Software Design and Patterns

MET CS665

Instructor: Kia Teymourian
Email: kiat@bu.edu
Office hours: Thursday afternoon 2-5pm or by appointment
Office Location: 808 Commonwealth Avenue, Room 257

Course Description

This course is an introduction to software design patterns. A design pattern is a general reusable solution to a commonly occurring problem within a given context in software design. Patterns are formalized best practices that the programmers should implement in the applications. This course covers the most common object-oriented software design patterns. For each pattern, it will discuss the underlying object -oriented desig design problem it solves; the context it can be applied and the consequences of applying it; how the different components of the pattern collaborate with each other.

Course Prerequisites

Student should have solid background on object-oriented programming.

- MET CS 341 or 342 (Data Structures with C++ or Java) is required for understanding the contents of this course.
- MET CS 565 (Advanced Java Programming) is highly recommended, but it is not required.

The course is emphasizing the object-oriented design pattern concepts independent of programming language.

All examples in class are using Java programs. But students have the choice of using either Java or C++ to implement the homework or project assignments.

Textbooks

Required

- *Head First Design Patterns* By Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra O'Reilly, 2004

Recommended

- *Design Patterns Explained: A New Perspective on Object Oriented Design, (Software Patterns) by Alan Shalloway, James R. Trott, Addison Wesley, 2004 ISBN-13: 978-0321247148*
- *Design Patterns: Elements of Reusable Object* By Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides Addison-Wesley, 1994

Class Policies

1) Attendance & Absences – Full attendance and participation is expected. If there is a reason to miss a session, advanced notice through email should be sent to the lecturer.

2) Assignment Completion & Late Work – All assignments should be submitted on time. If there is a delay, the student must be in touch with the instructor. Late submissions without reasons will result in grade deduction.

3) Academic Conduct Code –Cheating and plagiarism will not be tolerated in any Metropolitan College course. They will result in no credit for the assignment or examination and may lead to disciplinary actions.

Please take the time to review the Student Academic Conduct Code:
http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html

NOTE: [This should not be understood as a discouragement for discussing the material or your particular approach to a problem with other students in the class. On the contrary – you should share your thoughts, questions and solutions. Naturally, if you choose to work in a group, you will be expected to come up with more than one and highly original solutions rather than the same mistakes.]

Final Examination

The final exam will be comprehensive and will cover material from the entire course.

The final grade for this course will be based on the following:

Deliverable	**Weight**
Weekly Homework Assignments	40%
Quizzes	20%
Final Exam	40%

Study Guide

Lecture 1 – Course introduction; Object -oriented design basics and principle

Lecture 2 – Introduction to design patterns; The Strategy Pattern

Lecture 3 – The Observer Pattern

Lecture 4 – The Decorator Patterns

Lecture 5 – The Factory Pattern

Lecture 6 – The Singleton Pattern

Lecture 7 – The Command Pattern

Lecture 8 – The Adapter and Facade Pattern

Lecture 9 – The Template Method Pattern

Lecture 10 – The Iterator and Composite Pattern

Lecture 11 – The State Pattern

Lecture 12 – The Proxy Pattern

Lecture 13 – The Compound Pattern

Lecture 14 – Pattern Categories and Review Session