EE462 OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA

Sem 2, Class 3, Credit 3

Pre- or Co-requisite: EE368

Prerequisite By Topic:

A student wishing to take this course must be proficient with advanced C. The specific topics the student would need to have mastered include: arrays, structures, pointers, dynamic memory management, writing multifile programs, and make.

Engineering Design Content:

Designing simple object-oriented programs with specified functionality. Constructing test cases for the evaluation of such programs.

Engineering Design Considerations:

Development of extendible and maintainable software.

Justification:

Most commercial-grade software development these days is based on object-oriented methods and two of the most frequently used languages for OO programming are C++ and Java. It is therefore important that our computer engineering students be well conversant with these two languages. Since both these languages were born out of C, they have much in common at the level of basic lanaguage structures. This course takes advantage of this fact and teaches the two languages together by comparing and contrasting them at all levels --- from basic language constructs to the constructs needed for application development.

Course Description:

The C++ and Java programming languages are presented. The language constructs discussed include classes, inheritance, encapsulation, inheritance, polymorphism, class derivation, abstract classes, interfaces, static class members, object construction and destruction, namespaces, exception handling, function overloading and overriding, function name overload resolution, container classes, template classes, etc.

Course Outcomes:

A student who successfully fulfills the course requirements will have demonstrated:

i) an understanding of the concepts of inheritance and polymorphism [3,4;k]

ii) an ability to overload operators in C++ [4;c,e,k]

iii) an understanding of the difference between function overloading and function overriding [3,4;k]

iv) an ability to incorporate exception handling in object-oriented programs [3,4;k]

v) an ability to use template classes and the STL library in C++ [3,4;k]

vi) an ability to write object-oriented programs of moderate complexity in C++ [3,4;e]

vii) an ability to write object-oriented programs of moderate complexity in Java [3,4;e]

Text:

"Programming with Objects, A Comparative Presentation of Object-Oriented Programming with C++ and Java" by A. C. Kak, John-Wiley, March 2003, ISBN 047-126-8526.

Lecture	**Topic**
1	Course Introduction
2	Comparison of simple C++ and Java programs with C programs
3-4	First Introduction to Classes, Encapsulation, Inheritance, and Polymorphism
5-7	Strings in C++ and Java
8-10	Container Classes in C++ and Java
11-12	Primitive Types in C++ and Java
	Test 1
13-15	Declarations, Definitions, and Initializations
16-18	Object Reference, Memory Allocation, and C++ Structures
19-22	Functions and Methods
23-25	Exception Handling in C++ and Java
	Test 2
26-29	Classes in C++ and Java
30-31	Abstract Classes and Interfaces
32-34	Operator Overloading in C++
35-37	Templates and Generics
38-42	Extending Classes and Multiple Inheritance
	Test 3

Assessment Methods for Course Outcomes: Each of the outcomes will be assessed by giving the students appropriate C++ and Java programming assignments.