CSC 436: Software Engineering

Fall 2017

Tuesdays and Thursdays 12:00-1:45, GS 906

THE UNIVERSITY OF ARIZONA.
Computer Science

(*Note: This policies in this document are from the Syllabus for Spring 2017. The updated Fall 2017 syllabus is expected to be available in time for the first class of the semester.*)

Description of Course

Software engineering is the art and science of developing reliable software systems that address customer needs, subject to resource, business, and societal constraints.

The course will emphasize principles and practices, illustrated by real-world examples. A team project is central to the learning experience.

The course may include guest lectures on topics related to the course content.

Course Prerequisites

The course prerequisites are CSC 252, 335, 345, 352.

Proficiency with a programming language such as Java and experience with completing a medium sized programming project are strongly recommended for completion of this course.

Proficiency in English is required for writing the project proposal and reports. The homework and tests may include questions that require reading and writing of English text.

Instructor Information

- Name: Ravi Sethi
- Office: Gould-Simpson 720
- Phone: 520-621-0689
- E-mail: rsethi@email.arizona.edu
- Office Hours: Tuesdays & Thursdays 10:00-11:00, or by appointment
- Page: http://www.cs.arizona.edu/~rsethi/

Course Format and Teaching Methods

The course includes lectures, in-class group activities, a team project, and team presentations.

For the project, students will form their own teams of 4, prepare a written team proposal, design and implement a system, reflect on their experience, and complete a comprehensive final written report. Software and documentation produced by students will be made available as is, under the MIT open source license http://opensource.org/licenses.MIT .

Course Objectives and Expected Learning Outcomes

The learning outcomes for the course as follows:

- Describe the relative advantages and disadvantages of the different practices that are key components of several major software development process models; e.g., agile, iterative, waterfall, iterative, continuous delivery.

- Describe the fundamental challenges of and common techniques used for working with customers and identifying requirements.
- Design a simple software system, and explain how architecture and design principles have been applied in its design.
- Conduct a peer review of the architecture of a software system.
- Describe techniques for designing significant test cases for regression, integration, and system testing
- Set up an improvement program by establishing goals and defining metrics for establishing progress towards the goals.
- Discuss common behaviors that contribute to the effective functioning of a team.

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences preapproved by the UA Dean of Students (or dean's designee) will be honored. See https://deanofstudents.arizona.edu/absences

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

Policy for Students Who Register Late

Students who wish to register late must contact the instructor before the third class meeting on August 29.

Course Communications

The class web page http://www.cs.arizona.edu/classes/cs436/fall17 has general information about the course, including a link to this syllabus.

Announcements, events, homework, project templates, notes, readings, and other materials related to the course will be posted during the semester to the course materials page http://www.cs.arizona.edu/classes/cs436/fall17/materials.html.

Required Texts or Readings

Students will be assigned readings that will be available on-line either through the University of Arizona Library or through the class course materials page.

Edited versions of the slides from the lectures will be posted to the class course materials page before the next lecture.

All materials made available through the instructor or The University of Arizona remain the property of the copyright holders. They are provided for the use of students in this course for the duration of the course, except as noted.

Required or Special Materials

Students are responsible for providing their own software and hardware systems and services that they might need for their project. Check with the instructor if you need special access to the computing facilities provided by the Department of Computer Science or the University.

Assignments, Reports, and Exams: Schedule/Due Dates

Exams:

10/10/17   Midterm Exam, covering course material to date. (To be graded by 10/19.)

12/08/17   1:00-3:00. Final Exam, covering course material from the start of the semester. (To be graded as required by University policies for submitting grades.)

Team Project Schedule and Reports:

 9/14/17   Proposal for the semester-long team project

10/10/17   Complete Iteration 1 (Viable System)

10/31/17   Complete Iteration 2 (Feature Release)

10/21/17   Complete Iteration 3 (Full Beta Release)

11/30/17   Complete Iteration 4 (Complete System)

Homework Due Dates:

Graded homework will be returned before the next homework due date.

 8/31/17   Homework 1

 9/07/17   Homework 2

 9/14/17   Homework 3

 9/21/17   Homework 4

 9/28/17   Homework 5

10/05/17   Homework 6

10/26/17   Homework 7

11/02/17   Homework 8

11/09/17   Homework 9

11/16/17   Homework 10

Late Work Policy

Work will not be accepted late except in case of a documented emergency or illness. Students who miss a deadline due to illness or emergency are required to bring documentation from their healthcare provider or other relevant professional third party. Failure to submit third-party documentation will result in zero credit.

