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CEG 460/660: Introduction to Software Computer Engineering

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CEG 460/660: Introduction to Software Engineering

Fall Quarter, 2005

Course Description

This course introduces established practices for engineering large-scale software systems. Emphasis is placed on both the technical and managerial aspects of software engineering, and the software development process. This includes techniques for requirements elicitation, analysis, design, testing, and project management. The course emphasizes object-oriented development with the Unified Modeling Language (UML). Hands-on experience is provided through individual homework problems and a group project.

Textbook

B. Bruegge and A.H. Dutoit, *Object-Oriented Software Engineering Using UML, Patterns and Java, Second Edition*, Prentice Hall, 2004. This is a required textbook for this course.

The textbook employs an example development project (the ARENA project) throughout the text. The reading assignments for each lesson do not include this material. This exclusion is not meant to imply that students shouldn't look over these portions of the text. By all means, if this information is helpful, look it over. Students should use all available means to help better understand the material.

References Available for Student Use

Students may find the following documents helpful:

- *The Rational Unified Process, Version 2002.05.00.25*, IBM Corp, 2003. Available at L:\eng students\csce593\RationalUnifiedProcess\index.html.
- *OMG Unified Modeling Language Specification, Version 1.5*, Object Management Group, 2003. Available at L:\eng students\csce593\Papers\UML 1.5 Spec 03-03-01.pdf.

Instructor Contact Info

John Reisner

Office Hours by Appointment

Phone: 255-7777 x3270 (mornings through Oct 1) or 255-3636 x7422

email: john.reisner@wright.edu (it wouldn't hurt to cc: john.reisner@afit.edu)

→ or use WebCT email tool

The instructor is an adjunct faculty member. Most contact will be done via WebCT, or in after-class discussions. Other meetings can be arranged.

Course Objectives

Each student should be able to

- Comprehend the advantages of using a sound software engineering methodology for developing complex software systems.
- Comprehend the importance of a good software process for managing the development of large software systems.
- Analyze the characteristics of software process models
- Comprehend how the Software Engineering Institute's (SEI) Capability Maturity Model (CMM) can be used to measure and improve an organization's software development process.
- Apply object-oriented techniques and modeling with the UML to the development of software systems.
- Identify and apply other appropriate techniques and tools for use at each phase of the software lifecycle.

Grading

20% Homework Assignments

- Homework assignments are designed to facilitate deeper comprehension about a lecture topic (in other words, these are “think and respond” assignments).
- There may be up to two assignments per week, but some weeks may have one or zero assignments.
- Answers to these homework assignments generally run about half page to one page in length, and should not take too long to complete.
- Details about these assignments will be found on WebCT.
- Normally, these assignments will be due on Monday of the following of that week (one week to complete a Monday assignment; five days to complete a Wednesday assignment). Any exceptions to this policy will be mentioned when the homework is assigned.
- Assignments are due at the start of the class/lab session; please have them printed out and ready to turn in at the start of class. If you are unable to attend class, email will be accepted. Emailed assignments should be timestamped before class time (skipping class does not give you a homework extension).
- These assignments will be graded using the SUE grading system (explained on the following page).

40% Group Project

- Partnered with another student, you will perform a use-case driven design and refinement project.
- This project will begin during the first week of class, and last for the duration of the course.
- Students will submit their work at various stages of development in order to get some feedback.
- Grade for the project is based on the final turn-in. Modifications can be made to interim work before the final grade is assigned.

20% Mid-term Exam

- Mixed-format exam, administered in class.

20% Final Exam

- Comprehensive, mixed-format exam, administered during scheduled exam time.

Final course grades will be assigned at the instructor’s discretion, after all grades have been calculated.

Class Project

The class project will be weighted based on several deliverables and factors:

Milestone or Factor	Due	Weight
Use-case scenarios	After Week 2 (Sep 19)	15%
Use-case diagram	After Week 3 (Sep 26)	10%
Class diagram	After Week 4 (Oct 3)	15%
Sequence Diagrams	After Week 6 (Oct 17)	15%
Code	After Week 9 (Nov 7)	10%
Good use of OO Constructs	Evaluated in Final Report (Nov 9)	10%
Scenario/Structural/Behavioral Consistency	Evaluated in Final Report (Nov 9)	15%
Supporting Documentation	Evaluated in Final Report (Nov 9)	10%

More information and guidance concerning the class project will be discussed in class and distributed in various handouts.

The SUE Grading System

Homework for this class will be ordinarily graded on a three-tier scale: the work will be graded as Satisfactory, Unsatisfactory, or Exemplary.

If your submission was Satisfactory, then your grade will be S, which will translate to a 90. Don't think of a 90 as "losing 10 points;" think of it as getting ample credit for satisfactory work.

