CSCI 528: OBJECT ORIENTED PROGRAMMING, Fall 2015

INSTRUCTOR:

Dr. Ray Maleh
Adjunct Professor, Department of Computer Science
Office: TBD
Email: Ray_Maleh@tamuc.edu
Office Hours: Mondays 7:10 PM – 8:10 PM, Other Times By Appt.

CLASS MEETING TIMES:

E-College (Online)
Aug. 31 2015 – Dec. 18, 2015

TEXTBOOK:

Horstman, Cay. Big Java 6th Edition. New York: John Wiley & Sons, Inc. (4th and 5th Editions are also acceptable) [This is a great introduction to the Java programming language.]

Any additional resources about UML and important differences between OOP in Java and C++ will be handed out in class.

CREDIT HOURS: 3

PREREQUISITES:

CSCI 515 and CSCI 520

STUDENT LEARNING OUTCOMES:

(CO528.1): **Software Engineering Basics.** Students will be expected to apply knowledge of the software development cycle to write programs using the object oriented programming paradigm.

(CO528.2): **Classes basics/advanced.** Students will become comfortable at designing and implementing classes as well as creating and manipulating objects belonging to those classes. Students will also become familiar with advanced topics such as reflection and the use of GoF design patterns.

(CO528.3): **Overloading.** Students will learn how to take advantage of function overloading so as generate more readable and maintainable code suitable for large software projects.

(CO528.4): **Polymorphism/Virtual functions.** Students will learn to develop hierarchies of related classes. They will design and implement super-classes and interfaces that use common field/method names but have base class dependent implementations. Students will learn the principles of code-refactoring and efficient code reuse.

(CO528.5): **Templates/Generic Programming.** Students will learn to design, implement, and use generic classes and methods. Students will learn about the limitations of generic programming, i.e. type erasure. Students will also learn how to throw and handle exceptions for dealing with exceptional situations and errors. Students will design custom exception types.

(CO528.6): **UML.** Students will use the Unified Modeling Language to model the static and dynamic behavior of object oriented software.

(CO528.7): **Integration Project.** Students will complete a comprehensive final project to include design/analysis as well as implementation.

COURSE DESCRIPTION:

This course provides an in-depth survey of object oriented programming (OOP) using the Java language. We begin with an introduction to object oriented design and analysis, objects, and classes. We use classes to implement advanced linked data structures such as lists and trees. We then cover the topic of inheritance and polymorphism: we learn how to factor out (refactoring) common functionalities among a set of related classes and incorporate them into a common super-class or interface. Then we discuss generic programming (templates) as a method for achieving additional polymorphism when a class is written in terms of another variable class type (e.g., ArrayList<T>). We provide an introduction to exception handling including the design and implementation of custom exception types. Then, we cover the topic of reflection in which one can learn about classes, their fields, and their methods, all at run-time. We then wrap up with an analysis of commonly used design patterns (GoF patterns) that are utilized extensively in object oriented software development. The Unified Modeling Language (UML) will be presented and students will be expected to use it throughout the course to develop blueprints of their software programs. While primary instruction will be provided in Java, we will also show a few C++ examples in order to outline similarities and differences between the two languages.

METHOD OF EVALUATION (Tentative):

Your grade in the course will be calculated as follows:

Programming Assignments:	25 %
3 Exams:	25 % each (lowest dropped)
Final Project:	25 %

Assignments and projects will be assigned on eCollege and must be turned into the ***correct*** dropbox. Three exams will be administered. I will keep only your two best scores and drop the lowest. Because of this policy, no makeup exams will be given. If you have to miss an exam for any reason, this will be the exam that will not be counted.