Final Examination

The Final Exam will be on 12/05/17, 1:00-3:00, in Gould-Simpson 906.

For the Final Exam Regulations, see
http://www.registrar.arizona.edu/courses/final-examination-regulations-and-information.

The University Final Exam Schedule is available at
http://www.registrar.arizona.edu/schedules/finals.htm

Grading Scale and Policy

University policy regarding grades and grading systems is available at
http://catalog.arizona.edu/policy/grades-and-grading-system

The purpose of grading is to assess the level of mastery on the following scale from the ACM-IEEE 2013 Curriculum Guidelines for Undergraduate Degree Programs in Computer Science:

- *"Familiarity*: The student understands what a concept is or what it means."
- *"Usage*: The student is able to use or apply a concept in a concrete way. Using a concept may include, for example, appropriately using a specific concept in a program, using a particular proof technique, or performing a particular analysis."
- *"Assessment*: The student is able to consider a concept from multiple viewpoints and/or justify the selection of a particular approach to solve a problem."

The proportion of questions on exams will be roughly as follows:

- Familiarity   at least 25%
- Usage   up to 40%
- Assessment   up to 35%

At the instructors discretion, an exam may have additional questions that push the points on an exam up to 110%. Additional points over 100% on one exam may be applied on another exam. Extra credit on exams cannot be used to offset a gap on homework, the team project, or team reports. The overall contribution of the exams to the final grade is capped at 40%.

The contributions toward the grade in this Course are as follows:

- Individual Homework   20%
- Team Project and Reports   40%
- Midterm Exam   20%
- Final Exam   20%
- Instructor Discretion (bonus points)   up to   5%

Grade Distribution for this Course:

- A: 90+%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- E: 0-59%

Department of Computer Science Grading Policy:

1. Instructors will explicitly promise when every assignment and exam will be graded and returned to students. These promised dates will appear in the syllabus, associated with the corresponding due dates and exam dates.
2. Graded homework will be returned before the next homework is due.
3. Exams will be returned "promptly", as defined by the instructor (and as promised in the syllabus).
4. Grading delays beyond promised return-by dates will be announced as soon as possible with an explanation for the delay.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal, respectively.

Scheduled Topics

This course is an introduction to the following topics in Software Engineering:

- What is Software Engineering
- Introduction to Software Development Processes
- Working with Customers
- Goals and Metrics
- Project Planning
- Design and Architecture
- Static Analysis and Code Reviews
- Testing
- Model Checking
- Project Management

The ordering of the topics is subject to change. Additional topics may be added if time permits.

Department of Computer Science Code of Conduct

The Department of Computer Science is committed to providing and maintaining a supportive educational environment for all. We strive to be welcoming and inclusive, respect privacy and confidentiality, behave respectfully and courteously, and practice intellectual honesty. Disruptive behaviors (such as physical or emotional harassment, dismissive attitudes, and abuse of department resources) will not be tolerated. The complete Code of Conduct is available on our department web site. We expect that you will adhere to this code, as well as the UA Student Code of Conduct, while you are a member of this class.

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and

not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Classroom Use of Personal Devices

The use of personal electronics such as phones, laptops, iPads, and other such mobile devices is distracting to the other students and the instructor. Their use can degrade the learning environment. Therefore, students are not permitted to use these devices during the class period.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Elective Name and Pronoun Usage

This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit http://drc.arizona.edu.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

The University Libraries have some excellent tips for avoiding plagiarism, available at http://www.library.arizona.edu/help/tutorials/plagiarism.

All materials made available through the instructor or The University of Arizona remain the property of the copyright holders. They are provided for the use of students in this course for the duration of the course, except as noted.

Selling class notes and/or other course materials to other students or to a third party for resale is a violation of copyright laws and is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-Harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available at http://catalog.arizona.edu/policies

Student Assistance and Advocacy information is available at http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Office of Diversity information is available at http://diversity.arizona.edu/Campus Health information may be found here: http://www.health.arizona.edu/counseling-and-psych-services

OASIS Sexual Assault and Trauma Services https://www.health.arizona.edu/oasis-sexual-assault-and-trauma-services

Confidentiality of Student Records

http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.