6. "Digital Electronics: Principles and Applications" by Roger L. Tokheim Publisher: McGraw-Hill Education (India) Pvt. Ltd.
7. "Fundamentals of Digital Logic with VHDL Design" by Stephen Brown and Zvonko Vranesic Publisher: McGraw-Hill Education (India) Pvt. Ltd.
8. "Digital Electronics: A Primer" by Michael J. Ciletti Publisher: Pearson India Education Services Pvt. Ltd.
9. "Analog Circuits" by A.K. Maini, Khanna Book Publishing Co.
10. "Design of Analog Circuits" by A.V.N. Tilak, Khanna Book Publishing Co.

**SUBJECT NAME: Programming for Problem Solving through C Credit: 3L + 2P**

**SUBJECT CODE: BCAC102**

**COURSE OBJECTIVE:**

The objective of the course "Programming for Problem Solving through C" is to equip students with fundamental programming skills using the C programming language and foster a problem-solving mindset. Throughout the course, students will develop a solid foundation in computer programming concepts and techniques, enabling them to tackle real-world problems and develop efficient, structured, and modular solutions.

| **COURSE OUTCOME** | |
|---|---|
| CO1 | Apply programming constructs of C language to solve the real world problem |
| CO2 | To implement conditional branching, iteration and recursion |
| CO3 | Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting |
| CO4 | Explore user-defined data structures like structures, unions and pointers in implementing solutions |
| CO5 | Create problem-solving solutions utilizing modular programming elements and functions. |
| CO6 | Use files to store information after solving the problem related to the real world |

**DETAILED SYLLABUS:**

| **Module No:** | **NAME OF THE TOPIC** | **HOURS** | **MARKS** |
|---|---|---|---|
| M1 | **Introduction to components of a computer system**: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker. Representation of Algorithm, Flowchart, Pseudo code with examples, From algorithms to programs, source code. Compilation process of C program; .asm file, .obj file and .exe file. Number Systems: Binary, Octal, Decimal, Hexadecimal format. | 4 | 5 |

| | | | |
|---|---|---|---|
| M2 | **Introduction to 'C' Language**: C Language - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions. | 4 | 2 |
| M3 | **Conditional Statements and loops :** Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming | 7 | 15 |
| M4 | **Arryays:** One dimensional arrays: Array manipulation; Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in an array; Two dimensional arrays, Addition/Multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, Standard library string functions | 8 | 15 |
| M5 | **Pointers :**Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays, pointers and structures, dynamic memory allocation. | 8 | 8 |
| M6 | **Functions:** Top-down approach of problem solving, Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments.<br>**Storage Classes :** Scope and extent, Storage Classes in a single source file: auto, extern and static, register, Storage Classes in a multiple source files: extern and static | 8 | 15 |
| M7 | **File Processing** : Concept of Files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file | 6 | 10 |
| | INTERNAL EXAMINATION | 3 | 30 |
| | TOTAL | 48 | 100 |

**PRACTICAL:**

**SUBJECT NAME: Programming for Problem Solving Lab Credit: 2**

**SUBJECT CODE: BCAC192**

**List of Practical:**

1. Write a c program to display the word "welcome".
2. Write a c program to take a variable int and input the value from the user and display it.
3. Write a c program to add 2 numbers entered by the user and display the result.

4. Write a c program to calculate the area and perimeter of a circle.
5. Write a C program to find maximum between two numbers.
6. Write a C program to check whether a number is divisible by 5 and 11 or not.
7. Write a C program to input angles of a triangle and check whether triangle is valid or not.
8. Write a C program to check whether a year is leap year or not.
9. Write a C program to input basic salary of an employee and calculate its Gross salary according to following:
   Basic Salary <= 10000 : HRA = 20%,
   DA = 80% Basic Salary <= 20000 :
   HRA = 25%, DA = 90% Basic Salary
   > 20000 : HRA = 30%, DA = 95%
10. Write a c program to print "welcome" 10 times.
11. Write a c program to print first n natural numbers using while loop.
12. Write a c program to print all the odd numbers in a given range.
13. Write a c program to add first n numbers using while loop.
14. Write a c program to print all numbers divisible by 3 or 5 in a given range.
15. Write a c program to add even numbers in a given range.
16. Write a c program to find the factorial of a given number.
17. Write a c program to find whether a number is prime or not.
18. Write a c program to print the reverse of a number.
19. Write a c program to add the digits of a number.
20. Write a c program to print the fibonacci series in a given range.
21. Write a c program to check whether a number is an Armstrong number or not.
22. Write a c program to find g.c.d. and l.c.m. of two numbers.
23. Write a C program that writes "hello File Handling" to the File.
24. Write a C program that reads the information from the file.
25. Write a C program that defines a structure for student. Then Create five instance of the student and find who scores the highest marks. Write the information of the student who scores the highest marks.

**SUGGESTED READING:**


1. "AICTE's Programming for Problem Solving" by Khanna Book Publishing Co.
2. "Let Us C" by Yashavant Kanetkar Publisher: BPB Publications
3. "C Programming: A Modern Approach" by K. N. King Publisher: W. W. Norton & Company India Pvt. Ltd.
4. "C Programming for the Absolute Beginner" by Perry, Greg Publisher: Course Technology PTR (Cengage Learning)
5. "C How to Program" by Deitel, Paul, and Deitel, Harvey Publisher: Pearson Education India
6. "Programming in ANSI C" by Kochan, Stephen G. Publisher: Pearson Education India
7. "C Primer Plus" by Prata, Stephen Publisher: Pearson Education India
8. "C Programming Absolute Beginner's Guide" by Perry, Greg Publisher: Pearson Education India
9. "Programming with C" by Gottfried, Byron S. Publisher: Tata McGraw-Hill Education