Course Syllabus

Instructor / Lecture:	Zhipeng Chen	
"Virtual Office Hours":	At least one 1-hour session per week via skype will be offered. Details will be sent by email throughout the semester. Hours will vary, including both weekdays and weekends, to accommodate the students' schedule.	
Appointments:	In addition to weekly "Virtual Office Hours," the students are encouraged to email the instructor to set up individual appointments, if needed.	
Phone:	N/A. Email will be much more reliable as the means of communication.	
Email:	zhipengchen@email.arizona.edu When emailing the instructor, please try your best to use your official UA email account for better record keeping. In addition, in the subject line of your email, please always start with "[MIS 507A] " to ensure timely reply.	

Course Quote

"You think you know when you can learn, are more sure when you can write, even more when you can teach, but certain when you can program." Alan Perlis

Course Description

MIS 507A aims to equip students with advanced object-oriented system design and software engineering principles and techniques to tackle modern challenges facing the development and maintenance of production-quality software systems in today's fast-paced business environments. The students are expected to develop software architectural designs using design patterns, to write small-scale computer code to implement such patterns, and to understand a range of software design and integration challenges and implement the best practice from the industry to deal with such challenges.

Prerequisite Requirements:
Prior computer programming experience in Java or other object-oriented languages (e.g., C++, C#, or python).

Although programming is not a particular emphasis of MIS 507A, students are expected to be able to write some object-oriented computer code throughout the class (ranging roughly from 50 lines -- 400 lines). The emphasis of coding will be

on defining classes/subclasses, and the use of composition and inheritance. For students who do not have prior programming experience, they are strongly encouraged to complete MIS 501 "Fundamentals of Object Oriented Programming" before enrolling in MIS 507A.

Course Rationale

Developing production-quality software systems that are scalable and reusable presents many engineering and project management challenges. Despite the major technological advances in the computing platform (e.g., cloud computing) and the availability of powerful (and often in the form of open source) software libraries and toolkits, these software development challenges remain partially driven by today's competitive marketplace, which demands for rapid development and deployment with ever changing user requirements. Furthermore, as the distributed and networked computing infrastructure through the Web has quickly become the dominating platform for information system deployment, additional challenges have emerged. This course is designed to expose the students to modern software system design and integration techniques to address these challenges.

Course Objectives

This course aims to prepare you with a solid technical foundation and limited hands-on experience to meet these challenges of software design and system integration in the Web era. It covers both the design principles and state of the art modeling and implementation techniques of production-quality software systems. In addition, it will introduce several emerging trends in software development and discuss a number of specific software engineering and project management issues with great practical relevance.

We will start with a discussion of more traditional object-oriented modeling material, followed by strategies for implementing reusable and extensible systems. We will then have an extensive discussion of design patterns--templates for software design that have been thoroughly tested and proven to deliver great value. The last module of the class will focus on a selected set of software engineering and project management issues and discuss the current thinking on what constitutes the best practice to deal with these issues.

Course Time Zone

All dates and times mentioned in this course represent Mountain Standard Time (Arizona), which are UTC-7 hours. Arizona does not observe Daylight Savings Time. You can use the following link to get the current local time in Tucson, Arizona: http://www.timeanddate.com/worldclock/city.html?n=393

Course Reading Material
Required Readings:

``Design Patterns Explained: A New Perspective on Object-Oriented Design,'' 2nd edition, by Shalloway and Trott. 2004. ISBN-10: **0321247140** | ISBN-13: **978-0321247148**

Supplemental Readings / References:

``Program Development in Java: Abstraction, Specification, and Object-Oriented Design,'' by Barbara Liskov and John Guttag. 2000. ISBN-10: **0201657686** | ISBN-13: **978-0201657685**

``Object-Oriented Analysis and Design with Applications,''3rd edition, by Booch, Maksimchuk, Engle, Young, Conallen, and Houston. 2007. ISBN-10: **020189551X** | ISBN-13: **978-0201895513**

Additional required and optional readings will be available from the course web site.

