FACULTY OF TECHNOLOGY & ENGINEERING
U & P U. PATEL DEPARTMENT OF COMPUTER ENGINEERING

CE144: OBJECT ORIENTED PROGRAMMING WITH C++

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	4	-	7	5
Marks	100	100	-	200	

A. Objective of the Course:

The main objectives for offering the course Object Oriented programming with C++ are:

1. To introduce students with object-oriented programming in C++ language.
2. To display how the object oriented approach differs from procedural approach.
3. To promote skills like Development of logic and implementation of basic mathematical and other problems by using Object oriented concepts.
4. To explain them concepts of encapsulation, class, objects, Operator Overloading, function overloading and inheritance.
5. Take a problem and develop the structure to represent objects and the algorithms to perform operations.

B. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	Principles of object-oriented Programming	02
2	Introduction of C++	03
3	Tokens and Expressions & Control Structure	02
4	Functions	04
5	Classes and objects'	07
6	Constructor and Destructors	03
7	Operator Overloading	06
8	Inheritance	06

9	Pointers and Virtual Functions	06
10	Managing Console I/O Operations	02
11	Working with Files	04

Total hours (Theory): 45

Total hours (Lab): 60

Total hours: 105

C. Detailed Syllabus:

1	**Principles of object-oriented Programming**	**02 Hours**	**5%**
1.1	Basic concept of object-oriented Programming , Benefits of OOP		
1.2	Difference between object oriented language and procedure oriented language		
2	**Introduction of C++**	**03 Hours**	**3%**
2.1	What is C++, Simple C++ Program, Applications of C++		
2.2	Introduction to class, object and creating simple program using class, Structure of C++ program		
3	**Tokens and Expressions & Control Structure**	**02 Hours**	**4%**
3.1	Type compatibility, Dynamic initialization, Reference variables		
3.2	Scope Resolution Operator, Memory Management Operator, Manipulators, Type cast operator		
4	**Functions**	**04 Hours**	**8%**
4.1	The main function, simple functions, call by reference, return by reference, inline functions, overloaded functions, default arguments		
5	**Classes and objects**	**07 Hours**	**16%**
5.1	Limitation of C structure, Declaring class and defining member function, making outside function inline , Nesting member function, Private member function arrays within a class, memory allocation of objects, Static data members and Member functions.		
5.2	Arrays of Objects, Object as a function argument, Friend functions, Returning objects, const Member functions.		
6	**Constructor and Destructors**	**03 Hours**	**9%**
6.1	Introduction to Constructors, Parameterized Constructors, Multiple		

	Constructors in class, Constructors with default argument, Dynamic initialization of Constructors, Dynamic Initialization of objects, Copy Constructor, Dynamic Constructor		
6.2	Destructors		
7	**Operator Overloading**	**06 Hours**	**11%**
7.1	Introduction, Defining Operator overloading, overloading unary and binary operators, overloading binary operator using friend function, rules for overloading operators		
7.2	Type Conversion		
8	**Inheritance**	**06 Hours**	**13%**
8.1	Introduction, Defining a derived class, Example of Single Inheritance,		
8.2	Public and private inheritance.		
8.3	Multilevel, multiple and hierarchical Inheritance, Hybrid Inheritance Virtual Base Class, abstract class nesting of classes, constructors in derived classes		
9	**Pointers and Virtual Functions**	**06 Hours**	**16%**
9.1	Introduction, pointer to object, this pointer, pointer to derived class		
9.2	Virtual functions, pure virtual functions		
10	**Managing Console I/O Operations**	**02 Hours**	**5%**
10.1	Introduction, C++ stream, C++ stream classes		
10.2	Unformatted and for matted console I/O Operations		
11	**Working with Files**	**04 Hours**	**10%**
11.1	Introduction, Classes for file stream operations, Opening and closing a file, Detecting End of File		
11.2	File modes, file pointers and their manipulations, Sequential I/O operations		
11.3	Error Handling during File operations, Command-line arguments		

D. Instructional Method and Pedagogy:

- At the beginning, the course delivery pattern, prerequisite of the subject will be discussed.

- Lectures will be conducted with the aids like multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and laboratory which carries 5 Marks weightage respectively.
- Two internal exams will be conducted and average of the same will be converted to equivalent of 15 Marks as a part of internal theory evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5 Marks as a part of internal theory evaluation.
- Surprise tests/Quizzes/Seminar will be conducted which carries 5 Marks as a part of internal theory evaluation.
- The course includes a laboratory, where students have the opportunity to build appreciation for the concepts being taught in lectures.
- Experiments/Tutorials related to course content will be carried out in the laboratory.

E. Student Learning Outcomes:

After completing this course, the student should demonstrate the knowledge and ability to:

1. Understand object-oriented approach with C++ language.
2. Able to differentiate object oriented approach and procedural approach.
3. Understand the concepts of encapsulation, class, objects, Operator Overloading, function overloading and inheritance.
4. Explain the benefits of object oriented design and understand when it is an appropriate methodology to use.
5. Design object oriented solutions for small systems involving multiple objects.

F. Recommended Study Material:

❖ **Text Books:**

1. Programming with C++ by E.Balagurusami(TMH-)
2. Object Oriented Programming in Turbo C++ by Robert Lafore (Galgotia-)

❖ **Reference Books:**

1. Let us C++ by Yashwant Kanetkar, BPB Publication

2. C++ How to program, by Deitel & Deitel, Prentice Hall
3. C++ Programming Bible, by Al Stevens and Clayton Walnum, Prentice Hall
4. The Complete Reference, by Herbert Schildt, Tata McGraw Hill

❖ **Web Materials:**

1. http://www.cplusplus.com/doc/tutorial/
2. http://www.learncpp.com/
3. http://www.cprogramming.com/tutorial/c++-tutorial.html
4. http://www.tutorialspoint.com/cplusplus/index.htm
5. http://www.dre.vanderbilt.edu/~schmidt/C++/