BCA CORE

Course Name: **Problem Solving with Programming** **Credits: 4**

(Course Code: SOBCA102)

Course Objectives:

- Provide a fundamental understanding of computer systems, software, and digital technologies suitable for everyday use.
- Enable learners to perform basic computing tasks such as document creation, web browsing, email communication, and digital banking.
- Promote digital inclusion by equipping individuals—including non-technical users and small business owners—with essential IT skills.
- Lay the groundwork for programming by introducing basic computational thinking and problem-solving skills.
- Develop the learner's ability to write structured and maintainable programs using C++.
- Introduce key programming constructs such as variables, control flow, loops, functions, and data structures.

Course Outcomes:

After completing this course, you will be able to:

Sr. No.	Course Outcome
CO1	Write efficient algorithms to solve various problems.
CO2	Understand and use various constructs of the programming language such as conditionals, iteration, and recursion.
CO3	Implement your algorithms to build programs in the C++ programming language.
CO4	Use data structures like arrays, linked lists, and stacks to solve various problems.
CO5	Understand and use file handling in the C++ programming language.

Course Content:

Unit- A: Computer Systems and Hardware Concepts

Introduction to Computers: What is a computer, characteristics of Computers, Generations of Computers, Classifications of Computers, Basic Computer Organization, Applications of Computers. Computer Memory and Processors: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, magnetic tapes, floppy disks, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture. Input and Output Devices: Input devices, Output devices, Softcopy devices, Hard copy devices.

Unit- B: Computer Software and Computer Codes

Computer Software: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware. Introduction to internet: Internet-Brief history, Web Page, Website, Browsers, URL, HTML, Internet Service Provider (ISP). Number System and Computer Codes: Binary number system, working with binary numbers, octal number system, hexadecimal number system, working with fractions, signed number representation in binary form.

Unit- C: Programming Fundamentals using C++

Introduction to the C++ Language: C++ Programs, Identifiers, Data Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associatively, Expression Evaluation, Type conversions. Statements - Selection Statements (making decisions) – if and switch statements, Repetition statements (loops) - while, for, do-while statements, Loop examples, other statements related to looping: break, continue, go to, Simple C++ Program examples.

Unit- D: Functions, Arrays, and Pointers in C++

Functions, Arrays and Pointers: Introduction to Structured Programming, Functions-basics, user defined functions, inter function communication (call by value, call by reference), Standard functions. Storage classes-auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C++ programs. One-dimensional arrays, two – dimensional arrays, multidimensional arrays, Pointers – Introduction (Basic Concepts), pointers to pointers, compatibility, Pointer Applications, Arrays and Pointers, Pointer Arithmetic, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments.

Teaching / Assessment Methodology:

- Synchronous Lectures
- Lectures on LMS
- Assignments
- Quizzes
- Project Report

Grading:

Internal Assessment	30%
End Term Exams	70%

Text Books:

1. Computer Fundamentals, Anita Goel, Pearson Education India.
2. Let Us C++, Yashavant kanetkar, BPB.

Reference Books:

1. Programming: Principles and Practice Using C++, Bjarne Stroustrup, Edition 2, Publisher: Addison Wesley, 2014.
2. The C++ Programming Language by Bjarne Stroustrup, 2nd edition, Pub: Addision Weslly.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.