St. Aloysius College (Autonomous), Jabalpur, Madhya Pradesh

PART A				
Program: **Certificate**		Class: **B.C.A.**	Semester :**1st**	Session: **2022-23**
1.	Course Code	**BCA-102**		
2.	Course Title	**Programming and Problem Solving through 'C'**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor**		
4.	Pre-Requisite (if any)	**10+2 Maths (opted as an elective by the students of Computer Application)**		
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to do the following**: CO1. Identify situations where computational methods and computers would be useful. CO2. Given a computational problem, identify and abstract the programming task involved. CO3. Approach the programming tasks using techniques learned and write pseudo code. CO4. Choose the right data representation formats based on the requirements of the problem. CO5. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand. CO6. Write the program on a computer, edit, compile, debug, correct, recompile and run it. CO7. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.		
6.	Credit Value	**Theory - 4 Credits**		
7.	Total Marks	Max. Marks : **40+60**	Min. Passing Marks: **35**	

PART B: Content of the syllabus		
No. of Lectures (in hours per week): **4 Lectures per week**		
Total No. of Lectures: **60**		
Unit	**Topics**	**No. of Lectures**
I	**Classification of programming language:** Structured programming concepts, modular programming, top-down programming approach. **Problem solving using computer**: coding, compilation, debugging and testing, documentation, implementation and maintenance. **Problem- Solving Techniques**: Steps for Problem-Solving, Design of Algorithms, Definition, Features of Algorithm. Flowcharts, Basic Symbols used in Flowchart Design. **Basics of C**: History of C, salient	12

	Features of C, C language IDE'S: What is IDE's Types of IDE's, Structure of a C Program, a Simple C Program, Compiling a C Program, Link and Run the C Program.	
II	**Variables and Constants**: Character Set, Identifiers and Keywords, Rules for Forming Identifiers, **Data Types**, Qualifiers, **Variables**, Declaring Variables, Initializing Variables, **Constants**, Types of Constants, **Operators**, expressions, operator precedence and associativity. **Managing input/output function**: formatted and unformatted. **Conditional Statements and Loops:** Decision Control Statements: if Statement, switch Statement, Loop Control Statements: while Loop, do-while Statement, for Loop, Nested Loop, goto Statement, Break Statement, Continue Statement.	12
III	**Array:** one dimensional array Declaration, Initialization, insertion, deletion of an element form an array, finding the largest/smallest element in an array, two dimensional arrays, addition / multiplication of matrices. **String:** Declaration and Initialization of Strings, String formatted specifiers, Array of Strings, Use of <string.h>, String library function (strlen, strcpy, strcmp,strcat, strlwr, strrev), **Storage Class:** Need & types of Storage class,	12
IV	**Functions:** Definition of a Function, types of function, Declaration of a Function, Function Prototypes, passing arguments to a function, call by value, call by reference, command line argument, recursion. **Pointers:** pointers and their characteristics, address and indirection operators, pointer Type declaration and assignment, pointer arithmetic, passing pointers to functions, array of pointers, introduction to pointer to pointer.	12
V	**Structures**: Declaration of Structures, Accessing the Members of a Structure, Initializing Structures, Structures as Function Arguments, Structures and Arrays, **Preprosessor**: What is pre-processor, Type of Pre-processor, Macros, File Inclusion, Conditional Compilation, Other directives. **Dynamic memory allocation** Memory management, Types of memory allocation, Allocation (malloc, calloc, realloc), Deallocation(free) **Command Line Arguments, Enumeration**, typedef.	12
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings		

Textbooks:

- D. Ravichandran, programming New Age International, 1996.
- E. Balaguruswamy, Tata McGraw Hill Pub.

Reference Books:

- Y.Kanitkar, Let us C. BPB Publication, 4th Ed. 2002.
- Rajiv Dharaskar, Hidden Treasure of C, BPB Publication, 1995.
- Shridhar B. Dandin, Programming – Pragya Publication (Hindi Medium)

Suggestive digital platform web links
https://www.cprogramming.com/ https://www.linuxtopia.org/online_books/programming_books/gnu_c_programming_tutorial/index.html https://www.codewithharry.com/videos/c-tutorial-in-hindi-with-notes
Suggested equivalent online courses
https://nptel.ac.in/courses/106/105/106105171/

PART D: Assessment and Evaluation

Internal Assessment: Continuous Comprehensive Evaluation (CCE): **40 Marks**
Shall be based on allotted assignments and Class Tests based on the Course outcomes.

