Hours: 4 /week   **Credits: 4**

Objected oriented Programming: C++

Unit – 1
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
    2.4. Friend functions and classes.
    2.5. Static class members.
    2.6. Local and nested classes.
    2.7. Passing objects to functions and returning objects from function.
    2.8. Object assignment.

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

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

Unit – 2
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 classes.
    6.4. Constructor destructors and inheritance
    6.5. Virtual base class

7. Virtual functions and polymorphism

8. I/O system
    8.1. Streams and stream classes.
    8.2. formatted I/O
    8.3. File I/O
        8.3.1. Opening and closing files.
        8.3.2. Reading and writing text files.
        8.3.3. Unformatted and binary I/O

-: DATA Structure:-

Unit – 3
9. Primitive Data Structures and Operations on them
10. Introduction to structure and pointer
11. Non- Primitive Data Structures
    11.1. Arrays
        11.1.1. Single and multiple array
        11.1.2. Storage Representation.
        11.1.3. Operations

    11.2. Sorting and searching.
        11.2.1. Insertion sort, selection sort, Quick sort
        11.2.2. Sequential Searches
        11.2.3. Binary Search

Unit – 4
    11.3. Stack
        11.3.1. Operation on Stack
        11.3.2. Application in Recursion, Polish notation etc.

    11.4. Queues
        11.4.1. Types of Queue
        11.4.2. Operation on Queue & Applications.

    11.5. Linked Lists
        11.5.1. Types of Linked List
        11.5.2. Operations on Linkes Lists & Applications.

Recommended Reference Books:-

1. Object Oriented Programming in C++: Robert Lafore – Galgotia Publication.
2. The complete reference C++ : Herbert Schildt, TMH.
3. C++ : Effective Object Oriented Software Construction – KayshavDattari.
4. Object Oriented Programming in C++ - Addition Wesley.
5. Object Oriented Programming in C++ - Balaguruswamy.
6. Wirth, Niclaus, Algorith+ Data Structure Programs, Prentice Hall.
7. Horwith E and Sahni S, Fundamental of Data Structure, Computer Science Press.
8. Knuth D., The Arts of Computer Programming Vol 1-2, Addition-Wessly.
9. Aho A.V., Hopcrott and Ullman, Data Structure and Algorithms , Addition-Wesslely.

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Visual Basic. NET

Unit : 1
1. Overview of Microsoft.NET Framework
    1.1 What is.NET Framework and it's benefits
    1.2 The Common Language Runtime (CLR), purpose of CLR
    1.3 Managed/Unmanaged code, Compilation & Execution
    1.4 Memory Management, Garbage Collection
    1.5 The. NET Framework class Library
    1.6 NET Web Services.
    1.7 Introduction to Ms Visual Studio. NET

2. VB.NET Programming Language.
    2.1 Data Types, Type Conversion Functions, Operators and Expressions.
    2.2 Variable Declaration: Levels, Lifetime, Scope and Accessibility.
    2.3 Array: Multidimensional, Jagged Array.
    2.4 Collections, User-Defined Data Types.
    2.5 Decision Structures
    2.6 Loop Structures: While, Do.. Loop, For.. Next, For Each…Next, with… End With.
    2.7 Nested Control Statements, Exit & End Statements
    2.8 Procedures.

Unit : 2
3. Console Applications
    3.1 Console Class
    3.2 Handling Strings, Characters and Dates

4. Designing User Interface
    4.1 Working with Forms
    4.2 Basic Windows Controls
    4.3 Menus, Timer, Common Dialog Controls, Rich Text Box.
    4.4 Tree View and List View Controls, Toolbar, Statusbar.
    4.5 SDI and MDI Applications.

