DETAILS OF COURSE-WISE SYLLABUS

B Sc	Semester: I	Credits: 4
Course: 1	PROBLEM SOLVING IN C	Hrs/Wk: 4

Aim and objectives of Course:

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

Learning outcomes of Course:

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

- Understand the evolution and functionality of a Digital Computer.
- Apply logical skills to analyse a given problem
- Develop an algorithm for solving a given problem.
- Understand 'C' language constructs like Iterative statements, Arrayprocessing, Pointers.
- Apply 'C' language constructs to the algorithms to write a 'C' languageprogram.

3. Detailed Syllabus: (Five units with each unit having 12 hours of class work)

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 multi dimensional arrays, character handling and strings.

UNIT IV:

Functions: Introduction – using functions – Function declaration/ prototype – Functiondefinition – 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.

B Sc	Semester: I	Credits: 1
Course: 1(L)	PROBLEM SOLVING IN C Lab	Hrs/Wk: 2

1. Details of Lab Syllabus: **Problem solving in C LAB**

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 refection of parameters in swapping of two integervalues 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 create ***Book (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

5.MODEL QUESTION PAPER (Sem-end. Exam)
B.Sc DEGREE EXAMINATIONS
Semester - I
Course 1: PROBLEM SOLVING IN C

Time: 3Hrs Max.marks:75

Section - A

Answer any FIVE question **5X5 = 25M**

1. Explain Block diagram of Computer.
2. Define an Algorithm. What are the key features of an algorithm?
3. Write about go to statement with syntax and example.
4. Dynamic memory allocation.
5. Explain pointers in arrays.
6. How to write data from files with example?
7. Write about enumerated data types.
8. Briefly explain various types of recursions.

Section - B

Answer ALL following question **5X10 = 50M**

9. a) Briefly explain about generations of computers.

(OR)

b) What is a Flowchart? Explain significance with an example.

10. a) Explain basic data types in C?

(OR)

b) Explain about iterative statements available in C.

11. a) What is an Array? Explain different types of arrays with examples.

(OR)

b) What is a string? Explain various string handling functions available in C.

12. a) Define a function. Explain the passing parameter mechanism.

(OR)

b) Explain about Structure with syntax and example in detail.

13. a) Define and use of a pointer and write a ‘C’ program on swapping of two numbersusing pointers.

(OR)

b) Explain file modes in detail.