K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Computer Science & Engineering
FIRST / SECOND SEMESTER SYLLABUS

Course : C++ Programming Lab		Semester	I/II
Course Code	**25BPLL109/209B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Practical**		

Course Objectives (Course Skill Set)

1. Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.
2. Understand the capability of a class to rely upon another class and functions.
3. Understand about constructors which are special type of functions.
4. Create and process data in files using file I/O functions
5. Use the generic programming features of C++ including Exception handling

1. Students have answer 1(one) question from list of Experiments.
   a. The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
2. For continuous internal evaluation, during the semester, classwork, and any other similar questions to enhance the skill of the students

List of Experiments

Note: Students must write the algorithm & flowchart for experiments in the Record book

1. Write a C++ program to sort the elements in ascending and descending order.
2. Write a C++ program to find the sum of all the natural numbers from 1 to n.
3. Write a C++ program to swap 2 values by writing a function that uses call by reference technique.
4. Write a C++ program to demonstrate function overloading for the following prototypes.
   add (int a, int b)
   add (double a, double b)
5. Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle have the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively.

Again, make another class named Square having the same function which prints "Square is a rectangle". Now, try calling the function by the object of each of these classes.

6. Suppose we have three classes Vehicle, Four-Wheeler, and Car. The class Vehicle is the Base class,The class Four-Wheeler is derived from it, and the class Car is derived from the class Four Wheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class Four-Wheeler has a method 'four-Wheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods. So, if we invoke the methods in this order, car (), four-Wheeler (), and vehicle (), then the

Output will be

I am a car

I have four wheels

I am a vehicle

Write a C++ program to demonstrate multilevel inheritance using this.

7. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.

8. Write a C++ program to write and read time in/from binary file using fstream

9. Write a function which throws a division by zero exception and catch it in catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.

10. Write a C++ program function which handles array of bounds exception using C++.

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO1: Explain and demonstrate basic C++ constructs such as loops, arrays, and functions.

CO2: Develop and implement C++ programs to solve simple computational problems.

CO3: Utilize C++ derived data types (structures, classes, files) to model and solve simple real-world problems.

CO4: Apply the concepts of function overloading and call by reference to design efficient solutions.

CO5: Illustrate inheritance and polymorphism through class hierarchies to analyse object-oriented relationships.

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd, Fourth Edition 2010.

Reference books

1. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill
2. Education Pvt.Ltd., Sixth Edition 2016.
   Bhave, "Object Oriented Programming with C++", Pearson Education, 2004.

Web links and Video Lectures (e-Resources):

1. Basics of C++ - https://www.youtube.com/watch?v=BClS40yzssA.
2. Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw.

Tutorial Link:

1. https://www.w3schools.com/cpp/cpp_intro.asp.

   https://www.edx.org/course/introduction-to-c-3

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. Engineering tool usage for the conduction of experiment
2. Demonstration through ICT tools

Use of virtual labs (https://www.vlab.co.in/)

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks. For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.

A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

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