

Subject Code: 1ET1030301	Subject Title: Object Oriented Programming with C++
Pre-requisite	Knowledge of C Language, Fundamentals of Programming

Course Objective:

This course aims to describe Object Oriented Programming concepts with the help of methods and classes present in C++. The subject integrates the basics of C++, Objects and classes, inheritance, Polymorphism, file handling and the advanced features like Exception and templates. Introduce different techniques pertaining to problem solving skills. The object oriented approach aims to develop the product based and customized based application on demand.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	70	30	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Fundamental of OOP: What is OOP? Procedure oriented vs. Object Oriented Programming, basic concept of OOP, Application and Benefits of OOP.	2	5%	
2	C++ Environment What is C++? C vs C++, Structure of C++ Program, Working with C++.	2	5%	
3	Getting started with Programming in C++: Tokens, Keywords, Identifiers and constants, data types, basic input/output statement, Operator in C++, Other Operators: Scope resolution Operator, Member dereferencing operator, Memory Management Operator, Type Cast Operator etc.	4	10%	
4	Functions in C++: Introduction about function, Parameter Passing, Return by reference, Default Arguments, Inline Function, Function Overloading, Friend function and Virtual Function, Math library functions	6	18%	
5	Classes and Object: Introduction of Class and Object, Defining member function, Class access modifier, Class Programming, Static data member and static member function, constructor, destructor, Operator Overloading, Type Conversion	8	25%	
6	Inheritance: Introduction to inheritance, Types of Inheritance: Single, Multiple, Multilevel, Hybrid, Hierarchical, Virtual base class and polymorphism, Abstract Classes.	6	18%	
7	File and Exception Handling: File Management concept, Stream classes, File Management functions, Basic of Exception Handling, Exception handling mechanism	4	12%	
8	Templates: Class templates, Class templates with Multiple Parameters, Function templates, Function templates with multiple parameters.	2	7%	

Course Outcome:

Upon completion of this course, students should be able to:

1. Describe the object oriented programming concept.
2. Develop elementary C++ programs.
4. Implements C++ programs using concept of operators.
5. Apply concept of control structures in C++ program.
6. Write object oriented program using object and classes.
7. Implement features of oops like inheritance, polymorphism in C++ program.
8. Understand the file, exception handling concept and template classes.
9. Develop simple application by combining various features of C++.

List of References:

1. Object Oriented programming with C++ – E Balagurusamy, McGraw Hill
2. The C++ Programming Language Bjarne Stroustrup
3. C++ How to Program by Paul Deitel , Harvey Deitel
4. Let us C++ by Yaswant Kanitkar
5. C++ Black Book by Steven Holzner
6. C++ Primer Plus by Stephen Prata

e-Resource:

1. <http://www.cprogramming.com/>
2. <https://www.programiz.com/cpp-programming>
3. <https://www.tutorialspoint.com/cplusplus/>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

Sr.No	Practical Exercise
1.	Write a simple program to perform arithmetic operation using three variables.
2	Write a program to calculate the monthly telephone bills as per the following rule: Minimum Rs. 200 for upto 100 calls. Plus Rs. 0.60 per call for next 50 calls. Plus Rs. 0.50 per call for next 50 calls. Plus Rs. 0.40 per call for any call beyond 200 calls.
3	Write a function that receives two numbers as an argument and display all prime numbers between these two numbers.
4	Write a C++ program to sort an array of integer in ascending order using a function called exchange () which accepts two integer arguments by reference.
5	Write a program to find maximum out of three number using inline functions. Also aim to display number of object created.
6	Write a program to implement power function using Function overloading.
7	Create class fruit with at least three data member. Initialize the Class members using constructor and display the details of at least 5 fruits.

8	Write the definition for a class called time that has hours and minutes as integer data members. The class has the following member functions. time(int, int) and time() to set the specified value of object. void showtime() to display time object. Create friend function time sum(time,time) to sum two time object. 1. Write the definitions for each of the above member functions. 2. Write main function to create three time objects. Set the value in two objects and call sum () to calculate sum and assign it in third object. Display all time objects.
9	Create a 'MATRIX' class of size m X n. Overload the '+' operator to add two MATRIX objects. Write a main function to implement it.
10	Create a 'STRING' class which overloads '=' operator to compare two STRING objects.
11	Write a C++ program: a) To illustrate single inheritance. b) To illustrate multilevel inheritance. c) To illustrate multiple inheritance
12	Create a base class called 'SHAPE' having two data members of type double member function get-data() to initialize base class data members pure virtual member function display-area() to compute and display the area of the geometrical object. Derive two specific classes 'TRIANGLE' and 'RECTANGLE' from the base class. Using these three classes design a program that will accept dimension of a triangle / rectangle interactively and display the area.
13	Write a C++ program that read the content from one file and writing the data into another. The name of the file is specified as command line argument.
14	Write a C++ program to demonstrate the concept of Exception Handling.
15	Write a program to swap the numbers using the concept of function template