Attainment Expressions	**PO Mapping**	**PSO mapping**	**Cognitive level**
Identifying basic problem of real world with abstract requirement (CO1, CO2)	PO1, PO2	PSO4	R, U
Applying algorithm, flowchart and pseudocode on basic real-world problems (CO3)	PO3	PSO5	AP
Applying input output operations and basic programming constructs on basic real problems (CO4, CO5)	PO1, PO2	PSO4, PSO6	AP
Writing basic programs for enhancing programming skills (CO6, C07)	PO1, PO2, PO3	PSO9	AN, C

External Assessment: **60 Marks** Time: **03.00 Hours**

Section	**Mark x No. of Questions**
A: Very Short Questions	1 x 5
B: Short Questions	4 x 5
C: Long Questions	7 x 5

PART A: Introduction			
Program: **Certificate**	Class: **BCA**	Semester Ist	Session: **2022-23**
Subject: **Computer Application**			

1.	Course Code		
2.	Course Title	**C Programming Lab**	
3.	Course Type (Core / Elective / Generic Elective / Vocational / Lab / Practical / Project)	**Lab**	
4.	Pre-requisite (if any)	**10+2 Maths (opted as an elective by the students of Computer Application)**	
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to**: • Basic Concepts of programming • Build Logic • Knowledge of problem solving skills	
	Credit Value	**2 Credits**	
	Total Marks	Max. Marks : **40+60**	Min. Passing Marks: **35**

PART B: Content of the Course

No. of Lab. Practicals (in hours per week): 1 **Lab. per week (1 hr 25 mins)**

Total No. of Lab.: **30 Hrs.**

SNo	**Suggestive List of Practical**	**No. of Labs**
1	Basic C commands on computer	**30**
2	Write a program to check given year is leap or not	
3	Write a program to find maximum from given three number without using logical operator.	
4	Write a program to find area of a circle, rectangle, and square using switch-case.	
5	Write a program whether a given number is prime or not.	
6	Write a program to input 10 numbers add it and find its average.	
7	Write a program to generate even/odd series from 1 to 100.	
8	Write a program to create a pyramid structure	
9	Write a program to reverse a string.	
10	Write a program to find whether a given string is PALINDROME or not.	
11	Write a program to change the case of string.	
12	WAP to print Fibonacci series	
13	Write a program to generate a series 1+1/1!+2/2!+3/3!+---------- +n/n!	
14	Write a program to generate series 1+1/2!+1/3!+---------- +1/n!	
15	WAP to find length of string without using built in function.	
16	Write a program for call by value and call by reference.	
17	Write a recursive program to calculate factorial of a given number.	
18	Write a program to print sum of two matrices.	
19	Write a program to demonstrate different storage	
20	Write a program to demonstrate concept of command line argument.	
21	Write a program to demonstrate concept of structure.	
22	Write a program to draw Line, Circle, Rectangle by using built in function.	
23	Write a program to check given year is leap or not	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- D. Ravichandran, programming New Age International, 1996.

- E. Balaguruswamy, Tata McGraw Hill Pub.
- Computer Fundamentals and Programming in C by R.Thareja.

Suggestive digital platform web links

https://codeforwin.org/
http://learn-c.org/

Suggested equivalent online courses

https://nptel.ac.in/courses/106/105/106105171/
https://www.youtube.com/watch?v=OHCMfsNpqCc

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : 40 **Marks**		**External Assessment**: **60 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Hands-on Lab Practice	10 Marks	Practical record file	20 Marks
Viva	10 Marks	Viva voce practical	10 Marks
Lab Test from practical list	20 Marks	Table works/ Exercise Assigned /Execution (02) in practical exam	30 Marks
Total	**40 Marks**	**Total**	**60 Marks**