

<b>Effective communicators</b>  Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	<b>5 Written communication</b>  <b>6 Oral communication</b>  <b>7 Teamwork</b>
<b>Responsible</b>  Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	<b>10 Sustainability, societal &amp; environmental impact</b>

### Practical work:

1	Basics of programming	To understand how C++ improves C with object-oriented features.
2	<p><b>2.1</b> Write a program to calculate the area of circle, rectangle and square using function overloading.</p> <p><b>2.2</b> Write a program to demonstrate the use of default arguments in function overloading.</p> <p><b>2.3</b> Write a program to demonstrate the use of returning a reference variable.</p>	To learn how to overload functions and operators in C++.
3	<p><b>3.1</b> Create a class student which stores the detail about roll no, name, marks of 5 subjects, i.e. science, Mathematics, English, C++. The class must have the following:</p> <ul style="list-style-type: none"> <li>• Get function to accept value of the data members.</li> <li>• Display function to display values of data members.</li> <li>• Total</li> </ul>	To learn how to design C++ classes for code reuse.

	<p>function to add marks of all 5 subjects and store it in the data members named total.</p> <p><b>3.2</b> Create a function power() to raise a number m to power n. the function takes a double value for m and int value for n, and returns the result correctly. Use the default value of 2 for n to make the function calculate squares when this argument is omitted. Write a main that gets the values of m and n from the user to test the function.</p> <p><b>3.3</b> Write a basic program which shows the use of scope resolution operator.</p> <p><b>3.4</b> Write a C++ program to swap the value of private data members from 2 different classes.</p>	
<b>4</b>	<p><b>4.1</b> Write a program to illustrate the use of this pointer.</p> <p><b>4.2</b> An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case a number is read outside the range of 1 to 5, the ballot should be considered as a ‘spoilt ballot’ and the program should also count the number of spoilt ballots.</p> <p><b>4.3</b> Write a program to call member functions of class in the main function using pointer to object and pointer to member function.</p>	To learn how to design C++ pointers
<b>5</b>	<p><b>5.1</b> Using friend function find the maximum number from given two numbers from two different classes. Write all necessary functions and constructors for the program.</p> <p><b>5.2</b> Using a friend function, find the average of three numbers from three different classes. Write all necessary member functions and constructor for the classes.</p> <p><b>5.3</b> Define currency class which contains rupees and paisa as data members. Write a friend function named AddCurrency() which add 2 different Currency objects and returns a Currency object. Write parameterized constructor to initialize the values and use appropriate functions to get the details from the user and display it.</p> <p><b>5.4</b> Create Calendar class with day, month and year as data members. Include default and parameterized constructors to initialize a Calendar object with a valid date value. Define a function AddDays to add days to</p>	To learn how to implement constructors and class member functions.

	<p>the Calendar object. Define a display function to show data in “dd/mm/yyyy” format.</p>	
6	<p><b>6.1</b> Create a class named ‘String’ with one data member of type <code>char *</code>, which stores a string. Include default, parameterized and copy constructor to initialize the data member. Write a program to test this class.</p> <p><b>6.2</b> Write a base class named <code>Employee</code> and derive classes <code>Male</code> employee and <code>Female Employee</code> from it. Every employee has an id, name and a scale of salary. Make a function <code>ComputePay</code> (in hours) to compute the weekly payment of every employee. A male employee is paid on the number of days and hours he works. The female employee gets paid the wages for 40 hours a week, no matter what the actual hours are. Test this program to calculate the pay of employee.</p> <p><b>6.3</b> Create a class called <code>scheme</code> with <code>scheme_id</code>, <code>scheme_name</code>, <code>outgoing_rate</code>, and message charge. Derive customer class from <code>scheme</code> and include <code>cust_id</code>, <code>name</code> and <code>mobile_no</code> data. Define necessary functions to read and display data. Create a menu driven program to read call and message information for a customer and display the detail bill.</p>	<p>To learn how to implement copy constructors and class member functions.</p>
7	<p><b>7.1</b> Write a program with use of inheritance: Define a class <code>publisher</code> that stores the name of the title. Derive two classes <code>book</code> and <code>tape</code>, which inherit <code>publisher</code>. <code>Book</code> class contains member data called <code>page_no</code> and <code>tape</code> class contains <code>time</code> for playing. Define functions in the appropriate classes to get and print the details.</p> <p><b>7.2</b> Create a class <code>account</code> that stores customer name, account no, types of account. From this derive classes <code>cur_acc</code> and <code>sav_acc</code> to include necessary member function to do the following:</p> <ul style="list-style-type: none"> <li>• Accepts deposit from customer and update balance</li> <li>• Compute and Deposit interest</li> <li>• Permit withdrawal and Update balance.</li> </ul> <p><b>7.3</b> Write a base class named <code>Employee</code> and derive classes <code>Male</code> employee and <code>Female Employee</code> from it. Every employee has an id, name and a scale of salary. Make a function <code>ComputePay</code> (in hours) to compute the weekly payment of every employee. A male employee is paid on the number of days and hours he works. The female employee</p>	<p>To learn how containment and inheritance promote code reuse in C++.</p>

