

Department/Institute Name	Department of Computer Science and Engineering / Chitkara University Institute of Engineering & Technology		
Program Name	BE -Computer Science and Engineering		
Course Code	CSP2201		
Course Name	Object Oriented Programming Lab		
Labs (per week)	0-0-8	Course Credits	4
Course Coordinator Name	Er. Tanya Gera		

1. Course Objectives

1. To demonstrate the use of inconceivable features of Object Oriented Programming approach such as code re-usability, code-extensibility, testability and increased quality.
2. To compute and compare the efficiency and performance of various programming paradigm.
3. To apply the conceptual knowledge to build a prototype of real life applications.
4. To define their own Templates and implement the generic programming
5. To enhance the efficiency of existing programs using Standard Template Library.
6. To formulate the practical utility of object oriented programming.

2. Recommended Books

RB1: 'Object Oriented Programming with C++' by E Balagurusamy, 4th Edition, Tata McGraw Hill.

RB2: Object Oriented Programming in C++' by Robert Lafore, Third Edition, Galgotia 2008.

RB3: The Complete Reference C++' by Herbert Schildt , Tata McGraw Hill.

RB4: Stroustrup, Bjarne, the C++ Programming Language, Pearson Education.

3. Other readings and relevant websites

S. No.	Link of Journals, Magazines, websites and Research Papers
1	http://www.cprogramming.com/tutorial/c++-tutorial.html
2	http://www.cplusplus.com/doc/tutorial/
3	http://www.tenouk.com/cncplusplusutorials.html
4	http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-088-introduction-to-c-memory-management-and-c-object-oriented-programming-january-iap-2010/

4. Recommended Tools and Platforms:

GCC compilers, Hackerank and Hackerearth.

5. Lab Plan:

S. No.	Program Detail
1	Introduction to class and object.
2	Implementation of function overloading and inline function.
3	Implementation of access specifier.
4	Implementation of constructor and destructor.
5	Implementation of operator overloading.

6	Implementation of Inheritance.
7	Implementation of Polymorphism.
8	Implementation of Exception Handling and templates.
9	Implementation and usages of STL.
10	Implementation of File Handling.

* Annexure 1 gives the list of reference program corresponding to above mention topics.

Annexure 1

Topic	S. No	Program Detail
Introduction to class and object	1	Write a C++ program to swap the values of two variables using Call by value and Call by reference mechanism.
	2	Design a class called "Complex" that represents complex numbers. The class should contain data members that stores real and imaginary parts. Moreover, it should contain member functions that can implement the elementary operations (Addition, Subtraction, Multiplication and division) of two complex numbers. Furthermore, the class should contain Print() member function that print complex numbers and the result of elementary operation on the screen in the form a + ib.
	3	Write a program to calculate the age of a person and height in cms when year of birth and height in meters is known. //write code here int main() { person_data p1("Ram",1975,1.05); p1.cal_age(2016); p1.cal_ht_cms(); p1.show(); return 0; } Expected Output: Approximate age of a person: 41 Age in cms: 105
Function overloading and inline function	4	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
Friend function/class	5	Create a class 'COMPLEX' to hold a complex number. Write a friend function to add two complex numbers. Write a main function to add two COMPLEX objects.
Constructor and destructor	6	Write Program to demonstrate use of constructors and destructors for performing dynamic operations //write code here int main() { data d1("obfuscation"); data d2("obstruction"); d1.show(); d2.show(); d1.compare(d2); return 0; } Expected output: Data 1= Obfuscation Data 2= Obstruction