Course Web Site via D2L: All reading material, class handouts, voice-over PPT presentations, pointers to useful Web sources, and assignments are available on the course Web site.

Course Workload Expectations

This 3-credit-hour course is structured around 8 weeks. Given this condensed time-frame, students can expect a heavier than normal workload. The course workload is estimated as follows:

Course Item	Estimated Hours
Learning Modules	22
Readings	20
Regular Assignments	12
Final Exam	6
Course Project	20
Total	80

This averages out to be approximately 10 hours/week and 80 hours for the entire course. These estimates will vary depending upon the student's knowledge level (especially prior computer programming experience), and time commitment.

Course Operation

Course Time Zone:

All dates and times mentioned in this course represent Mountain Standard Time (Arizona), which is UTC-7 hours. Arizona does not observe Daylight Savings Time. You can use the following link to get the current local time in Tucson, Arizona: http://www.timeanddate.com/worldclock/city.html?n=393

Weekly Topic Coverage:

This course is structured around weekly progress. The table below summarizes the main topics covered each week. For detailed information about expected weekly progress, please refer to the course schedule.

Week	Topic
Week 1	Course Introduction and Java Review
Week 2	Abstractions and Object-Oriented Modeling
Week 3	OO Case Studies and Design Patterns
Week 4-6	Design Patterns

Week 7	Software Engineering
Week 8	Wrap-up, Final Exam, and Final Project Report

D2L Course Management System:

This course uses the Eller D2L course management system. Students are **required** to use D2L with this class and are encouraged to check our D2L class website at least twice a week.

Students are also encouraged to have their D2L email forwarded to their primary email account. The instructor will use D2L for course assignments, quizzes, exams, and content distribution. Important announcements will be sent to the students' official UA email accounts. The Eller College D2L system is available at: http://D2L.eller.arizona.edu

Course Grading

Course grades will be determined by the following criteria.

	Percent of Grade
Six Assignments	45%
Final Exam	35%
Class Project	20%
	100% (100 pts)

The approximate final course grade breakdown will be as follows:

Grade	Letter Grade
85-100	A
75-84.9	B
65-74.9	C
50-64.9	D
0-49.9	F

Incomplete Policy:

If you experience extraordinary circumstances beyond your control, which prevent you from completing the course within the scheduled 8-week timeframe, you must request an incomplete by emailing me *before the end of the course*. Please clearly explain the reasons for the request and provide relevant documentation. Please be aware that you must be receiving a passing grade at the time of the request. If granted an incomplete, you should review the related policy stipulations at http://registrar.arizona.edu/gradepolicy/incomplete.htm

Assignments and Assessments

Assignments

Each week, the students are expected to complete an assignment, typically consisting of a couple of short conceptual/discussion questions and problem-solving problems which might involve a limited amount of computer coding and the use of UML diagrams. These small assignments are designed to help the students review the materials

covered and use the knowledge to solve some small-scale problems on a weekly basis. There are strong dependencies among the modules covered in this course and it is essential that the students learn the materials in the allocated time window as such materials very likely will be needed to understand the materials in the ensuing weeks.

Programming and Class Project

You are expected to implement some small-scale programs using any object-oriented programming language of your choosing.

In most cases, you should complete an individual class project, in which you are expected to apply design pattern principles to design and implement a very small program (roughly with 300-400 lines of source code). In very rare cases (e.g., a small group of you already worked on some related projects before; or you currently work for the same organization and would like to design something related to your work), with the approval of the instructor, you can form groups of 2-3 people to design and implement a small-sized program using design patterns (roughly with 600-1,200 lines of source code). In terms of the application context, your group project can be continuation of the projects you completed in other MIS courses (e.g., MIS 541). However, for MIS 507A, you need to take a design pattern-based approach to enable software flexibility and extensibility.

More detailed instructions about the class project are as follows.

- The MIS 507A project is intended to be focused on "design patterns." I understand all of you are very busy. This class project is meant to be a small-scale project with a very limited scope. Your project can be continuation of the projects you completed in other MIS courses.

