.
- To make the student solve problems, implement them using C & C++ programming languages.
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem.

Learning Outcomes:

After Completion of this course students will be able to

- Apply problem solving techniques to find solutions to problems.
- Able to use C & C++ languages features effectively and implement solutions using C & C++ languages.
- Be capable to identity the appropriate data structure for a given problem or application.
- Improve logical and programming skills.

LIST OF EXPERIMENTS

1) a) Write a C program to swap the two numbers.
   b) Write a C program to find the roots of a quadratic equation.
   c) Write a C program to compute the factorial of a given number.
2) a) Write a C program to find the series of prime numbers in the given range.
   b) Write a C program to generate Fibonacci numbers in the given range.
3) a) Write a C program to check for number palindrome.
   b) Write a C program to generate Pascal Triangle.
4) Implement the following operations on matrices using C
   a) Sum of Two Matrices b) Product of Two matrices
   c) Transpose of Matrix
5) Write a C program to find Factorial, GCD, fibonacci, towers of hanoi, sum of digits, base conversions, reversal of numbers. (Using recursion).
6) Write a C program to implement all string operations(strlen(), strcpy(), , strcmp(), strcat(), strrev(), strstr(), strchr()) without using standard string library functions.
7) Write a C program to find the student grade by using structures.
8) Write a C program to perform the operations addition, subtraction, multiplication of Complex numbers using structures.
9) Write a C program to copy the file contents from one file to another file(pass file names as command line arguments).

10) Implement the following searching techniques using C++ templates (Generic Programming)
    a) Linear Search b) Binary Search
11) Implement the following sorting techniques using C++ templates
    a) Bubble Sort b) Selection Sort c) Insertion Sort
12) Implement the following sorting techniques using C++ templates
    a) Merge sort b) Quick sort.
13) Implement the following Data Structures using C++ templates
    a) Stack ADT b) queue ADT c) Circular queue ADT
14) Write a C++ Program to convert infix to postfix expression and its evaluation.
15) Implement Singly linked list ADT and operations(Insertion, Deletion, Traversing)

References:

1. "Programming with C", Byron Gottfried, Third Edition, Schaum's Outlines, Mc Graw Hill.
2. "Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
3. "The C Programming Language", Brian W. Kernighan, Dennis M. Ritchie, Pearson.
4. "Classic Data Structures", Samantha, PHI
5. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
6. "Pointers in C", Yeswant Kanetkar, BPB publications.