

COM 421, 430: Software Engineering I II

American University of Central Asia
Software Engineering Department

1 Course Information

Course Codes

COM-421, COM-421.1
COM-430, COM-430.1

Course IDs

3705
3881

Prerequisite

COM-117, Programming II. Intro to Object Oriented Programming
or
COM-119, Object-Oriented Programming

Prerequisite for

COM-430, Software Engineering II

Credits

6

Time and Place

Lecture: Monday 10:50–12:05, Room 432
Lab: Friday 10:50–12:05, Lab 432

Course Materials

<https://github.com/auca/com.421-430>

2 Contact Information

Professor

Dmitrii Toksaitov
toksaitov_d@auca.kg

Office

AUCA, room 315

Office Hours

By appointment throughout the work week (write to your professor to make an appointment)

3 Course Overview

The course introduces students to software engineering, teaching each of the individual steps of the software life cycle: requirements, design, coding, testing and software delivery. The course covers estimating man months to complete a project and writing project proposals. Along with the theory, students will go through all the stages of software development on their own projects. This is a two-semester course designed for Software Engineering majors and minors.

At the end of the course student should be able to research, analyze, design, develop, and maintain functioning software systems in accord with the goals of the AUCA Software Engineering Department and the 510300 IT competency standard.

4 Topics: Software Engineering I

- Week 1–3: Software engineering concepts (9 hours)
- Week 4–8: Software Development Tools and Technologies (15 hours)
- Week 9–11: Software development methodologies (9 hours)
- Week 12–14: Agile software development (9 hours)
- Week 15–16: Project management (6 hours)

5 Topics: Software Engineering II

- Week 1–3: Requirements engineering (9 hours)
- Week 4–6: System design and modeling (9 hours)
- Week 7–9: System implementation (9 hours)
- Week 10–12: Software testing (9 hours)
- Week 13–14: Software evolution (6 hours)
- Week 15–16: Dependability and security (6 hours)

6 Assignments and Exams

6.1 GitHub Checkpoints

Students will have to maintain a personal private GitHub repository with all their works shared with their instructor. Students have to periodically commit and push a specific number of lab and project solutions as told by the instructor. The instructor will regularly check the work and give points for the accomplished work.

6.2 Labs and Projects

Students will have a number of laboratory tasks and have to finish a course project. Students will have to defend their work to the instructor during midterm and final examination sessions.

Students will have to finish several lab tasks. The tasks are based on topics discussed during lectures. Many tasks should be finished during the class to receive a grade.

The course contains one project for each semester. Each project requires to develop a software product for an imaginary customer. A team or teams of students will work to deliver solutions to a specified problem. A team will go through all steps of software production such as requirements specification, software design, construction, testing, deployment, and maintenance. Students will get a chance to practice agile methodologies such as Scrum and Kanban, work with Version Control Systems (VCS) such as Git, work with project management systems, learn to test their systems, try out Test-Driven Development (TDD), practice Continuous Integration (CI) and Continuous Delivery (CD).

7 Course Materials, Recordings and Screencasts

Students will find all the course materials on GitHub. We hope that by working with GitHub, students will become familiar with the Git version control system and the popular (among developers) GitHub service.

Every class is screencasted online and recorded to YouTube for students' convenience. The course Zoom link is <http://com-421-zoom.auca.space>. YouTube links can be found on the course repository at <https://github.com/auca/com.421-430>. An ability to watch a class remotely at any time MUST NOT be a reason not to attend classes. Active participation is necessary to succeed in this course. Class recording may stop if the instructor feels the attendance and participation are unsatisfactory.

8 Software

Students are recommended to install the following software on their machines.

- IntelliJ IDEA Ultimate: <https://www.jetbrains.com/idea/download>
- Git with SSH: <https://git-scm.com/downloads>

Most of the tools required for the course will be available on the remote course server.

9 Reading

Software Engineering (9th or 10th Edition) by Ian Sommerville (AUCA Library Call Number: QA76.758.S657 2011, ISBN: 978-0137035151 or 978-0133943030)

9.1 Supplemental Reading

1. The Mythical Man-Month: Essays on Software Engineering, Second Edition by Frederick P. Brooks Jr. (ISBN: 858-0001065793)
2. Extreme Programming Explained: Embrace Change, 2nd Edition by Kent Beck, Cynthia Andres (ISBN: 978-0321278654)
3. Essential Scrum: A Practical Guide to the Most Popular Agile Process by Kenneth S. Rubin (ISBN: 007-6092046028)
4. Test Driven Development: By Example by Kent Beck (ISBN: 978-0321146533)
5. Code Complete: A Practical Handbook of Software Construction by Steve McConnell (AUCA Library Call Number: QA76.76.D47M39 2004, ISBN: 079-0145196705)
6. Design Patterns: Elements of Reusable Object-Oriented Software by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (AUCA Library Call Number: QA 76.64 D47 1995, ISBN: 978-0201633610)
7. Refactoring: Improving the Design of Existing Code by Martin Fowler, Kent Beck, John Brant, William Opdyke, Don Roberts (AUCA Library Call Number: QA76.76.R42 F695 1999, ISBN: 978-0201485677)

10 Grading

10.1 GitHub Checkpoints

Your instructor will announce a periodic review of your work. You will be awarded up to the following number of points for such checks.

