

CS520 Theory and Practice of Software Engineering

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The lectures will be held in person on Tuesdays and Thursdays from 10:00 to 11:15 AM in the Integrated Learning Center Room S211. They will be recorded and made available for later viewing.

Course description:

This course introduces students to the principal activities and state-of-the-art techniques involved in developing high-quality software systems. The group and individual assignments will involve performing such activities and applying these techniques.

For UMass undergraduates, the prerequisite is having taken CS320. All students should be familiar with an object-oriented programming language (e.g., C++, Java, python).

Course objectives and learning outcomes:

We hope this course will provide you with new knowledge and experience with applying best practices for software development. The course will also include guest lectures about the latest software engineering research.

The topics covered are:

- requirements engineering
- formal specification methods (e.g., UML class diagrams)
- design principles & patterns
- best programming practices
- verification & validation (e.g., testing, model checking, theorem proving)
- debugging
- automated software engineering (e.g., automated program repair)

The course activities are:

- 3 homework assignments (individual assignments)
- 4 in-class exercises (group assignments)
- 1 final project (group assignment)
- Weekly participation questionnaires (individual assignments)

The homework and in-class exercise assignments are written in Java. Any final project involving software development should be written in an object-oriented programming language. Each student will be expected to do at least half (i.e. 50%) of the participation questionnaires.

Course resources:

- **Website:** <https://people.cs.umass.edu/~hconboy/class/2021Fall/CS520/>
- **Moodle:** <https://umass.moonami.com/course/view.php?id=916>
- **Echo360:** <https://www.umass.edu/it/lecture-capture>
- **Textbooks:** None are required. Some are recommended on the website and others will be recommended on the course forums.

Please see the website for the weekly schedule. All assignments will be submitted through Moodle. The Echo360 recorded lectures will also be made available through Moodle.

Course grading:

Your success in this class is important to us. All assignments must be completed to pass this course.

- **Homeworks:** 35%
- **In-class exercises:** 30%
- **Final project:** 25%
- **Participation:** 10%

The final numerical cutoff for final course letter grade assignment will be made after all grading is done. The following grades may be given: A, A-, B+, B, B-, C+, C, C-, D+, D, F, PASS/SAT. The approximate grade thresholds that usually apply are: A (93-100), A- (90-92), B+ (87-89), B (83-86), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D+ (67-69), D (60-66), F (0-59).

The Plan for success section provides additional learning resources available on campus.

Incompletes will be granted only in exceptional cases, and only if you have completed at least half the course with a passing grade. Prior to that, withdrawal is the recommended course of action.

Course policies and statements:

Diversity & Inclusion statement:

Software engineering is at its nature a collaborative activity and it benefits greatly from diversity. We celebrate the diversity in our community and actively seek to include and listen to voices that are often silenced in the computing world. We welcome all individuals regardless of age, background, citizenship, disability, sex, education, ethnicity, family status, gender, gender identity, geographical origin, language, military experience, political views, race, religion, sexual orientation, socioeconomic status, and work experience.

Everyone has the right to be addressed by the name and pronouns that they use for themselves. You can indicate your preferred/chosen first name and pronouns on SPIRE, which appear on class rosters. I am committed to ensuring that I address you with your chosen name and pronouns. Let me know what name and pronouns I should use for you if they are not on the roster.

Please remember: We want to foster open discussion in this course. We will be following the [UMass guidelines for civility and respect](#). Any kind of language or action displaying bias against or discriminating against members of any group, or making members of any group uncomfortable are

against the mission of this course and will not be tolerated. The instructor welcomes discussion of this policy, and encourages anyone experiencing concerns to speak with her.

Attendance and late submission policy:

Participation, in addition to attendance, is an expectation for all students enrolled in the course. We understand that circumstances may arise where you may need to miss a class, or submit an assignment late. Seek approval by contacting us at least 24 hours in advance (unless it's a last-minute emergency and you cannot). Medical conditions, religious or funerary events, university-related events (conference visit, athletic event, field trip, or performance), or extenuating non-academic reasons (military obligation, family illness, jury duty, automobile collision) that need extension will be accommodated with written documentation.

Collaboration policy:

Students are allowed to work together on all aspects of this class. All work in this course will be labeled as "individual" or "group" work. When the work is individual, we expect that you will complete the work on your own. You may work alongside others and discuss the work, but all writing (either natural language or code) should be yours and yours only. When the work is group-based, you will submit a single submission for your entire group, and you will all receive the same grade.

Academic honesty policy:

All work in this class must be your own or the work of your group, where appropriate. In most cases this work will consist of a written component (either natural language or code). ALL writing must be your own original work, or the joint work of your group where appropriate, and may not be copied from any source without proper attribution. Please refer to the [UMass Academic Honesty Policy and Procedures](#) for guidelines on what constitutes academic dishonesty and the sanctions that may be imposed on any student who has committed an act of academic dishonesty. If you have any questions or concerns about what constitutes cheating in this class, please ask us as soon as the question arises.

Accommodation statement:

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we can make appropriate arrangements. For more information, consult the Disability Services website at <http://www.umass.edu/disability/>.

Plan for success:

We all learn differently and bring different strengths and needs to the class. If there are aspects of the course that prevent you from learning, or make you feel excluded, please let us know as soon as possible. Together, we will develop strategies to meet both your needs and the requirements of the course. There are also a range of other resources available on campus, including:

- Assistive Technology: <https://www.umass.edu/it/assistive>

- Center for Counseling and Psychological Health: <https://www.umass.edu/counseling/>
- CICS Advising: <https://www.cics.umass.edu/advising>
- Disability Services: <https://www.umass.edu/disability/>
- English as a Second Language: <http://www.umass.edu/esl>
- Learning Resource Center: <https://www.umass.edu/lrc/>
- Student Success: <https://www.umass.edu/studentssuccess/>
- Title IX Resources: <https://www.umass.edu/titleix/title-ix-campus-resources>
- UMass Libraries: <https://www.library.umass.edu>
- Writing Center: <http://www.umass.edu/writingcenter>