	<p>gets paid the wages for 40 hours a week, no matter what the actual hours are. Test this program to calculate the pay of employee.</p>	
8	<p>8.1 Create a class vehicle which stores the vehicleno and chassisno as a member. Define another class for scooter, which inherits the data members of the class vehicle and has a data member for a storing wheels and company. Define another class for which inherits the data member of the class vehicle and has a data member for storing price and company. Display the data from derived class. Use virtual function.</p> <p>8.2 Create a base class shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data() to initialize the base class data members and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine this function in the derived class to suit their requirements.</p> <p>8.3 Write a program to demonstrate the use of pure virtual function. 8.4 For multiple inheritance, write a program to show the invocation of constructor and destructor.</p> <p>8.5 Create a class string with character array as a data member and write a program to add two strings with use of operator overloading concept.</p> <p>8.6 Create a class distance which contains feet and inch as a data member. Overhead ==, &lt;and&gt; operator for the same class. Create necessary functions and constructors too.</p>	<p>To learn how inheritance and virtual functions implement dynamic binding with polymorphism.</p>
9	<p>9.1 Create a class MATRIX of size mxn. Overload + and - operators for addition and subtraction of the MATRIX.</p> <p>9.2 Define a class Coord, which has x and y coordinates as its data members. Overload ++ and - operators for the Coord class. Create both its prefix and postfix forms.</p> <p>9.3 Create one class called Rupees, which has one member data to store amount in rupee and create another class called Paise which has member data to store amount in paise. Write a program to convert one amount to another amount with use of type conversion.</p>	<p>To learn how to overload functions and operators in C++.</p>

	9.4 Create two classes Celsius and Fahrenheit to store temperature in terms of Celsius and Fahrenheit respectively. Include necessary functions to read and display the values. Define conversion mechanism to convert Celsius object to Fahrenheit object and vice versa. Show both types of conversions in main function.	
10	10.1 Write a program to create a function template for finding maximum value contained in an array. 10.2 Write a program to create a class template for the ‘Array’ class. 10.3 Create a template for the bubble sort function. 10.4 Write a program to illustrate the use of insertion and extraction operators for Text mode Input/Output.	To learn how to design and implement generic classes with C++ templates.
11	11.1 Write a program to illustrate the use of put(), get() and getline() functions for Text mode Input/Output. 11.2 Write a program to illustrate the use of read() and write() functions for Binary mode Input/Output. 11.3 Write a program to illustrate the use of manipulators in file handling. 8. Write a program to illustrate the use of file pointer manipulation functions. 11.4 Write down a program to Copy source file ‘source.txt’ to destination file. 11.5 A file contains a list of telephone numbers in the following format: a) Ram 47890 b) Krishna 878787 c) ----- d) ----- The names contain only one word and the names and telephone numbers are separated by white space. Write a Program to read the tel.dat file and display the content. The names should be left justified and the number right-justified.	To learn how to design and implement files with C++.