

**Savitribai Phule Pune University**  
**Second Year B.C.A. (Science) Semester IV**  
(To be implemented from Academic year 2017-18)

Course Code: BCA 401  
Total Contact Hours: 60hrs  
Total Marks: 100

Course Title: C++  
Total Credits: 04  
Teaching Scheme: Theory- 05 Lect. /Week

**Course Objectives:**

- ☐ Understand object oriented programming:
  - Be able to explain the difference between object oriented programming and procedural programming.
  - Be able to program using C++ features such as Class, objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
  - Be able to build C++ classes using appropriate encapsulation and design principles.
- ☐ Improve problem solving skills:
  - Be able to apply object oriented or non-object oriented techniques to solve bigger computing problems

**Prerequisites:** Knowledge of C Programming Language

Unit No	Contents	No Of Lectur
1.	<b>Introduction to C++</b> 1.1. Basics of C++, 1.2. Structure of C++ Program, keywords in C++, 1.3. Data types hierarchy in C++, 1.4. Operators in C++: Scope resolution operator, Insertion and Extraction operator New and Delete operators. 1.5. Reference variable. 1.6. Manipulators function: endl, setw, set fill, set precision.	[6]
2.	<b>Object oriented Concepts</b> 2.1. Object oriented concepts 2.2. Features, 2.3. Advantages and Applications of OOP 2.4. Difference between Procedure oriented programming and object oriented programming.	[2]

3.	<b>Classes and Objects</b> 3.1. Structure sand class, Class, Object, Access specifies, 3.2. Class members, 3.3. Defining member functions :Inside and outside the class definition, 3.4. Creating objects. String class, operation on string, Array of objects. 3.5. 'this' pointer.	[10]
4.	<b>Function in C++</b> 4.1. Call by reference, Return by reference, 4.2. Function overloading and default arguments 4.3. Inline function 4.4. Passing and returning objects from functions, Static class members 4.5. Friend Concept – Function, Class	[6]
5.	<b>Constructors and Destructors</b> 5.1. Memory allocation and static data members 5.2. Definition of constructor Types of constructors: Default Constructor 5.3. Constructor with default arguments 5.4. Parameterized Constructor 5.5. Copy Constructor 5.6. Overloaded constructors in a class 5.7. Destructors	[4]
6.	<b>Operator overloading</b> 6.1. Introduction, rules of operator overloading 6.2. Operator overloading: 6.3. Unary and binary operators, 6.4. Comparison, arithmetic assignment operator 6.5. Overloading new & delete operators 6.6. Overloading without friend function and using friend function,	[6]
7.	<b>Inheritance</b> 7.1. Introduction 7.2. Types of Inheritance: Single inheritance Multiple inheritance, Multilevel inheritance Hierarchical inheritance Hybrid inheritance. 7.3. Derived Class Constructor sand Destructors 7.4. Ambiguity in multiple Inheritances, virtual base classes, Abstract base class.	[8]

8. **Virtual Function & Polymorphism** [6]  
8.1. Introduction, Pointer to object, Pointer to derived  
8.2. class, Overriding member functions, Virtual function, Rules for virtual functions, pure virtual function, Run- time type information (RTTI)
9. **Working with files** [4]  
9.1. File operations – Text files, Binary files  
9.2. File stream class and methods  
9.3. File updation with random access  
9.4. Overloading insertion and extraction operator
10. **Templates** [5]  
10.1 Introduction function templates, function templates with multiple parameters  
10.2 Overloading of template functions, Class Templates, class template multiple Parameters, member function templates  
10.3 Introduction to Standard Template Library (STL)  
10.4 Components of STL  
10.5 Containers  
10.6 Algorithms  
10.7 Iterators  
10.8 Application of Container classes
11. **Exception handling** [3]  
11.1 Exception Handling Mechanism  
11.2 The try block  
11.3 The catch block  
11.4 Throw statement  
11.5 The try/throw/catch sequence
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**Reference Books:-**

1. Object Oriented Programming with C++ by Robert Lafore
2. Object Oriented Programming with C++ by E. Balagurusamy
3. The Complete Reference C++ by Herbert Schildt
4. Let us C++ by– Yashwant Kanitkar
5. Mastering C++ by Venugopal, TRavishankar, Rajkumar THM Pub.
6. Thinking in C++ 2nd Edition by Bruce Eckel, Prentice Hall Pub.