



# ST. ALOYSIUS COLLEGE (AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

## Faculty of Science

**BACHELOR OF SCIENCE (B.SC.) II SEMESTER**

**SUBJECT: COMPUTER SCIENCE**

**Paper: Elective**

**Programming Using C++ and Data Structure**

### Course Outcomes


CO. No.	Course Outcomes	Cognitive Level
CO 1	To develop simple algorithms and flow charts to solve a problem with programming using top-down design principles.	U, A
CO 2	To understand the concept of modular programming and object-oriented programming in C++	K
CO 3	To understand the concept of arrays and analyze constructors and destructors in a C++ program	U, A
CO 4	To get familiar with the concept of searching and sorting	U
CO 5	To understand the concept of queues and linked lists	U, A

### Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
<b>Theory</b>	3	40	60	<b>100</b>
<b>Practical</b>	1	40	60	<b>100</b>
<b>Total</b>	<b>4</b>		<b>200</b>	

### Evaluation Scheme

	Marks	
	Internal	External
<b>Theory</b>	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of the Semester)
<b>Practical</b>	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of the Semester)



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Bachelor of Science (B.Sc.)  
II Semester

Subject: Computer Science  
Paper: Elective, Programming Using  
C++ and Data Structure

## Content of the Course

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

Units	Topics	No. of Lectures
I	Basic of Programming, Steps in Programming development, Algorithm, Flowchart, Concept of Modular Programming, Introduction to C++, Structure of a C++ Program, Data Types, Operator in C++, C++ Stream Classes, Unformatted and Formatted I/O Operation, Managing Output with Manipulators, Scope Resolution Operator.	10
II	Functions In C++: The Main Function, Function Prototyping, Call by Address, Call by Value, Inline Function, Default Arguments, Function Overloading, Basics of OOPs: Features and Characteristics of OOPs, Classes & Objects: A Sample C++ Program with class, Defining Member Functions (Private & Public).	10
III	Arrays: Concept and types of Array, strings in C++, Concept of Constructor & Destructor, and Inheritance: Defining Derived Classes and Base Classes, Single Inheritance, Multiple Inheritance, Virtual Base Classes, Operator Overloading. Polymorphism: Virtual functions.	10
IV	Searching (linear & binary) and sorting (bubble sort, selection sort & insertion sorting), Data Structure: Basic concepts, Linear and Non-Linear data structures Stacks: Operations, Infix to Postfix Conversion, Infix to Prefix Conversion, Postfix Expression	15
V	Queues: Definition, Operations, Array and Linked Implementations. Circular Queue-Insertion and Deletion Operations, De-queue (Double Ended Queue), Priority Queue- Implementation. Linked Lists: Singly Linked Lists, Operations, Circularly linked lists- Operations Doubly Linked Lists- Operations, Doubly Circular Linked List.	15

## Reference

### Text Books:

- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015
- E. Balguruswamy, "C++ ", TMH Publication ISBN 0-07-462038-X
- Herbert Schildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7

### Reference Books:

- R. Lafore, 'Object Oriented Programming C++'
- N. Dale and C. Weems, "Programming and problem solving with C++: brief edition", Jones & Bartlett Learning.

### Suggestive digital platform web links

- <https://www.youtube.com/watch?v=BCIS40yzssA>
- <https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en>
- <https://www.youtube.com/watch?v=Umm1ZQ5ltZw>



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## List of Practical

16. Write a program to find area of a circle, rectangle, and square using switch case.
17. Write a program to convert decimal number into equivalent binary number.
18. Write a program to check given string is palindrome or not.
19. Write a program to print digits of entered number in reverse order.
20. Write a program to print sum of two matrices.
21. Write a program whether a given number is even or odd
22. Write a program to find factorial of any n entered number.
23. Write a program to find the area and volume of a rectangular box using constructor.
24. Write a program to implement single inheritance.
25. Write a program to find largest element from an array.
26. Write a program to implement push and pop operations on a stack
27. Write a program to perform insert and delete operations on a queue
28. Write a program for linear search.
29. Write a program for Selection sort.
30. Write a program to implement linked list.



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