ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

I SEMESTER **COMPUTER SCIENCE** TIME:4HRS/WEEK

CS 1602(3) **PROBLEM SOLVING IN ‘C’** MAX.MARKS:100

w.e.f.20-21 admitted batch-“20AH” **SYLLABUS**

**OBJECTIVES:** This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

**COURSE LEARNING OUTCOMES:**

Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.

2. Apply logical skills to analyse a given problem

3. Develop an algorithm for solving a given problem.

4. Understand ‘C’ language constructs like Iterative statements, Array processing, Pointers, etc.

5. Apply ‘C’ language constructs to the algorithms to write a ‘C’ language program.

**UNIT – I:** **General Fundamentals:** Introduction to computers, Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computer generations.

**Introduction to Algorithms and Programming Languages**: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

**UNIT – II:** **Introduction to C:** Introduction – Structure of C Program – Writing the first C Program –File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.

**Decision Control and Looping Statements** : Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement.

**UNIT – III: Arrays :** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array– Operations on Arrays – one dimensional, two dimensional and multidimensional arrays, character handling and strings.

**UNIT – IV: Functions:** Introduction – using functions – Function declaration/ prototype – Function definition function call – return statement – Passing parameters – Scope of variables –Storage Classes – Recursive functions.Structure, Union, and Enumerated Data Types: Introduction – Nested Structures – Arrays of Structures – Structures and Functions– Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types.

**UNIT – V: Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs –Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers.

**Files**: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

**REFERENCE BOOKS :**

1. E Balagurusamy – Programming in ANSI C – Tata McGraw-Hill publications.

2. Brain W Kernighan and Dennis M Ritchie – The ‘C’ Programming language” –Pearson publications.

3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.

4. YashavantKanetkar – Let Us ‘C’ – BPB Publications.

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ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

I SEMESTER **COMPUTER SCIENCE** TIME:2HRS/WEEK

CS 1652 (2) **PROBLEM SOLVING IN ‘C’ LAB** MAX.MARKS:50 w.e.f. 20-21 admitted batch-“20AH” **PRACTICAL SYLLABUS – IA**

1. Write a program to check whether the given number is Armstrong or not.

2. Write a program to find the sum of individual digits of a positive integer.

3. Write a program to generate the first n terms of the Fibonacci sequence.

4. Write a program to find both the largest and smallest number in a list of integer values

5. Write a program to demonstrate reflection of parameters in swapping of two integer values using Call by Value & Call by Address

6. Write a program that uses functions to add two matrices.

7. Write a program to calculate factorial of given integer value using recursive functions

8. Write a program for multiplication of two N X N matrices.

9. Write a program to perform various string operations.

10. Write a program to search an element in a given list of values.

11. Write a program to sort a given list of integers in ascending order.

12. Write a program to calculate the salaries of all employees using Employee (ID,Name, Designation, Basic Pay, DA, HRA, Gross Salary, Deduction, Net Salary)structure.

a. DA is 30 % of Basic Pay

b. HRA is 15% of Basic Pay

c. Deduction is 10% of (Basic Pay + DA)

d. Gross Salary = Basic Pay + DA + HRA

e. Net Salary = Gross Salary - Deduction

13. Write a program to illustrate pointer arithmetic.

14. Write a program to read the data character by character from a file.

15.Write a program to createBook (ISBN,Title, Author, Price, Pages,Publisher)structure and store book details in a file and perform the following operations

a. Add book details

b. Search a book details for a given ISBN and display book details, if available

c. Update a book details using ISBN

d. Delete book details for a given ISBN and display list of remaining Books

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