- Labs (20%)
- Project (25%)

10.2 Interview

- Midterm Exam (25%)
- Final Exam (30%)

10.3 Totals

- 100% is formed from the GitHub submissions (45%) and the two exams (55%).

11 Scale

- [92%–100] %: A
- [85%–92) %: A-
- [80%–85) %: B+
- [75%–80) %: B
- [70%–75) %: B-
- [65%–70) %: C+
- [60%–65) %: C
- [55%–60) %: C-
- [50%–55) %: D+
- [45%–50) %: D
- [40%–45) %: D-
- Less than 40%: F

Please, note that requests to award a better grade if the number of points is close to such a grade will be ignored. For example, 91.99 is A-, NOT A. Likewise, requests to get extra assignments to increase the number of points will also be overlooked entirely.

12 Rules

Students are required to follow the rules of conduct of the Software Engineering Department and the American University of Central Asia.

12.1 Participation

Active work during the class may be awarded with extra points at the instructor's discretion. Poor student performance during a class can lead to points being deducted from the final grade.

Instructors may conduct pop-checks during classes at random without prior notice. Students MUST be ready for every class in order not to lose points. Students absent without a good reason from such classes with graded work will also lose points unless it is force-majeure circumstances. Instructors must be notified in advance about why a student is absent not to lose points.

12.2 Questions

We believe that a question from one student is most likely a question that other students are also interested in. That is why we encourage students to use the online discussion board of the LMS (Learning Management System) that you use (e.g., AUCA e-Course System or Canvas) to ask questions in public that other students can see and answer. We discourage students from asking questions through E-mail.

If it is a private matter, write direct messages to your instructor through the LMS system (such as AUCA e-Course System or Canvas) too. We will not be answering most E-mail messages this semester (unless it is a severe emergency) to consolidate all the course correspondence in one place.

Do not post the complete source code for any task on the LMS discussion board. You will get zero for that work for any such public post. Do not ask generic questions about your code to know why it does not work. Please spend some time thinking about your code, debugging it.

12.3 Late Policy

Late submissions and late exams are not allowed. Exceptions may be made at the professor's discretion only in force-majeure circumstances. If you got ill, got severe personal issues, got problems with your computer or the Internet, you **MUST** notify instructors at least 24 hours in advance. Otherwise, we will not give you an extension. We will consider that you were procrastinating until the very last day. We will also not be giving more than one emergency extension throughout the course.

Six hours before the deadline for any work on the course, instructors will go into a silent mode. No questions will be answered about the work that has to be submitted, no requests to have office hours will be considered. However, at any other work time before the deadline, we will try our best to answer your questions and help you through Zoom or in our office.

12.4 Exam and Task Submission Ceremonies

Students **MUST** follow exam and task submission ceremonies. It means they **MUST** strictly follow all the rules specified by the instructors in written or verbal form. Failure to do so will result in lost points. Throughout your career, you will have to work with various supporting documents (contracts, timesheets, etc.). It is a good idea to start learning to work with such documents accurately early. We will remove points for not following these rules or even refuse to accept your exam defense or tasks submitted to us. We will also give zero for not following deadlines or the strict exam timing rules.

12.5 Incomplete Grade

As with late exams, the grade *I* may be awarded only in exceptional circumstances. The student must start a discussion on getting the grade *I* with the instructors in advance and not during the last week before the final exams.

12.6 Academic Honesty

Plagiarism can be defined as “an act or an example of copying or stealing someone else's words or ideas and appropriating them as one's own”. The concept of plagiarism applies to all tasks and their components, including program code, comments, documentation, abstracts, reports, graphs, statistical tables, etc.

The following are examples of some common acts of plagiarism:

1. Representing the work of others as their own
2. Using other people's ideas or phrases without specifying the author
3. Copying code snippets, sentences, phrases, paragraphs or ideas from other people's works, published or unpublished, without referring to the author
4. Replacing selected words from a passage and using them as your own
5. Copying from any type of multimedia (graphics, audio, video, Internet streams), computer programs, graphs or diagrams from other people's works without representation of authorship
6. Buying work from a website or from another source and presenting it as your own work

In addition to being unethical, this indicates that the student has not studied the given material. Tasks written from somewhere for 5% or less will be assessed accordingly or will receive a 0 at the discretion of the teacher. If plagiarism is more than 5%, the case will be transferred to the AUCA Disciplinary Committee.

Students are not recommended to memorize lab and project code before exams, as this is a difficult and inefficient way to learn; and since practice exams may consist of open questions designed to test a student's analytical skills, memorization invariably leads to the fact that the answers are inappropriate and of poor quality.