Unit : 3

5. Object Oriented Programming
    5.1 Classes: Methods, Properties, Fields, Events.
    5.2 Overloading

       5.3 Constructors and Destructors

       5.4 Creating and Using Objects, Managing groups of objects

       5.5 Abstraction, Encapsulation & Polymorphism

6. Files IO Streams

       6.1 Directory and Directory Info class

       6.2 Path and File Info class

       6.3 Path and Environment class

       6.4 Sequential – Access File

       6.5 Random – Access File

       6.6 The File System Watcher Component

Unit : 4

7. Data Access

       7.1 History of Microsoft Data Access Technologies.

       7.2 Overview of ADO. NET

       7.3 The Server Explorer and Query Builder

       7.4 ADO.NET Object Model

       7.5 Programming with ADO.NET

8. Printing with VB.NET

       8.1 Print Document

       8.2 Print Dialog

       8.3 Page Setup Dialog

       8.4 Print Preview Dialog

       8.5 Print Preview Control

Reference Books:-

1. Mastering Visual Basic.NET
   By Evangelos Petroutsos – BPB
2. Professional VB.NET 2003, 2004 Edition
   By Bill Evjen, Billy Hollis, Rockford Lhotka et al. – Wrox , Wiley dreamtech
3. Visul Basic. NET Programming Bible
   By Bill Evjen, Jason Beres et al .–Wlleydreamtech
4. Visul Basic.NET How to Program, second Edition
   By H.M.Deitel, P.J. Deitel, T.R. Nieto-Person Education
   (Low Price Edition)
5. Database Access with Visul Basic.NET, Third Edition.
   By Jeffrey P. Mc Manus, Jackie Goldstein – Person Education
   (Low Price Edition)

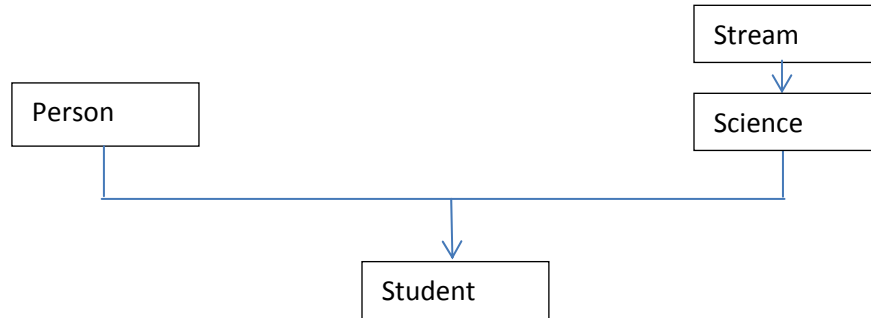**Hours: 6 /week**   **Credits: 2.5**
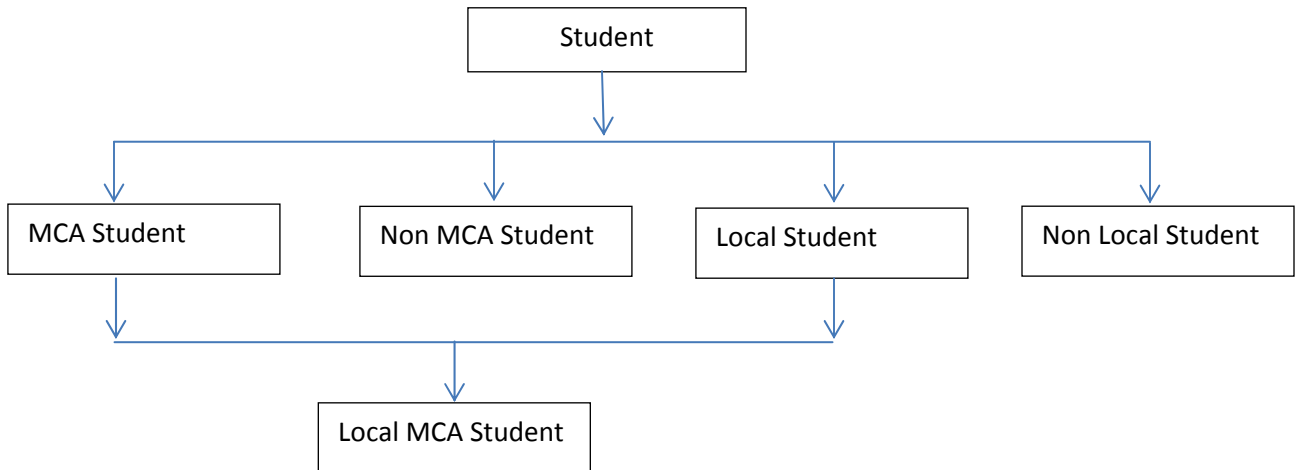
List of Practicals:
   C++ Practical List

1. Create a class called Temperature. User can give temperature in either Celsius or Fahrenheit. Output must be in both the form.