All code must be readable. What this means is that you indent nested statements and provide a generous amount of comments. As an example, consider the following two pieces of code, both of which calculate the factorial of an integer n:

```
//Good Code

/*This function calculates the factorial of its non-negative
integer input n. Output type is integer.*/
```

```
public static int factorial(int n)
{
   if (n == 0)                  //Base Case: 0! = 1
      return 1;
   else
      return n*factorial(n-1);   //For n > 0, recursively let
                                 //n! = n*factorial(n-1)
}

//Bad Code
public static int fctrl (int n) {return n>0?n*fctrl  (n-1):1;}
```

While both are correct, the second version can be very difficult for another person to understand. Conversely, don't over-comment your code to the point where I'm struggling to find the locations of the actual instructions. When evaluating your code, I will take coding style into account. I believe that it is imperative for programmers to produce readable code, especially when working on massive team-based software development projects.

Your final letter grade will be determined as follows:

A – total number of points ≥ 89.5
B – 79.5 ≤ total number of points < 89.5
C – 69.5 ≤ total number of points < 79.5
D – 59.5 ≤ total number of points < 69.5
F – total number of points < 59.5

I reserve the right to curve the grades in the course; however, for a given raw average, you will at least earn the grade letter shown above (if not better). As you will notice, I have already incorporated a standard rounding scheme into the schedule of grades. Thus, please do not ask me to round your grade at the end of the semester.

TECHNOLOGY REQUIREMENTS

In order to successfully participate in and complete this course, you must have access to a computer with internet access that can run the e-College software. You will also need access to word processing software (preferably Microsoft Word). Within the e-College interface, you must be accessible with the following tasks: reading and posting to a discussion thread, uploading and downloading documents from "Doc Sharing," uploading homework assignments/papers into an appropriate drop box, and taking exams online. If you are uncomfortable with performing these tasks, then you are encouraged to view the tutorial that is offered on the e-College website. In addition, you can always ask the e-College technical support staff or me if you require assistance.

ACADEMIC ETHICS:

"All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).

ATTENDANCE POLICY:

Students are expected to be present at all class lectures. If a student is absent from class on the due date of any assignment, they are expected to make alternative arrangements to assure that the assignment is turned in ON TIME. Any student wishing to withdraw from the course must do so officially as outlined in the class schedule. THE INSTRUCTOR CANNOT DROP OR WITHDRAW ANY STUDENT.

COURSE REQUIREMENT DEADLINES:

Credit will be given for ONLY those exam(s), program(s), and/or project(s) turned in no later than the deadline(s) as announced by the instructor of this class unless prior arrangements have been made with the instructor.

ACADEMIC ETHICS AND HONESTY STATEMENT:

Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion. "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).

Academic dishonesty includes, but is not limited to, cheating on tests, plagiarism and collusion. ***Cheating*** includes copying from another student's test or homework assignments or projects or quizzes, using materials not authorized, collaborating with or seeking aid from another student during a test, knowingly using, buying, selling, stealing, or soliciting the contents of an unadministered test, and substituting for another person to take a test. ***Plagiarism*** is the appropriating, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own written work. ***Collusion*** is the unauthorized collaboration with another person in preparing written work for the fulfillment of course requirements. Academic dishonesty is a serious offense in college. You will be given not only a failing grade on the assignment or test, but also a failing grade for the class. Further, it will result in suspension from college.

PLAGIARISM:

In any written paper or test or assignment or quiz or project including code and/or documentation, you are guilty of the academic offense known as plagiarism if you half-copy or copy another author's sentences, words or any part of the content. **This will result in an automatic grade of "F" for the course.** Hence any of these must be fully avoided in order not to fail the class. Students copying from work done in previous semesters by former students as well as copying from internet sources without proper referencing will result in you failing this course. You cannot mix the author's words with your own or "plug" your synonyms into the author's sentence structure. To prevent unintentional borrowing, resist the temptation to look at the source as you write. The author's words, phrases, sentences must be put in your words and in your way of writing! When you do this, you are demonstrating your ability to understand and comprehend the material!

STUDENTS WITH DISABILITIES:

Students requesting accommodations for disabilities must go through the Academic Support Committee. For more information, please contact the Director of Disability Resources & Services, Halladay Student Services Bldg., Room 303D, (903) 886-5835

This syllabus is subject to change at any time and for any reason.