- It is very important for you or your team to communicate with me about your project ideas very early and frequently so that I can provide quick feedback to help you control its size and scope.

- Project Idea. You take the source code from an existing project from another class you completed before, and re-design and re-implement the core logic based on one or more design patterns. Of course, you can also design and implement a new project using design patterns but this new project needs to be quite small to help control the scope.

  Some design patterns are very simple. Thus using only them in your projects will not be sufficient.

  Recommended, more complex, design patterns are: the "Strategy" Pattern, the "Bridge" Pattern, various "Factory" Patterns, and the "Publish-Subscribe" Pattern.

  To preview and learn more about these patterns, go to wikipedia page on "Design Pattern" and there is a table containing pointers to detailed discussions of each of these patterns.

- Several possibilities of a project will be discussed in class. Note that these ideas are just examples. You are encouraged to explore other possibilities. If you have trouble coming up with your own project ideas, I could assign specific projects to you, as the last resort.

- There is no need to come up with fancy user interfaces or even sophisticated user functions. In many cases, a simple command-line interface will suffice. It is also perfectly fine for your program not even having any user interactions; it could just run and output something using the canned parameter values. The key of the MIS 507A projects is the INTERNAL software architecture. You should focus on designing and implementing a flexible and extensible software architecture reflected through your class and type hierarchy designs. I will be reading your source code.

The table below summarizes milestones for the class project.

Milestone	Due Date
If you choose to complete an individual class project (as most of you should), your first milestone will be the two-paragraph project proposal due in Week 4. If you choose a group class project, by the end of Week 1, email the instructor with (a) information about your team members, (b) a brief justification for opting in for a group project, and (c) a one-paragraph introduction to your project ideas. After receiving the approval, proceed with the milestones as posted below.	Week 1
Two-paragraph project proposal	Week 4
Detailed project implementation plan	Week 5
Final project report	Week 8

Final Exam
All students will take an open-book, open-note final exam. The exam questions will be posted on D2L at designated time and the students are expected to submit their answers within 2 hours of the posting of the questions. The exam will consist of short answer, discussion, class design, and (light) coding questions.

Course Policies
Missed Exams
The following are possible acceptable excuses for rescheduling. In all cases, the student is required to contact the instructor via email. In some cases the instructor may request documentation as proof of the need to reschedule taking the exam. In all cases, the rescheduling will not exceed the University's last day of scheduled exam days (if applicable).

- The student is aware of a scheduling conflict (e.g., interview, field trip, conference) that can be identify at least two weeks prior to the Exam due date. For example, the student may have an important, unchangeable job interview scheduled for one of the exam dates.
- An emergency that comes up before the exam. For example, a family emergency that requires the student to be away from a computer for a period of time or the student has a serious illness.

Academic Integrity
Academic Policies and Procedures:
As a University of Arizona student, you are expected to become familiar with and abide by the university-wide policies and procedures. You can find complete, up-to-date information http://catalog.arizona.edu/2015-16/policies/aaindex.html

Academic Integrity:
Academic Dishonesty occurs whenever any action or attempted action is pursued that creates an unfair academic advantage or disadvantage for student and/or any member or members of the academic community. All forms of academic dishonesty are subject to sanctions under the Code of Academic Integrity. Sanctions include: written warning, reduction in grade for work involved, disciplinary probation, loss of credit for work involved, failing grade in the course,

suspension, and/or expulsion. Various forms of academic dishonesty include, but are not limited to cheating, fabrication, facilitating academic dishonesty, and/or plagiarism.

Academic Misconduct is defined as any behaviors not conforming to prevailing standards or rules within the academic community. All forms of academic misconduct are subject to sanctions under the Code of Conduct. Sanctions include: restricted access to University property, administrative hold, warning, probation, suspension, and/or expulsion. Various forms of academic misconduct include, but are not limited to disruptive behavior, threatening behavior, and/or the theft or damage of University property.

