BOS	Computer Science
Class	F.Y.B.C.A
Semester	I
Course Name	PROBLEM SOLVING TECHNIQUES
Course Code	CA101
Type of course	Discipline Specific Core
Level of the Subject	Basic
Credit Points	2

Course Objectives:
1.To acquire knowledge on business culture
2. To develop the skill of Communication and exploring the web.

Unit No.	Name of Unit	Topic No.	Content	Hours
1		1.1	Problems And Problem Instances, Generalization and Special Cases, Types of Computational Problems, Classification of Problems, Analysis of Problems, Solution Approaches	10
		1.2	Definition And Characteristics of Algorithms, Standard Algorithm Format. Algorithm Development, Analysis of Algorithm, Efficiency, Correctness, Role of Data Structures in Problem Solving,	
		1.3	Problem-Solving Steps (Understand the Problem, Plan, Execute, And Review), Breaking the Problem into Subproblems, Input/Output Specification, Input Validation, Pre and Post Conditions.	
2		2.1	Structured Programming Concepts: Sequence (Input/Output/Assignment), Selection (If, If-Else) And Repetition (For, While, Do-While) Statements, Control Structure Stacking and Nesting.	10
		2.2	Different Kinds of Data in The Real World and How They are Represented in The Computer	

			Memory. Representation of Integers: Signed Magnitude Form, 1's Complement And 2's Complement. Representation of Real Numbers: IEEE 754 Floating Point Representation. Representation of Characters: ASCII, UNICODE.	
		2.3	Boolean algebra: Basic identities of Boolean Algebra, Boolean function (b) Logic Gates: AND, OR, NOT, NOR, NAND, EX-OR EX-NOR operations and their truth table, Simplification of Boolean expression,	
3		3.1	Problems on Numbers: Extracting Digits of a Number (Left to Right and Right to Left), Palindrome, Prime Number, Prime Factors, Amicable Number, Perfect Number, Armstrong Number, Factorial,	10
		3.2	Converting Number from One Base to Another. Statistics (Maximum, Minimum, Sum and Average) on a Sequence of Numbers which are Read using Sentinel.Sequential And Binary Search. Any one Sorting Algorithm. Matrix Operations.	
		3.3	Modular Programming, Top-Down and Bottom-Up Approaches to Problem Solving. Recursion. Problems on Arrays: Reading and Writing of Array Elements,	
			Total number of hours	**30**

Course Outcomes:
1. Understand basic terminology of computers, problem solving, programming Languages and their evolution
2. Create specification from problem requirements by asking questions to disambiguate the requirement statement.
3. Design the solution from specification of a problem and write pseudo code of the algorithm using basic building blocks or structured programming constructs (Sequence, Selection and Repetition statement).
4. Translate an algorithm into a C computer program
5. Testing and analysing programs using debugging tools.
6. Evaluate the correctness and efficiency of algorithms through basic performance analysis.

References:
1. Venkatesh, Nagaraju Y, Practical C Programming for Problem Solving, Khanna Book Publishing Company, 2024.
2. AICTE's Programming for Problem Solving (with Lab Manual), Khanna Book Publishing Company, 2024.
3. Harvey Deitel and Paul Deitel, C How to Program, 9th edition, Pearson India,

2015. 4. R G Dromey, How to Solve It by Computer.

4. Brian W. Kernighan and Dennis Ritchie, The C Programming Language, 2nd edition, Pearson, 2015. 2. Jeri Hanly and Elliot Koffman, Problem Solving and Program Design in C, 8th edition, Pearson, 2015.

5. Introduction to Algorithms – Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein

6.Programming in C – Stephen G. Kochan