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 Computer Application
BCA II Semester
Paper-Major
Programming Using C++ and Data Structure

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	Develop simple algorithms and flow charts to solve a problem with programming using top down design principles.	U
CO 2	Writing efficient and well-structured computer algorithms/programs.	Apply
CO 3	Learn to formulate iterative solutions and array processing algorithms for problems.	Apply, Analyze
CO 4	Use recursive techniques, pointers and searching methods in programming.	Create, Apply
CO 5	Will be familiar with fundamental data structures, their implementation; become accustomed to the description of algorithms in both functional and procedural styles.	Apply
CO 6	Have knowledge of complexity of basic operations like insert, delete, search on these data structures.	Apply, Analyze
CO 7	Possess ability to choose a data structure to suitably model any data used in computer applications.	Apply

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100
Practical	2	40	60	100
Total	6	200		

Evaluation Scheme

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

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BCA II Semester   **Paper-Major**

Programming Using C++ and Data Structure
Theory

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	**Basics of OOPs:** Features and Characteristics of OOPs, History of C++, Application of C++, Data Types, Operator in C++, C++ Stream Classes, Unformatted and Formatted I/O Operation, Managing Output with Manipulators, Scope Resolution Operator.	12
II	**Functions In C++:** The Main Function, Function Prototyping, Call by Reference Call by Address, Call by Value, Return by Reference, Inline Function, Default Arguments, Constant Arguments, Function Overloading. **Classes & Objects:** A Sample C++ Program with class, Defining Member Functions (Private & Public), Static Data Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions.	12
III	**Arrays:** Representation of single, two-dimensional arrays **Constructor & Destructor:** Constructor, Constructors with Default Arguments, Parameterized Constructor, Copy Constructor, Multiple Constructors in a Class, Destructor. **Searching** (linear & binary) and **sorting** (bubble sort, selection sort & insertion sorting)	12
IV	**Inheritance:** Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Operator Overloading. **Polymorphism:** Virtual functions. Pointers, Exception Handling	12
V	**Data Structure:** Basic concepts, Linear and Non-Linear data structures **Stacks:** Operations, Array and Linked Implementations, Applications- Infix to Postfix Conversion, Infix to Prefix Conversion, Postfix Expression Evaluation. **Queues:** Definition, Operations, Array and Linked Implementations. Circular Queue-Insertion and Deletion Operations, Dequeue (Double Ended Queue), Priority Queue-Implementation. **Linked Lists:** Singly Linked Lists, Operations, Circularly linked lists-Operations Doubly Linked Lists- Operations, Doubly Circular Linked List.	12

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

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BCA II Semester   **Paper-Major**

Programming Using C++ and Data Structure
List of Practical

1. Write a program to find area of a circle, rectangle, square using switch case.

2. Write a program to convert decimal (integer) number into equivalent binary number.

3. Write a program to check given string is palindrome or not.

4. Write a program to print digits of entered number in reverse order.

5. Write a program to print sum of two matrices.

6. Write a program whether a given number is prime or not.

7. Write a program to check entered number is Armstrong or not.

8. Write a program to find the area and volume of a rectangular box using constructor.
9. Write a program to implement single inheritance.

10. Write a program to find largest element from an array.

11. Write a program to implement push and pop operations on a stack using array.
12. Write a program to perform insert and delete operations on a queue using array.

13. Write a program for Linear search.

14. Write a program for Binary search.

15. Write a program for Bubble sort.

16. Write a program for Selection sort.

17. Write a program for Insertion sort.

18. Write a program to implement linked List.