**Institute of Information Technology & Management, New Delhi**

**Lesson Plan for C++ Lab**

**Programme: BCA Semester: III (M2) Paper Code: 253 Academic Year: August 2022**

Date of commencement of classes: 23rd July’ 2007

No of hours allotted to complete the syllabi\*: 44

**Course Objective:**

* To gain knowledge of objects, Class, Data Abstraction, Encapsulation, Inheritance, Polymorphism and Dynamic Binding.
* To know about constructing programs using Bottom-up design approach.
* The objectives of the course are to have students identify and practice the object-oriented programming concepts and techniques, practice the use of C++ classes and class libraries, develop C++ classes for simple applications, and practice the concepts of Object-Oriented programming.

**Course Outcomes:**

**CO1:** To be able to prepare object-oriented design for small/medium scale problems.

**CO2:** To demonstrate the differences between traditional imperative design and object- oriented design.

**CO3:** To understand class structures as fundamental, modular building blocks

**CO4:** To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code

**CO5:** To write small/medium scales C++ Project.

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| **Course Outcomes** | **Programme Outcomes** | | | | |
|  | **PO1**  **Core Subject knowledge** | **PO2**  **Enquiry-based learning** | **PO3**  **Cognitive skills and critical thinking** | **PO4**  **Communication, Adaptive & Interactional Skills** | **PO5**  **Holistic Outlook** |
| **CO1** | **✓** |  |  | **✓** |  |
| **CO2** | **✓** |  | **✓** |  |  |
| **CO3** | **✓** |  | **✓** |  |  |
| **CO4** | **✓** | **✓** | **✓** | **✓** |  |
| **CO5** |  | **✓** | **✓** | **✓** | **✓** |

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| **Lab No** | **Unit No** | **Application Area/Functionality/ Concept on which practical is based** | **Problem Statement** | **No. of SessionsAllotted** |
| L1 | I | If-else construct, loops, Arrays and Pointers  Cin, cout, new and delete operators, Reference variable, class | 1. **WAP to check whether the number is prime or not.** 2. **WAP to find the reverse of an inputted number.** 3. **WAP to find the sum of the digits of a number.** 4. **WAP to find the factorial of a number.** 5. **WAP to print Fibonacci series** 6. **WAP for matrix addition, subtraction and multiplication.** | 4 |
| L2 | I | Structures, Strings in c++ | 1. **W AP to create a structure Student and add functions to read and show details.** 2. **W AP to find the length of a string.** 3. **W AP to concatenate two strings using your defined Function.** | 4 |
| L3 | I,II | Class, Constructor, Destructor, Default Parameter, Polymorphism – function overloading | 1. **W AP to show the working of a class Student add functions to read and show details.** 2. **W AP to define a class circle and add functions to perform following tasks. Read, display and calculate area.** 3. **W AP to overloaded function area ( ) for calculating the area of triangle and circle** 4. **W AP to create Student class and add constructors, other functions and destructor.** 5. **W AP a program to demonstrate constructor function overloading.** | 4 |
| L4 | II | Polymorphism-Operator overloading | 1. **W AP to create class DISTANCE and overload Binary + operator to add objects. Use member functions.** 2. **W AP to create class COMPLEX and overload Binary + operator to add objects. Use member functions.** 3. **W AP to create class COMPLEX and overload Binary + operator to add objects. Use friend functions.** 4. **WAP to overload binary < operator to compare two objects of user defined English Distance Class.** 5. **Write a program to define object to int conversion for class distance using operator overloading. (Consider all values converted to inches for assignment to integer variable)** | 4 |
| L5 | II | Polymorphism-Operator overloading | 1. **WAP to overload binary + operator to concatenate two objects of user defined class String.** 2. **WAP to overload binary +operator to add two objects of user defined Time class with data members HH MM SS.** 3. **W AP to show overloading of ++operator.** 4. **W AP to show overloading of ( )operator.** 5. **W AP to show overloading of [ ]operator.** | 4 |
| L6 | II | Inheritance | 1. **W AP to demonstrate the working of virtual function.** 2. **WAP to demonstrate the concept of Inheritance use person and student class for the same** | 2 |
| L7 |  | Exception Handling | 1. **W AP to implement a class Stack that throws Overflow and Underflow Exceptions.** 2. **W AP to implement a class Customer that throws Negative Balance Exceptions.** | 2 |
| L8 | III | Template function and classes | 1. **W AP to implement template function that interchanges two data values.** 2. **W AP to implement a generic class Stack, add necessary constructors and other functions** | 2 |
| L9 | IV | File Handling and Stream Class Hierarchy | 1. **W AP that reads a text file.** 2. **W AP that writes paragraph to a text file.** 3. **W AP that writes Student records to a data file.** 4. **WAP that uses file pointer to display any arbitrary record from anpre existing file.** 5. **W AP that writes Student records to a data file. Read records based on name entered** | 4 |
| L10 | IV | Friend function and static | 1. **Friend function as a bridge between two classes rupee and dollar** 2. **Static data member and member function** | 2 |

**TEXT BOOKS:**

**T1:** Ashok N. Kamthane, “Object-Oriented Programming With Ansi And Turbo C++”, Pearson Education.

**T2:** A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.

**T3:** E. Balguruswamy, “C++ ”, TMH Publication ISBN 0-07-462038-x .

**REFERENCES:**

**R1:**MaheshBhave, “Object Oriented Programming with C++”, Pearson Education

**R2:** Bjarne Stroustrup , “The C++ Programming Language”, Addison Welsley, 3rd Ed.

**R3:**Schildt Herbert, “C++: The Complete Reference”, Tata McGraw Hill, 4th Ed., 1999.

**R4:** R. Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004

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