CSE 460/598

Software Analysis and Design

Spring 2004

General:

Bldg/Room: SCOB-105 (Main campus)
Lecture hours: 7:40 – 8:55, T & TH
Course portal: http://my.asu.edu (CSE 460/598, SLNs: 32366/52579)

Textbooks:

Required:

- *Object Oriented Analysis and Design (OOAD)*, 2nd Ed., G. Booch, Benjamin Cummings, 1994.
- *Software Architecture in Practice (SAP)*, Second Ed. L. Bass, P. Clements, R. Kazman, AW, 2003.

References:

- Object Solutions: Managing the Object Oriented Project, G. Booch, AW, 1996.
- *Software Architecture in Practice*, L. Bass, P. Clements, R. Kazman, AW, 1998.
- Software Engineering: A Practitioner's Approach (SEPA), 5th Ed., R.S. Pressman, McGraw Hill, 2000.
- *UML Standard (UMLS)*, http://www.omg.org/technology/documents/formal/uml.htm.

Instructor:

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Office hours: Tue. & Thur. 9:00-10:30 am; Tue, 4-5 pm; and by appointment

Teaching Asst.:

Weilong (William) Hu
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Email: Weilong.Hu@asu.edu
Office hours: TBD

Lab. Facility:

Brickyard building: 214
Days/Hours: M-F, 7-6 pm; additional hours will be posted on blackboard

Course Description (CSE/ASU catalog): Requirements analysis and design; architecture and patterns; representations of software; formal methods; component-based development; Prerequisite: CSE 360 or equivalent.

Homework Assignments: Four to six homework assignments (weighted equally) will be assigned and some will be randomly graded. The lowest homework grade will be dropped. Each homework assignment generally is due 1 to 2 weeks after the day it is assigned.

Exams: Two quizzes, one midterm and one comprehensive final exam. Duration of quizzes and midterm exam will be 30 and 75 minutes respectively. Final exam will be 110 minutes.

Term Paper (Graduate students only): Each graduate student will research and prepare a term paper discussing a specific topic closely related to the course materials. A 300 to 500 word abstract will be due via email and in hardcopy submitted in class on **April 6th**. The length of the final term

paper should be between 3000 to 4500 words. Term papers will be presented at the end of the semester.

Software Usage: Rational Rose software will be used in the course.

Grading Scheme and Important Dates:

	% of total grade (Under. Students)	% of total grade (Grad. Students)	Date/Time	Location
Homework	15%	15%	start of class	SCOB-105
Quiz 1	15%	10%	02/12/04§	SCOB-105
Midterm	25%	25%	03/11/04§	SCOB-105
Quiz 2	15%	10%	04/06/04§	SCOB-105
Term Paper	NA	10%	05/04/04	SCOB-105
Final Exam	30%	30%	05/07/04 7:40 – 9:30 pm	SCOB-105
Total Grade	100%	100%	NA	NA

§ Tentative

Attendance Policy: Participation is an integral part of the course and attendance will be monitored randomly.

Homework Policy: Homework assignments must be turned in **hardcopy form** at the start of the class on the due date. Homework grades will be reduced by 20% each day. Late homework assignment grade is zero once the solution is posted on blackboard.

Letter Grade: Course grade is based on 10-point scale (it may be relaxed at the discretion of the instructor). **Students are responsible for all materials covered and discussed in class, posted on Blackboard, or email correspondences.** Examinations **may not be taken separately** except in special situations with prior arrangement at least 48 hours in advance.

Withdrawals: Unrestricted withdrawal deadline **Feb. 13th**; restricted course withdrawal deadline is **March 26th**; restricted complete withdrawal deadline is **April 28th**. Note that students wishing to drop the course AT ANY TIME must take appropriate actions. Ceasing attendance does not automatically drop you from the course. IF YOU ARE STILL ON THE CLASS ROLL AT THE END OF THE SEMESTER, YOU WILL RECEIVE 0's FOR ANY WORK NOT COMPLETED AND WILL BE GRADED ACCORDINGLY.

Academic Integrity and Ethics: The University's Code of Academic Integrity (http://www.asu.edu/studentlife/judicial/integrity.html and http://www.asu.edu/studentlife/judicial) states that students shall not "represent the work of others as their own." The Computer Science and Engineering department requires all students to adhere to ASU's policy on Academic Honesty. This policy will be applied to all work submitted for grade, including term paper, exams, and homework assignments. The minimum penalty for submitting work that is not your own is an E grade. Note: You are encouraged to discuss class assignments with your instructor, your teaching assistant, and your fellow students. However, any work submitted as part of course work must be your own work. I.e., final work submitted by student must represent his/her own individual efforts unless stated otherwise by the instructor. College of Engineering and Applied Sciences policy states that any act of cheating will result in receiving an XE for the course indicating failure due to disciplinary action.

Course Topics*

Part I: Object-Oriented and Structured Analysis and Design [~14 lectures]

1. Introduction [Ch. 1, OOAD, 1 lec.]
   - Course Description
   - Software complexity
2. The Object Model [Ch. 2, OOAD, 2 lec.]
   - Basic elements of the Object Model
3. Classes and Objects [Ch. 3, OOAD; UMLS, 2 lec.]
   - Fundamental concepts and life-cycle
   - Basic structural modeling in UML
   - Classes and objects in Java programming language
4. Classification [Ch. 4, OOAD, 2 lec.]
   - Use-cases, Classes, Responsibilities, Collaborators
   - Basic behavioral modeling in UML
5. The Object Model Revisited [Ch. 2, OOAD, 1 lec.]
6. Micro and Marco Development Processes [Ch. 6, OOAD, 1 lec.]
7. Analysis and Design in UML [Ch. 5, OOAD; UMLS, 3 lec.]
   - Analysis and design models
   - Advanced structural modeling
   - Advanced behavioral modeling
8. Structured Analysis and Design [Ch. 12 & 13, SEPA, 2 lec.]

Part II: Software Architecture Specification [~12 lectures]

9. Architecture Business Cycle [Ch. 1, SAP, 1 lec.]
   - Background and basic concepts
10. Elements of Software Architecture [Ch. 2 & 3 , SAP, 2 lec.]
    - Architectural styles, reference models, reference architectures
    - Architectural structures
    - Importance of software architecture
11. A-7E Avionics System [Ch. 3, SAP, 1 lec.]
    - Multiple software/system structures
12. Understanding Quality Attributes [Ch. 4, SAP, 2 lec.]
    - Functional and non-functional quality attributes
    - A taxonomy of non-functional quality attributes
    - Business quality attributes
13. Achieving Quality Attributes [Ch. 5, SAP, 2 lec.]
    - A taxonomy of design decisions
    - Architectural patterns and strategies
14. Designing the Architecture [Ch. 7, SAP, 1 lec.]
    - Software lifecycle and architecture
    - Architecture Design
15. Flight Simulation Case Study [Ch. 8, SAP, 2 lec.]
    - Architecture requirements and solution
    - UML for capturing architectural structures
    - Design patterns
16. Documenting Software Architecture [Ch. 9, SAP, 1 lec.]
    - Selecting multiple system architecture views
    - UML for design documentation

* Course topics and time allocated to each topic are subject to change.