2. Create a class called Ballot_Paper to represent a ballot paper of 5 candidates.
      a. User can give vote for N ballots.
      b. If user gives vote to other than 1 to 5, the ballot is considered as   a spoilt ballot.
      c. Print the result of voting with spoilt ballot.

3. Define a class to represent a bank account having members A/c No, Name, A/c Type and balance.
      a. Design member function to open new account, deposit amount, Withdraw amount and display the account detail.
          (Minimum balance required is Rs. 500/-)

4. Define a class to represent M x N matrix.
      a. Overload +, - and * operators for matrix addition, subtraction and multiplication respectively.
      b. Matrix must be constructed dynamically.

5. Define a class to represent a String.
      a. Overload +, == and = operators for concatenation, comparison And copying of two Strings.

6. Define a class to represent a Date having member dd, mm and yy.
      a. Overload – and + for subtraction of one date from another and Addition of days to given date using friend operators functions.

7. Define a class called Time having member hh, mm and ss.
      a. Implement all requires constructors.
      b. Overloads operators ++, --, + and – for incrementing one second, decrementing one second, add and subtract two times respectively.

8. Define a class to represent Student.
      a. Implement requires constructors.
      b. Enter N student information and print their merit list in descending order.
      c. Create Swap function using reference variable for sorting purpose.

9. Define a class to represent employee having fields EmpCode, Name, Des, and Salary. Enter employees and print them in ascending order according to their names.
   a. (Don't use friend function)
   b. Overload > operator

10. Define a class called Circle (radius, area). Derive it to cylinder (height, volume), further derive the Cylinder into Colored Cylinder (color). Take an object of colored Cylinder and display Area, Volume and Color of it.

11. Define two classes Person (name, address, email) and Stream (description). Derive Science (subject) from Stream class. Derive Student (roll no, subject) from Person and science.

```
                                        ┌──────────┐
                                        │  Stream  │
                                        └────┬─────┘
                                             ↓
      ┌──────────┐                      ┌──────────┐
      │  Person  │                      │ Science  │
      └────┬─────┘                      └────┬─────┘
           │                                 │
           └──────────────┬──────────────────┘
                          ↓
                    ┌──────────┐
                    │ Student  │
                    └──────────┘
```

Write a program to enter data for 10 students and display the detail in tabular format.

12. Define class called list. Derive the classes stack and Queue from it. Define pure Virtual functions insert () and delete () in the class list, and override them to all its successors and implement dynamic polymorphism.

13. Create the class hierarchy as under.

```
                          ┌──────────┐
                          │ Student  │
                          └────┬─────┘
                               ↓
   ┌──────────────┬────────────┼────────────┬──────────────────┐
   ↓              ↓            ↓            ↓                  ↓
┌───────────┐ ┌────────────────┐ ┌───────────────┐ ┌───────────────────┐
│MCA Student│ │Non MCA Student │ │Local Student  │ │Non Local Student  │
└─────┬─────┘ └────────────────┘ └───────┬───────┘ └───────────────────┘
      │                                  │
      └───────────────┬──────────────────┘
                      ↓
              ┌────────────────────┐
              │ Local MCA Student  │
              └────────────────────┘
```

Write a program to enter 10 Local MCA Students, using constructor, and print the list of student.

14. Write a program which shows the use of various formatting ios functions and their equivalent manipulators. Create at least two manipulators of your choice.

15. Write a program to copy one file to another file, using command line arguments.

16. Write a program to read a text and replace "this "with "that" and write the output to another file.

17. Write a program to create binary file to store Employee details. Insert 10 records to that file and display the specific record as per the employee code.

❖ **Data Structure Practical List**

Array

1. Write a program to insert, Traversing, Delete, Sorting a single Dimension Array.
2. Write a program to Marge two array lists.
3. Write a program Insert, traversing, Delete, Sorting a 2-Dimension Array.
4. Write a program for Addition, Subtraction, Multiplication & Transpose of matrices.

