GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3160922
Semester – VI
Subject Name: Object Oriented Programming

Type of course: Open Elective

Prerequisite: Basic Programming Concepts

Rationale: This course is an introductory course in Object Oriented Programming (OOP). The fundamental concepts of OOP will be studied using the C++ programming language. OOP has become a fundamental part of software development. OOP facilitates reuse of code, flexibility and effective problem solving. This course introduces standard tools and techniques for software development, using object oriented approach.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (V)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	20	30	150

Content:

Sr. No.	Content	Total Hrs
1	**OOP Concepts** : Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Applications of OOP	2
2	**Expression and Statements** : Data types, Expression, control statements and Iteration, typecasting	3
3	**Arrays and Functions** : 1D and 2D arrays, passing data to functions, scope and visibility of variables in functions, inline function, default arguments	5
4	**Classes** : Basics of object and class in C++, access specifiers - private and public members, static data members, class scope, constructors and their types, destructors, operator overloading, scope operator,	6
5	**Overloading** : Function overloading, Operator overloading, Type conversion	3
6	**Inheritance** : Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding,	4
7	**Exception Handling :** Introduction to exception, try-catch-throw, multiple catch, catch all, rethrowing exception, implementing user defined exceptions	2
8	**I/O and File management** : Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream,	3

Reference Books:

1 Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia
2 The Compete Reference C++, Herbert Schlitz, TMH
3 Object Oriented Programming With C++, E Balagurusamy, TMH
4 C++ Programming, Black Book, Steven Holzner, dreamtech
5 C++ Primer Stanley B Lippman, Josée Lajoie, Barbara E. Moo

Course Outcomes (CO):

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Sr. No.	CO statement	Marks % weightage
1	Understand Object Oriented Programming concepts and basic characteristics of C++	**20**
2	Differentiate between object oriented and procedure-oriented methodology.	**10**
3	Understand the concept of function and overloading	**20**
4	Know the principles of data encapsulation, inheritance, polymorphism, access specifiers, exceptions	**35**
5	Know the concept of streams	**15**

List of Experiments:

1.	Write a program that will allow computer to be used as an ordinary calculator. Consider only common arithmetic operations.(+, -, *, /) The program should display a menu showing the different options available. Do using if and also using switch statements.
2.	Write a program to arrange an array of N elements into ascending order
3.	Write a program to demonstrate the use of Scope Resolution Operator:: with variable name.
4.	Write a program to demonstrate the use of Manipulators (setw () and endl).
5.	Write a program which calculates volume of cube, cylinder, and rectangular box. (Use function overloading).
6.	Create a class SPACE having three member data x(int),y(int),z(int).overload the unary '-' operator for the class SPACE.
7.	Create a class Box whose default constructor initializes the dimensions length, width and height of the box. The main method is to be created for the above class that creates a Box object of dimension 3.89 cm, 2.1 cm and 1.5 cm. compute the volume of this box.
8.	Write a program to create a copy constructor. A constructor should be created, then a second constructor should be created which should have values of the previous constructor.
9.	Write a simple program that multiplies two numbers and then also divides the two numbers.(Use Inline Functions)
10.	Create a class called ITEM that has separate member data for item number(int) and item cost(float).Include the following member functions: • setdata( )to set these values to predefined values in the program • getdata( )to get these values from the user • putdata( ) to display these values.
11.	Write a program to demonstrate the use of static member data and static member function.
12.	Define a class to represent a bank account. include the following members: **Data members :** 1) name of the depositor 2) account number 3) type of account 4) balance amount in the account **Member functions:** 1) to assign initial value 2) to deposite an amount 3) to withdraw an amount after checking the balance 4) to display name and balance Write a main function to test the program.
13.	Implement Student class having proper member variables and functions for the following : • To input marks of 5 subjects. • Check whether or not student is pass. (above 40 marks is required to pass) • Check grade of student

	If percentage is >=70 then A grade >=60 and <70 then B grade >=50 and <60 then C grade >=40 then D grade • Display whole result of a given student Write main program to create such, n objects for n students and enter information for all students. Write a function to display information of all students who are PASS. Write a function to display information of those students who are FAIL. Also write a function to Display information of first 3 ranker students.
14.	Implement a string class containing the following functions. • Overloaded + operator function to carry out the concatenation of strings. • Overloaded = (assignment) operator function to carry out string copy. • Function to display the length of a string. • Function to overload comparison operator (= =) for two strings.
15.	Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks: • Accept deposit from a customer and update the balance. • Display the balance. • Compute and deposit interest. • Permit withdrawal and update the balance. • Check for the minimum balance, impose penalty, necessary, and update the balance.
16.	Create a class called TIME that has separate member data for hour(int) and minutes(int). Include the following member functions: • setdata( )to set these values to predefined values in the program • getdata( )to get these values from the user • putdata( ) to display these values. • add_time( ) to add two time objects to a third time object (e.g. T3.add_time(T1,T2). • Make new function to return a time object after addition of object passed as argument with the calling object, so that the function works as follows: T3=T1.add_time(T2).
17.	Write a program with the following: • A function to read two double type numbers from keybord. • A function to calculate divison of these two numbers. • A try block to throw an exception when a wrong type of data is keyed in . • A try block to detect and throw an exception if the condition “divide by zero ” occurs. • Appropriate catch block to handle the exception thrown.
18.	WAP in c++ to convert lowercase to uppercase from a file.