

CSE 460/598

Software Analysis and Design Spring 2006

General: Bldg/Room: BYAC-210 (ASU Main)
Lecture hours: 10:40 – 11:55, Tu & Th
Course portal: <http://my.asu.edu> (CSE 460/598, SLNs: 78860 / 08878 [ONLINE])

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:

- *UML Standards (UMLS)*, <http://www.uml.org/>.
- *Software Architecture in Practice*, L. Bass, P. Clements, R. Kazman, AW, 1998.
- *Software Engineering: A Practitioner's Approach (SEPA)*, 5th or 6th Ed., R.S. Pressman, McGraw Hill, 2000.
- *Design Patterns: Elements of Reusable Object-Oriented Software (DP)*, E. Gamma, R. Helm, R. Johnson, J. Vlissides, Addison-Wesley, 1995.
- *Object Solutions: Managing the Object Oriented Project*, G. Booch, AW, 1996.

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Teaching Asst.: Weilong (William) Hu, Brickyard/485-AC
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Office hours: TBD

Lab. Facility: Brickyard Artisan Court building (BYAC): 210
Days/Hours: 24 hours, 7 days a week. (Access right is required to use the lab.)

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 and Exams: Four to six homework assignments (weighted equally) will be assigned. For each homework assignment, selected problems will be randomly graded. Each homework assignment generally is due 1 to 2 weeks after its assigned date. The lowest homework assignment grade will not be included in the course final grade. There are two midterm exams and one comprehensive final exam.

Term Paper (graduate students only): Each graduate student will research and prepare a term paper discussing a specific topic related to the course materials. A 300 to 500 word extended abstract will be due (via Digital DropBox) on March 17th. The length of the Term Paper should be between 2500 to 4000 words. Term paper is graded in terms of the details and the quality of the materials contained in it.

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

Grading Scheme and Important Dates:

| | % of total grade (Under. Students) | % of total grade (Grad. Students) | Date/Time | Location^{§§} |
|--------------------|---|--|------------------------------|------------------------------|
| Homework | 25% | 25% | start of class | BYAC-210 |
| Midterm 1 | 25% | 20% | 02/23/06 [§] | BYAC-210 |
| Midterm 2 | 25% | 20% | 04/04/06 [§] | BYAC-210 |
| Term Paper | NA | 10% | 04/27/06 | NA |
| Final Exam | 25% | 25% | 05/05/06 10:00 – 11:50 am | BYAC-210 |
| Total Grade | 100% | 100% | NA | NA |

§ Tentative

§§ For on-campus students

On-campus students: Solutions must be turned in **hardcopy form** at the start of the class on the assigned due date. Solutions are to be typed if handwriting is not legible.

Online students: Date/time and location may vary slightly. Homework assignments must be submitted via the blackboard Digital DropBox.

Grading: Assignments and exams are evaluated based on *correctness* and *quality*. Note that most problems do not have unique answers.

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

Homework due date policy: Homework grades will be on a 100 points scale. Each homework grade is reduced by 20% for each day past due date. Late homework assignment grade is zero once the solution is made available.

Course Letter Grade: Course letter grade is given according to the table below (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 class-email correspondences.** Examinations **may not be taken separately** except in special situations with prior arrangement at least 48 hours in advance.

| | | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|------|
| % total score | ≥97 | ≥93 | ≥90 | ≥86 | ≥83 | ≥80 | ≥75 | ≥70 | ≥60 | <60 |
| Letter grade | A+ | A | A- | B+ | B | B- | C+ | C | D | E |
| Points for GPA | 4.33 | 4.00 | 3.67 | 3.33 | 3.00 | 2.67 | 2.33 | 2.00 | 1.00 | 0.00 |

Withdrawals: In Person withdrawal deadline **March 31st**; Interactive SunDial withdrawal deadline **April 2nd**; complete withdrawal deadline **May. 2nd**. Ceasing attendance does not automatically drop you from the course. If you are still on the class role at the end of the semester, you will receive zero for any work not submitted 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. Fulton School of Engineering policy states that any act of cheating will result in receiving an XE for the course indicating failure due to disciplinary action.

Course Topics* (Presentation Slides)

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

- Ch. 0. Course Description and Overview [Ch. 0, 1 lec.]
- Ch. 1. Software Complexity [Ch. 1, OOAD, 1 lec.]
- Ch. 2. The Object Model [Ch. 2, OOAD, 3 lec.]
 - Basic elements of the Object Model
 - Typing, Persistency, and Concurrency
- Ch. 3. Classes, Objects, and Basic Structural Modeling in UML [Ch. 3, OOAD; UMLS, 3 lec.]
 - Fundamental concepts and basic structural modeling in UML
 - Classes and objects in Java programming language
- Ch. 4. Classification and Basic Behavioral Modeling in UML [Ch. 4, OOAD, 1.5 lec.]
 - Use-cases, Classes, Responsibilities, Collaborators
 - Basic behavioral modeling in UML
- Ch. 5. Eclipse Modeling Framework [1 lec.]
 - Basic concepts (programming languages, UML, and XML)
- Ch. 6. Object-Oriented Analysis and Design in UML: Concepts and Techniques [Ch. 5, OOAD; UMLS, 4 lec.]
 - Advanced structural modeling
 - Advanced behavioral modeling
- Ch. 7. Software Engineering Enterprise: An Overview [Ch. 6, OOAD, 0.5 lec.]
- Ch. 8. Structured Analysis and Design [SEPA, 1 lec.]

Part II: Software Architecture Specification [~12 lectures]

- Ch. 9. Architecture Business Cycle [Ch. 1, SAP, 1 lec.]
 - Background and basic concepts
- Ch. 10. Software Architecture: Basic Concepts and Artifacts [Ch. 2 & 3 , SAP, 4 lec.]
 - Architectural styles, reference models, reference architectures
 - Architectural structures
 - Importance of software architecture
 - Software/system application
- Ch. 11. System, Business, and Architecture Quality Attributes [Ch. 4, SAP, 3 lec.]
 - Functional and non-functional quality attributes
 - A taxonomy of non-functional quality attributes
 - Business quality attributes
- Ch. 12. Software Architecture Design [Ch. 5, SAP-97; Ch. 7, SAP, 3 lec.]
 - Architectural styles
 - Evaluating architectural styles
- Ch. 13. Design Patterns Concepts and Techniques [DP and papers, 1.5 lec.]

* subject to change