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Syllabus For S.Y.B.Sc. (Computer Science)
Paper: III- DATA STRUCTURE WITH C++
With Effective from: July 2005

:-Object Oriented Programming: C++:-

- 1. Introduction**
 - 1.1.Introduction to Object Oriented Programming
 - 1.2.C++ fundamentals

- 2. Classes and Objects**
 - 2.1.Classes
 - 2.2.Constructors and Destructors
 - 2.3.Inline functions
 - 2.3.1. Defining inline functions within a class
 - 2.4.Friend functions and classes
 - 2.5.Static class members
 - 2.5.1. Static data members and member functions
 - 2.6.Local and nested classes
 - 2.7.Passing objects to functions and returning objects form functions
 - 2.8.Object assignment

- 3. Arrays, Pointers, References and the Dynamic Allocation Operators**
 - 3.1.Arrays of objects
 - 3.2.References
 - 3.3.Dynamic allocation operators
 - 3.4.pointers to objects
 - 3.5.this pointer

- 4. Function overloading, copy constructor and Default arguments**
 - 4.1.Function overloading
 - 4.2.Overloading constructor function
 - 4.3.Copy constructor
 - 4.4.Default function arguments

- 5. Operator overloading**
 - 5.1.Creating a member Operator Function
 - 5.2.Operator overloading using friend functions
 - 5.3.Overloading new and delete
 - 5.4.Overloading some special operators

- 6. Inheritance**
 - 6.1.Base class Access control
 - 6.2.Inheritance and protected members
 - 6.3.Inheriting multiple base class
 - 6.4.Constructor destructors and inheritance

6.5.Virtual base class

7. Virtual functions and polymorphism

8. Templates

8.1.Generic functions

8.2.Applying generic functions

8.3.Generic classes

9. Exception handling

9.1.Exception handling fundamentals

9.2.Handling derived class exceptions

10. I/O system

10.1. Stream and stream classes

10.2. formatted I/O

10.3. FILE I/O

10.3.1. Opening and closing files

10.3.2. Reading and writing text files

10.3.3. Unformatted and binary I/O

-:Data Structure:-

11. Primitive Data Structure and Operations on them

12. Non primitive Data Structure

12.1. Arrays

12.1.1. Single and Multiple array

12.1.2. Storage representation

12.1.3. Operations

12.2. Stack

12.2.1. Operations on stack

12.2.2. Application in recursion, polish notation etc.

12.3. Queues

12.3.1. Types of Queue

12.3.2. Operation on Queue and Application

12.4. Linked Lists

12.4.1. Types of linked list

12.4.2. Operations on linked list and applications

12.5. Tree

12.5.1. Concept and definition of tree & operations

- 12.5.2. Binary tree, 2-3 tree, Height and Weight balanced tree
- 12.5.3. Linked and threaded representation of tree and applications

13. Sorting and Searching

- 13.1. Insertion sort, selection sort, Quick sort
- 13.2. Sequential Search
- 13.3. Binary Search

Recommended Reference Books:

1. The complete reference C++ : Herbert Schildt, TMH.
2. Object Oriented Programming in C++ : Robert Lafore - Galgotia Publication
3. C++: Effective Object Oriented Software Construction – Kayshav Dattari.
4. Object Oriented Programming using C++ - Addison Wesley.
5. Object Oriented Programming in C++ - Balaguruswamy.
6. Wirth, Nielaus, Algorithm + Data Structure Programs, Prentice Hall
7. Horwith E and Sahni S, Fundamental of Data Structure, Computer Science Press.
8. Knuth D, The Art of Computer Programming, Vol. 1-2, Addison – Wesley.
9. Aho A.V. Hopcroft and Jullman, Data Structure and Algorithm, Addison – Wesley.

NOTE : Practical shall be based on the above syllabus.