Stack

5. Implement Stack by using static & dynamic storage representation.(Push, pop, peep, display, isempty, isfull,….)
6. Write a program to solve the Tower of Hanoi problem.(Using recursion & without Recursion).
7. Write a program to print n Fibonacci series (using recursion).
8. Write a program to find factorial of n number (using recursion).
9. Write a program to find GCD & LCD of two numbers (using recursion).
10. Convert decimal number into binary. (Using recursion).
11. Find X^N, i.e. power (x,n) (using recursion).
12. Write a program to convert infix expression into postfix expression.(Vice versa)
13. Write a program for evaluation of postfix expression.
14. Implement Double Stack, i.e. maintain two stacks in the same shared array.

QUEUE

15. Write a program for Single Queue operation (Insertion, Deletion, traversing (using static& dynamic storage representation).
16. Write a program for Circular Queue operations (Insertion, Deletion, traversing (using static& dynamic storage representation).
17. Write a program for Double Ended Queue operations (Insertion, Deletion, traversing (using static& dynamic storage representation).
18. Write a program for Priority Queue operations (Insertion, Deletion, traversing (using static& dynamic storage representation).

Link List

19. Write a menu driven program that implements singly linked list for the following operation: Create, Display, Insert, Delete, Search, Count, Copy, Concat, Reserve, Sort, Merge, Union, Insertion, etc.
20. Write a menu driven program that implements doubly linked list for the following operation: Create, Display, Insert, Delete, Search, Count, Copy, Concat, Reserve, Sort, Merge, Union, Insertion, etc.
21. Write a menu driven program that implements circular linked list for the following operation: Create Display, Insert, Delete, Search, Count, Copy, Concat, Reserve, Sort, Merge, Union, Insertion, etc.

SEARCHING & SORTING

22. WAP for linear Search (With Recursion & without Recursion)
23. WAP for binary Search (With Recursion &without Recursion)
24. WAP for implementation of Bubble Sort.
25. WAP for implementation of Insertion Sort.
26. WAP for implementation of Quick Sort.
27. WAP for implementation of Selection Sort.

❖ VB.NET Practical List

1. Write a program to calculate the sum of 100 natural numbers.
2. Write a program to calculate the sum of 100 odd numbers.
3. Write a program to display 'hello' in the text box when you click display hello button.
4. Write a color program that let's you choose a color from a menu and paint the program's widow with the selected color. The program also lets you select the size of the program's window from a menu.
5. Write a dialogs program using the msgbox statement and msgbox () function to display various button in dialog boxes.
6. Write program with using simple data control and store information with the help of text box and insert into selected table.
7. Write program to create random access file (the program lets you maintain a database file called phone.dat that keeps records of people and their phone numbers.
8. Write program to create status bar.
9. Write program in which the application provides convert exchange rate table for converting between u.s.dollor and the local currency of a selected country list and select a name.
10. The database version of the international currency exchange data from an access database file named currency.mdb (you can develop this file directly in Microsoft access or you can use the visual data manager add- in to create the database file.
11. Write a program by which you can add, delete, modify, and view the data from any table of access database with proper validation.
12. Prepare one complete from by which you can access another from. For that you can take an example of entering data of student's information in one from student's marks in other form these two from with another one on which display all information of students with marks and result.
13. Write a program of binary operator over loading.

14. Write a program using delegation in which addition and subtraction of two integer value possible.
15. Write a program using interface.
16. Write a program to create constructor and destructor of a class.
17. Write a program to demonstrate indexer.
18. Write a program for jagged array.
19. Write a program for to demonstrate Inheritance.
20. Write a program to display the caption, height of command button into label.
21. Write a window program for list box given the facility of adding, removing and clearing the list conformation and store the deleted file in another list box.
22. Create a window form through which user can details of employee:Empid, empname, basic, salary, sex, date of birth of joining, designation, total income, total deduction and gross salary will be calculated automatically.
23. Also in above program all details of employee will be appear in grid and depending upon selection particular actual record will be appear in form.