

Branch Name:	BCA (Bachelor of Computer Applications)
Program Code:	CS101
Course Title:	Problem Solving Techniques-I
Course Code:	21-SEC101-1C
Pre-requisite Course:	Basic familiarity with computers and logical thinking.

Course Objective:

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. Structured programming constructs (Sequence, Selection and Repetition statement).
4. Translate an algorithm into a C computer program.

Teaching and Examination Scheme:

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Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)								
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory				Practical				Total
				University Assessment		Continuous Assessment		University Assessment		Continuous Assessment		
				Min. Marks	Min. Marks	Min. Marks	Min. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	
4	-	4	6	18	50	18	50	09	25	09	25	150

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to Problem Solving and Overview of C • Introduction to problem-solving: Algorithm, flowchart, pseudocode • Types of Programming languages Characteristics of higher-level language, Compiler, Interpreter, Assembler • Basics of C: History, structure of a C program, compiling and executing C programs	10	25
2	Basics of C Programming • Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Defining symbolic constants • Input and output statements (printf, scanf) • Operators and expressions • Type conversion and precedence	12	25
3	Managing Input /Output & Control Structures • Formatting Input and Output • Conditional statements: if, if-else, nested if, switch-case • Looping structures: while, for, do-while loops • Loop control: break, continue, goto	14	25

4	Arrays & String Arrays: 1D and 2D arrays: declaration, initialization, and usage - Applications: search, sort, matrix operations Strings: - String handling functions (strlen, strcpy, strcmp, etc.) - String operations using arrays	12	25
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Course Learning Outcomes (CLO):

At the end of this course, the student would be able

- CLO1:** Understand the fundamentals of problem-solving techniques such as algorithms, flowcharts, and pseudo code, and differentiate between types of programming languages and their translators.
- CLO2:** Describe the structure and basic elements of a C program including character sets, tokens, data types, variables, constants, and symbolic constants.
- CLO3:** Use standard input/output functions and apply various operators and expressions with correct precedence and type conversions.
- CLO4:** Develop programs using conditional statements and iterative control structures, including nested conditions and loop control mechanisms.
- CLO5:** Implement and manipulate one-dimensional and two-dimensional arrays to perform search, sort, and matrix operations.
- CLO6:** Perform string operations using arrays and built-in string handling functions to process and manipulate text data effectively.

List of Text book:

- Programming in ANSI C, By E Balaguru swami, Tata McGraw-Hill Publishing Company Limited.
- Programming with C, By Bayron Gottfried, Tata McGraw-Hill Edition.

List of Reference book:

- Let Us C, By Yashavant Kanetkar, BPB Publications.
- Working with C, By Yashavant Kanetkar, BPB Publications.
- C in Depth, By Suresh K. Srivastava, BPB Publications.

E-Resources/ Web Links:

- <http://www.cprogramming.com/>
- <http://www.learn-c.org/>
- <https://www.w3schools.com/c/index.php>
- <http://www.programiz.com/>
- <https://www.tutorialspoint.com/cprogramming/index.htm>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

No.	Program Description
1	Display "hello computer" on the screen
2	Print personal details (name, address, city, state, gender, etc.)
3	Find area of a circle ($\text{Area} = \pi * r * r$)
4	Find area of rectangle, triangle, and cube [Formula are: Rectangle= $L*W$, Triangle = $(h * b)/2$, Cube = $L*L*L$]
5	Evaluate simple interest ($I = P * R * N / 100$)
6	Convert distance in KM to meter, feet, inches, and centimeter
7	Interchange two numbers

8	Convert Fahrenheit to Celsius ($C = (F - 32) / 1.8$)				
9	Perform addition, subtraction, multiplication, and division of two numbers				
10	Find the largest value among three numbers using conditional operator				
11	Check if a number is negative, positive, or zero				
12	Check whether entered character is capital, small, digit, or special character				
13	Map number (1–7) to weekday (Sunday to Saturday)				
14	Create Marksheet for Three Subject Display Total, Per, Grade, Result (pass/fail)				
15	Find sum of digits of a number				
16	Sum of first 100 odd numbers and even numbers				
17	Display first 25 Fibonacci numbers				
18	Check whether a number is a prime number				
19	Find factorial of a number				
20	Check whether a number is a palindrome				
21	Convert decimal to binary				
22	Convert decimal to octal				
23	Convert decimal to hexadecimal				
24	Display first 5 Armstrong numbers				
25	Sort numbers in ascending and descending order				
26	Check if a string is a palindrome				
27	Convert a line to uppercase or lowercase				
28	Count words, characters, lines, and spaces in given text				
29	Sort a given string in ascending order				
30	Print various triangle and pyramid patterns using loops				
	1 12 123	A BC DEF	1 0 1 1 0 1	* * * * * *	SUCH LEVEL OF TRIANGLE PARRENT USING LOOP
	1 1 2 1 2 3	A A B A B C	1 1 0 1 0 1	* * * * * *	SUCH LEVEL OF TRIANGLE PARRENT USING LOOP
	1 2 3 1 2 1	A B C A B A	1 0 1 1 0 1	* * * * * *	SUCH LEVEL OF TRIANGLE PARRENT USING LOOP
	1 2 3 1 2 1	A B C A B A	1 0 1 1 0 1	* * * * * *	SUCH LEVEL OF TRIANGLE PARRENT USING LOOP
	1 1 2 1 2 3	A A B A B C	1 1 0 1 0 1	* * * * * *	SUCH LEVEL OF PIYRAMID PARRENT USING LOOP
31	Find max and min no in an array				
32	Input N numbers and find sum, avg, max, min, even, odd (using array)				
33	Display two matrices and perform matrix addition				
34	Display two matrices and perform matrix multiplication				
35	Sort a list of numbers in an array				
36	Search a number in an array				

37	find a length of given string
38	implement strcmp, strcpy, strcat predefined function

Mapping of CLO, PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	L	H	L	H	H	L				M	M	M	H	M	M
CLO2		M		H	H	M	L			M	H	L	M		M
CLO3		H	L	H	M	M	M			M	H		M		H
CLO4	M	H		H	M	L	H	M		H	H		H	M	H
CLO5	M	H		H	M		H	H	M	H	H	M	H	M	H
CLO6	M	M	L	H	H	M	M	H	M	H	H	H	H	H	H

H: High, M: Medium, L: Low