CS 3331: Advanced Object-Oriented Programming
Summer 2017

CRN: 35732
Lecture: MTWRF 9:20 am - 11:30 am in CCSB 1.0510
Website: http://www.cs.utep.edu/cheon/cs3331/
Instructor: Yoonsik Cheon (x-8028, ycheon@utep.edu); office hours: TR 11:30 am - 12:20 pm in CCSB 3.0606
TA: Jesus Molina (jemolinamonsivais@miners); office hours: TBA in CCSB G.0512 (TA room)
Prerequisite: CS 2302 with a grade of C or better

Course Objectives

This course is to equip students with advanced design and programming techniques in the object-oriented programming paradigms. To this end, specific objectives are:
• To understand object-oriented design concepts and principles,
• To acquire skills needed for developing high quality object-oriented programs,
• To be able to use of object-oriented design notations and support tools such as UML for modeling problem solutions and software systems, and
• To be proficient in object-oriented programming environments.

Learning Outcomes

Upon successful completion of this course, students will be able to:
• [Level 3: *Synthesis and evaluation*] Design and implement software employing the principles of modularity, encapsulation, information hiding, abstraction, and polymorphism,
• [Level 3] Design, implement, and use classes and methods that follow conventions and styles, and make appropriate use of advanced features such as inheritance, exceptions, and generics,
• [Level 3] Evaluate existing classes and software for the purposes of extension through inheritance,
• [Level 3] Create API documents for classes, fields and methods,
• [Level 3] Design and implement test suites for automated unit testing,
• [Level 3] Refactor existing software to improve its design or efficiency,
• [Level 2: *Application and analysis*] Formulate use case diagrams and scenarios to support understanding of user requirements,
• [Level 2] Use object-oriented design notations, including UML class diagram, state machine diagrams, and sequence diagrams, to model problem solutions,
• [Level 2] Use basic object-oriented design patterns to structure solutions to software design problems,
• [Level 2] Translate design features, such as classes and their relationships, to implementations,
• [Level 2] Use frameworks and library classes and methods in problem solutions,
• [Level 1: *Knowledge and comprehension*] Explain the difference between an object-oriented approach and a procedural approach.

Textbooks

The required course textbook is Xiaoping Jia's *Object-Oriented Software Development Using Java,* 2nd edition*,* Addison Wesley, 2002. The textbook is available at the UTEP bookstore, and you are expected to acquire a copy for your use in this course, as reading assignments will be taken from the textbook.

In addition to the required textbook, the following books are recommended as references:

• Scott W. Ambler. *The Elements of UML 2.0 Style*, Cambridge University Press, 2005.
• Allan Vermeulen, et al. *The Elements of Java Style*, Cambridge University Press, 2000.
• Richard Warburton, *Java 8 Lambdas*, O'Reilly, 2014 (ebook through UTEP library).

Homework

There will be four or five homework assignments, and most homework will require programming in Java. Some may be done in pairs. For an individual homework, while you may discuss the assignment in general terms with others, your solutions (programs) should be composed, designed, written and tested by yourself alone. If you need a help, consult with the TA or the instructor. All homework assignments will be announced or handed out in class; if you miss a class, it is your responsibility to find out what you missed. No late submission will be accepted.

Exams

There will be one mid-term exam and a final exam. The final exam will be comprehensive. The mid-term exam will take place during the regular class session and will be 80 minutes in length, and the final exam will take place on the date specified by the university.

Grading

Your grade is independent of anyone else's grade; you are not graded on a curve and everyone can get an A in this course. The purpose of grading is not to rank you, but to uphold a standard of quality and to give you feedback. Your semester grade will be based on a combination of quizzes, in-class exercises, homework assignments and exams. The approximate percentages are as follows:

Quizzes and in-class exercises:	20%
Homework assignments:	50%
Exams:	30%

In addition, a bonus of up to 5% is available for lecture attendance and participation. To earn this bonus, you must arrive at lecture on time and participate in class discussion in a constructive and prepared manner, e.g., by asking or answering questions that demonstrate that you have read and attempted to understand the material.

The nominal percentage-score-to-letter-grade conversion is as follows:

90% or higher is an A
80-89% is a B
70-79% is a C
60-69% is a D
below 60% is an F

I reserve the right to adjust these criteria downward---e.g., so that 88% or higher represents an A---depending on overall class performance. The criteria will not be adjusted upward.

Attendance

Lecture attendance is required; you should understand that your success in the course will improve greatly by attending classes regularly. *The instructor reserves the right to penalize unexcused absences; e.g., your final grade may be lowered by one point for each unexcused absence above three.* The following is excerpted from the 2016-2017 Undergraduate Catalog.

> The student is expected to attend all classes and laboratory sessions. It is the responsibility of the student to inform each instructor of extended absences. When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor can drop the student from the class with a grade of W before the course drop deadline and with a grade of F after the course drop deadline.

Standards of Conduct

You are expected to conduct yourself in a professional and courteous manner, as prescribed by the UTEP Standards of Conduct. Graded work (quizzes, homework and exams) is to be completed independently and should be unmistakably your own work, although you may discuss your work with others in a general way. You may not represent as your own work material that is transcribed or copied from another source, including persons, books, or Web pages. Instructors are required to—and will—report academic dishonesty and any other violation of the Standards of Conduct to the Dean of Students.

Disabilities

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Schedule

The following table shows a planned schedule for the course. The schedule is subject to change, and an up-to-date one will be available from the course website.

Dates		Topics	Readings	Assignments
Day 1	Jul. 11	Intro to CS 3331 OO software development	Chap 1	
Day 2	Jul. 12	OO modeling with UML	Sec 2.1-2.2	HW1: UML
Day 3	Jul. 13	UML	Sec 2.3-2.4	
Day 4	Jul. 17	Applets	Sec 3.3, 4.7	HW2: Applet
Day 5	Jul. 18	Java features	Sec 4.4-4.6, 5.5	
Day 6	Jul. 19	Java features Documenting code (Javadoc)	Sec 6.1.2; App B	
Day 7	Jul. 20	Unit testing (JUnit)	Sec 6.4	HW3: JUnit
Day 8	Jul. 24	Inheritance Class design Design by contract	Sec 5.1-5.4 Sec 6.1, 6.3 Sec 6.2	
Day 9	Jul. 25	Exam 1		
Day 10	Jul. 26	Design by abstraction	Chap 7	HW4: Design
Day 11	Jul. 27	GUI framework	Sec 8.1, 8.3	
Day 12	Jul. 31	Network programming	Sec 12.1	HW5: Network
Day 13	Aug. 1	Concurrent programming	Chap 11	
Day 15	Aug. 2	Collections and I/O frameworks	Sec 8.2, 8.4	
Day 16	Aug. 3	Programming work		
Week 9	Aug. 4	Final at 10:00 am – 12:45 pm		

Important Dates

July 11:   Class begins
July 13:   Census day
July 25:   Exam 1
July 28:   Drop/withdrawal deadline
August 3:   Last day of classes
August 4:   Final on Friday at 10:00 am – 12:45 pm