For more specific examples of academic dishonesty, academic misconduct, and how to avoid such behaviors, please visit the following website:

http://deanofstudents.arizona.edu/tipsforavoidingacademicdishonesty

The MIS program takes violations of the University's Honor Code very seriously. All individual homework has to be done **individually**. Class projects have to be original and related coding and debugging have to be completed by the corresponding team members. Plagiarism, in the form of either paper writing or coding, will be severely punished.

Online Collaboration/Netiquette:
In MIS*online* courses, you will primarily communicate with instructors and peers virtually through a variety of tools such as discussion forums, email, and web conferencing. The following guidelines will enable everyone in the course to participate and collaborate in a productive, safe environment.

- Be professional, courteous, and respectful as you would in a physical classroom.
- Online communication lacks the nonverbal cues that provide much of the meaning and nuances in face- to- face conversations. Choose your words carefully, phrase your sentences clearly, and stay on topic.
- It is expected that students may disagree with the research presented or the opinions of their fellow classmates. To disagree is fine but to disparage others' views is unacceptable. All comments should be kept civil and thoughtful. Remember that this course abides by university policies regarding disruptive behavior: http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting
- Compose your messages and posts in a word processing tool, and check your spelling and grammar before submitting your post / email.

Statement of copyrighted materials:
All lecture notes, lectures, study guides and other course materials disseminated by the instructor to the students, whether in class or online, are original materials and reflect intellectual property of the instructor or author of those works. All readings, study guides, lecture notes and handouts are intended for individual use by students. You may not distribute or reproduce these materials for commercial purposes without the express written consent of the instructor. Students who sell or distribute these materials for any use other than their own are in violation of the University's Intellectual Property Policy (available at http://policy.arizona.edu/research/intellectual-property-policy). Violations of the instructors copyright may result in course sanctions and violate the Code of Academic Integrity.

UA MIS*online* Student Support:
The course instructor is available to assist with course related issues. Students may, at any time, send email to the instructor.

The following are guidelines for requesting support:

- **Course Questions –** Use direct Email for general or specific questions regarding course materials or policy.

- **Personal Questions**.   Send direct Email to the instructor for discussing specific topics related to grades or personal concerns.
- **Course Registration Questions**.   Send Email to misonline@eller.arizona.edu.
- **D2L Support Questions**: Email support@eller.arizona.edu.

Disability Accommodations:

Students needing special accommodations or special services should contact the Disability Resources Center, 1224 East Lowell Street, Tucson AZ 85721, (520) 621-3268, FAX (520)621-9423, email: drc-info@email.arizona.edu, http://drc.arizona.edu/.You must register and request that the center or DRC send the instructor official notification of your needs as soon as possible.

Please contact the instructor to discuss accommodations and how this course's requirements may impact your ability to fully participate. The need for accommodations must be documented by the Disability Resources Center.

Requests for Accommodations

If a student anticipates issues related to the format or requirements of this course, please contact the instructor to discuss ways to ensure full participation in the course.

Library Support:

The University of Arizona Libraries is dedicated to providing the research tools you need at any time. For an abbreviated list of resources directly related to a specific course, select the **Business Research / Library Tools** link (located in the Course Menu on the left of the screen). If you need any assistance, please contact Jason Dewland at dewlandj@u.library.arizona.edu and include your University of Arizona NetID.

Course Grievance Policy:

In case of grievances with a course component or grading, students are encouraged to first try and resolve the issue with the instructor. If the student feels the issue is not resolved satisfactorily, please send Email to misonline@eller.arizona.edu.

Course Surveys and Evaluations:

There are two formal online surveys associated with this course:
- **MIS course specific survey** - assists course designers with refining elements of the course. This survey is conducted by the MIS*online* team prior to the end of the course.
- **UA Teacher Course Evaluation** – standard course evaluation conducted by the University of Arizona.
    - This will appear be made available through https://tce.oirps.arizona.edu/TCEOnline at the appropriate time during the course.

Periodically, the instructor may conduct anonymous online surveys to receive quick student feedback, for the purpose of adjusting the course material and delivery, and better serving the students.

Please participate in these online surveys!