Occasionally, I receive an assignment with great originality and insight, reflecting much forethought and effort. Not only do I find these assignments enjoyable to read, I sometimes find myself thinking, "This is as good as or better than anything I could put in an answer key." Such exemplary work is graded E, which translates to 100. If submitted work indicates either a lack of understanding of basic concepts, or an apparent apathetic carelessness, then it will be graded as Unsatisfactory, and a numeric grade will be assigned accordingly. If I think the problem lies with misunderstanding the basic ideas, then I will usually provide some personal feedback, with the aim of helping you understand the material better.

Of course, I also reserve the right to stray from this guideline some. For example, I might grade with values such as 85 or 95 (corresponding to S- or S+), or even an S++, which would be a 98. After reading 25 or so essays the same topic, I get a pretty good idea of which papers are more well-thought-out than others. The ones that are "more than satisfactory" receive grades such as 93, 95, or 98, while the truly superior works will receive an E (100). Again, don't ask me what was wrong if your grade is a 90. A 90 means you understood the assignment and did a good job of presenting your response.

I also reserve the right to deduct points for late assignments, depending upon how late the work was turned in, how much advanced notice I was given about when I could expect the work, and any extenuating circumstances that may have applied.

Overall, my goal is to assign homework that requires thought, thereby reinforcing understanding and increasing retention.

Reading Assignments

Each lecture has a corresponding reading assignment from the course textbook. Some students might want to accomplish this reading prior to the lecture; others may prefer reading the text after the lecture. Still others might prefer to skim the reading assignment prior to the lecture, with more in-depth reading taking place after the lecture is finished. Students are encouraged to figure out which method works best with their particular style of learning.

Course Schedule (possibly subject to change)

PART I. USE-CASE DRIVEN OO DEVELOPMENT			
Lesson	Date	Lesson Topics	Reading Assignment
1	Wed Sep 7	Course Introduction Overview of O-O Software Development	<ul style="list-style-type: none"> • Preface, up to (but not including) the section marked <i>The book</i> (pp. vii - x) • Chapter 1, thru Section 1.5 (pp. 4 - 23)
2	Mon Sep 12	Use-Case Scenarios Use-Case Diagrams	<ul style="list-style-type: none"> • Section 2.4.1 (pp. 44-51) • Section 4.4, through Section 4.4.5 (pp. 130-143)
3	Wed Sep 14	Objects and Classes Encapsulation Inheritance	<ul style="list-style-type: none"> • Section 2.3 (pp. 35 - 43)
4	Mon Sep 19	Structural Modeling Candidate Classes CRC Cards Entity, Boundary, Control Objects	<ul style="list-style-type: none"> • Section 2.4.2 (pp. 51-59) • Section 4.4.6 (pp. 143-146) • Chapter 5, thru Section 5.4 (pp. 173-197)
5	Wed Sep 21	Behavioral Modeling Sequence Diagrams Polymorphism	<ul style="list-style-type: none"> • Section 2.4.3 thru Section 2.4.5 (pp. 59-67)
PART II. THE SOFTWARE ENGINEERING LIFECYCLE			
6	Mon Sep 26	Project Organization and Planning Project Management	<ul style="list-style-type: none"> • Chapter 3 (pp. 77-114)
7	Wed Sep 28	Requirements Analysis	<ul style="list-style-type: none"> • Chapter 4, thru Section 4.3 (pp. 121-129)
8	Mon Oct 3	Project Organization and Planning Project Management	<ul style="list-style-type: none"> • Chapter 3 (pp. 77-114)
9	Wed Oct 5	Implementation	<ul style="list-style-type: none"> • Chapter 10, thru Section 10.5 (pp. 391-422)
-	Mon Oct 10	TBD	
10	Wed Oct 12	Testing Types of Testing	<ul style="list-style-type: none"> • Chapter 11 (pp. 435-481)
11	Mon Oct 17	Software Maintenance	<ul style="list-style-type: none"> • Section 6.4.2 (pp. 248-251)
-	Wed Oct 19	NO LECTURE MIDTERM EXAM	
PART III. SOFTWARE ENGINEERING MANAGEMENT			
Class	Date	Lesson Topics	Reading Assignment
12	Mon Oct 24	Software Project Management Work Breakdown Structures	<ul style="list-style-type: none"> • Chapter 14, thru Section 14.4.2 (pp. 568-600)
13	Wed Oct 26	Development Processes The CMM	<ul style="list-style-type: none"> • Chapter 15 (pp. 613-639)
14	Mon Oct 31	Software Metrics	<ul style="list-style-type: none"> • Chapter 14, pp. 600-603
15	Wed Nov 2	Agile Development Methodologies Extreme Programming	<ul style="list-style-type: none"> • Section 16.4.2 (pp. 661-665)
16	Mon Nov 7	Configuration Management Risk Management Ethics	<ul style="list-style-type: none"> • Chapter 13 (pp. 531-563) • Chapter 14, pp. 604-606
17	Wed Nov 9	TBD	
-	Week of Nov 14 - 19	NO LECTURE FINAL EXAM	