

# CSE 460/598

## Software Analysis and Design Spring 2007

**General:** Bldg/Room: BYAC-210 (ASU, Tempe)  
Lecture hours: 01:40 – 02:55, TU & TH  
Course portal: <http://my.asu.edu> (CSE 460/598, SLN: 73196, 09586, Online)

**Textbooks:**

**Required:**

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

**References:**

- *Object-Oriented Modeling and Design with UML (OOMD)*: Michael Blaha, International Edition, Prentice Hall, 2004.
- *UML Standards (UMLS)*, <http://www.uml.org/>.
- *Software Architecture in Practice (SAP97)*, L. Bass, P. Clements, R. Kazman, AW, 1998.
- *Software Engineering: A Practitioner's Approach (SEPA)*, 5<sup>th</sup> or 6<sup>th</sup> 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.

**Instructor:**

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**Teaching Asst.:**

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**Lab. Facility:**

Brickyard building: 214  
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, In-Class Assignments, and Exam:** 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. There also will be three to six in-class exercises which will be counted toward class participation. The lowest homework assignment will not be included in the course final grade. There is one midterm exam 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. The theme of the term paper will be available on the course portal. A 400 to 600 word Extended Abstract is required. The length of the full Term Paper should be between 3000 to 4000 words (for details refer to the course webpage). The Extended Abstract and Term Paper must be submitted in hardcopy and softcopy format. On-campus students submit the hardcopies of extended abstracts and term papers in class. Online students must submit via CPD.

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

**Grading Scheme and Important Dates:**

	<b>% of total grade (Under. Students)</b>	<b>% of total grade (Grad. Students)</b>	<b>Date/Time</b>	<b>Location</b>
<b>Homework</b>	<b>25%</b>	<b>20%</b>	<b>start of class</b>	<b>BYAC-210</b>
<b>2 Mini-exams</b>	<b>25%</b>	<b>20%</b>	<b>TBD</b>	<b>BYAC-210</b>
<b>Midterm Exam<sup>§</sup></b>	<b>25%</b>	<b>25%</b>	<b>03/23/07</b>	<b>BYAC-210</b>
<b>Participation (Bonus)</b>	<b>5%</b>	<b>5%</b>	<b>NA</b>	<b>BYAC/MyASU</b>
<b>Term Paper<sup>§§</sup></b>	<b>NA</b>	<b>10%</b>	<b>Pre. Report: 03/28/07 Final Report: 04/26/07</b>	<b>BYAC-210</b>
<b>Final Exam<sup>§§</sup></b>	<b>25%</b>	<b>25%</b>	<b>05/03/07 12:20 – 2:10</b>	<b>BYAC-210</b>
<b>Total Grade</b>	<b>105%</b>	<b>105%</b>	<b>NA</b>	<b>NA</b>

§ Tentative  
§§ Date is firm

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

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

**Homework Policy:** Homework assignments must be turned in **hardcopy form** at the start of the class on the assigned due date. Homework grades will be on a scale 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. Grades for In-class Exercises will be low, medium, or high.

**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.

<b>% total score</b>	≥98	≥94	≥90	≥87	≥84	≥80	≥75	≥70	≥60	<60
<b>Letter grade</b>	A+	A	A-	B+	B	B-	C+	C	D	E
<b>Points for GPA</b>	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 is **March 30th**; Interactive SunDial withdrawal deadline is **April 1st**; complete withdrawal deadline is **May 1<sup>st</sup>**. 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, teaching assistant, and 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\*

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

1. Introduction [Ch. 1, OOAD, 1 lec.]
  - Course description
  - Software complexity
2. Object Modeling Foundations [Ch. 2, OOAD, 2 lec.]
  - Primary elements of the Object Model
  - Eclipse Modeling Framework
3. Classes and Objects [Ch. 3, OOAD; OOMD, UMLS, 3 lec.]
  - Fundamental concepts and life-cycle
  - Basic structural modeling in UML
  - Classes and objects in Java programming language
4. Classification [Ch. 4, OOAD, 1.5 lec.]
  - Use-cases, Classes, Responsibilities, Collaborators
  - Basic behavioral modeling in UML
5. The Object Model Revisited [Ch. 2, OOAD, 1 lec.]
  - Complex elements of the Object Model
6. Analysis and Design in UML [Ch. 5, OOAD; OOMD, UMLS, 4 lec.]
  - Advanced structural modeling
  - Advanced behavioral modeling
7. Micro and Marco Development Processes [Ch. 6, OOAD, 0.5 lec.]
8. Structured Analysis and Design [SEPA, 1 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, 1.5 lec.]
  - Architectural styles, reference models, reference architectures
  - Architectural structures
  - Importance of software architecture
11. Software/System Applications [Ch. 3, SAP, 1.5 lec.]
  - 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. Software Quality Attributes [Ch. 5, SAP, 2 lec.]
  - A taxonomy of design decisions
  - Architectural patterns and strategies
14. Designing Software Architecture [Ch. 7, SAP, 3 lec.]
  - Software lifecycle and architecture
  - Architecture Design
15. Design Patterns [DP and papers, 1 lec.]

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