II Semester
Course 3: Problem Solving using C
Credits -3

Course Objectives
1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes
Upon successful completion of the course, a student will be able to:
1. Understand the working of a digital computer and Fundamental constructs of Programming
2. Analyze and develop a solution to a given problem with suitable control structures
3. Apply the derived data types in program solutions
4. Use the 'C' language constructs in the right way
5. Apply the Dynamic Memory Management for effective memory utilization

UNIT-I
Introduction to computer and programming: Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-levelprogramming, Flowcharts and Algorithms
Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

UNIT-II
Control statements: Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break,continue and goto.

UNIT-III
Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.
Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

UNIT-IV
Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables. **Storage classes**: automatic, external, static and register.
Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.

UNIT-V
Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free **Structures:** Basics of structure, structure members, accessing structure members, nested structures, array of

structures, structure and functions, structures and pointers. **Unions** - Union definition; difference between Structures and Unions.

Text Books:
1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978-1-25- 90046-2
2. Herbert Schildt, ―Complete Reference with C, Tata McGraw Hill, 4th Edn., ISBN- 13: 9780070411838, 2000
3. Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS

Reference Books
1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.
4. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183331630,656 pages.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:
Unit 1: Activity: Quiz on computer hardware and software concepts
  Evaluation Method: Objective-based quiz assessing knowledge and understanding
Unit 2: Activity: Problem-solving using Decision-Making Statements
  Evaluation Method: Correctness of decision-making logic
Unit 3: Activity: Array and String Program Debugging
  Evaluation Method: Identification and correction of errors in code
Unit 4: Activity: Pair Programming Exercise on Functions
  Evaluation Method: Collaboration and Code Quality
Unit 5: Activity: Structured Programming Assignment
  Evaluation Method: Appropriate use of structures and nested structures

II Semester
Course 3: Problem Solving using C
Credits -1

List of Experiments

1. A. Write a program to calculate simple & compound interest
   B. Write a C program to interchange two numbers.
2. Find the biggest of three numbers using C.
3. Write a c program to find the sum of individual digits of a positive integer.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
5. Write a c program to check whether a number is Armstrong or not.
6. Write a c program to generate all the prime numbers between 1 and n, where n is avalue supplied by the user.
7. Write a c program that implements searching of given item in given list
8. Write a c program that uses functions to perform the following: Addition of twomatrices. Multiplication of two matrices.
9. Write a program for concatenation of two strings.
10. Write a program for length of a string with and without String Handling functions
11. Write a program to demonstrate Call by Value and Call by Reference mechanism
12. Write a Program to find GCD of Two numbers using Recursion
13. Write a c program to perform various operations using pointers.
14. Write a c program to read data of 10 employees with a structure of 1.employee id2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
15. Write a Program to demonstrate dynamic arrays using Dynamic Memory Management functions