		Both Objects have different text Release memory allocated to Obfuscation Release memory allocated to Obstruction
		Create a class called 'TIME' that has three integer data members for hours, minutes and seconds constructor to initialize the object to zero constructor to initialize the object to some constant value member function to add two TIME objects member function to display time in HH:MM:SS format Write a main function to create two TIME objects, add them and display the result in HH:MM:SS format.
Operator overloading	7	Write a C++ program to overload unary operator ++ and – to work with counter class object. The counter class should have one data member as count.
	8	Write a C++ program to add, subtract and multiply two matrices using operator overloading.
	9	Alisha always gets confused with the operators used with strings. When she has to concatenate two strings suppose string1 and string2, she used to write string1+string2. And when she has to compare whether the two strings are equal or first string is greater or smaller than string 2 again she writes like string1==string2 ,string1>strin2 and string1<string2. Which gives the error in program as these operators does not work with strings directly. So, help out her to work these operators with strings directly.
Inheritance and Polymorphism	10	Write a c++ program to create a super class named as figure. Derive two classes from super class named as rectangle and triangle. Create a member function of same name in all the three classes which will calculate area of shapes by making member function of super class as virtual.
	11	A company pays its employees weekly. The employees are of three types: Salaried employees are paid a fixed weekly salary regardless of the number of hours worked, commission employees are paid a percentage of their sales and base-salary-plus-commission employees receive a base salary plus a percentage of their sales. For the current pay period, the company has decided to reward base-salary-plus-commission employees by adding 10 per cent to their base salaries. The company wants to implement a C++ program that performs its payroll calculations polymorphically.
	12	Distinguish early binding from late binding with use of C++ program.
	13	A university with different departments where each department has number of employees working for university. The Head office personal wants to access information of employees of a particular department from respective department clerk where clerk is same name used by each department. How information could be gathered by concept of polymorphism.
Template Exception Handling	14	Implementation of bubble sort using templates.
	15	Implementation of exception handling.
	16	Start with the person class, and create a multiset to hold pointers to person objects. Define the multiset with the compare function object, so it will be sorted automatically by name of persons. Define half dozen persons, put them in the multiset, and display its contents. Several of the persons should have the same name, to verify that the multiset stores multiple objects with the same key.
STL	17	Mr. Khana, a sale manager in Ford Company has records of his customer that includes person name, city address, car name, car model and of purchase. He wants to store all this information in suitable format so write a program to store this information in suitable format and perform following operations: Print name of all employee who purchase same car in same year Year and count in which maximum number of car Display data in chronological order
	18	a) Start with a list of int values. use two normal (not reverse) iterators ,one moving forward through the list and one moving backward ,in a while loop, to reverse the contents of the list. you can use the swap() algorithm to save a few statements.(make sure your solution works for both even and odd number of items). b) Use the copy () algorithm to copy sequences within a container. However, you must be careful when the destination sequence overlaps the source sequence. write a program that lets you copy any sequence to a different location within an array ,using copy(). Have the user enter values for first1, last1 and first2.use the program to verify that you can shift a sequence that overlaps its destination to the left, but not to the right. (For example, you can shift several items from 10 to 9, but not from 10 to 11) this is because copy() starts with the leftmost element.

File Handling	19	Write C++ program to Find the Number of Lines in a Text File
	20	Write C++ program to Append the Content of File at the end of Another
	21	An application that maintains the record of student details along with their attendance and marks (one subject) for all the students in a class. The application also answers the student queries related to marks and attendance. For example if the student wants to know his attendance or marks in the course, he enters his Roll No. and the details of the student are displayed along with the required data. Write a C++ program for the application.

6. Evaluation Scheme (Practical):

Lab Component 1*	Lab Performance and Internal Viva	60
Lab Component 3**	External Viva	40
	Total	100

*Lab Performance will be evaluated periodically. Total three lab exams will be conducted of which best two will be considered for evaluation. Each exam will be of 20 marks. All three tests will carry one programming problem of 10 marks, one programming problems of 5 marks and 5 marks Viva Voce/MCQ. A suitable online platform will be used to conduct the exams.

**The End Term examination for practical courses is held at the end of semester. The end term exam includes conduct of practical exam of 15 marks that have one programming problems of 15 marks ,5 marks for file and an oral examination (viva voce) of other 20 marks. The mandatory requirement of 75% Attendance in all lab classes is to be met for being eligible to appear in this component.

7. Details of Evaluation component 1:

Description	Marks	To be held in week	Remarks
Lab Performance 1	20	5 th week	Program Execution(10 mark code + 5 mark code +5 mark MCQ)
Lab Performance 2	20	9 th week	Program Execution (10 mark code + 5 mark code +5 mark MCQ)
Lab Performance 3	20	11 th week	Program Execution (10 mark code + 5 mark code +5 mark MCQ)
Internal Viva	20	12th week	Program Execution 10 mark + 10 mark Viva

This document is approved by

Designation	Name	Signature
Course Coordinator	Er. Tanya Gera	
Associate Dean	Er. Sudha Goyal	
Deputy Dean	Er. Meenu Khurana	
Date	Dec 30,2017	