UMass College of Information and Computer Sciences
COMPSCI 320 – Introduction to Software Engineering (4 credits)
Fall 2023 Syllabus

Lecture: Mon,Wed 4:00 PM - 5:15 PM Hldswth203
Discussion: Wed 1:25 PM - 2:15 PM FlintL201

Instructor: Gordon Anderson

Course Statement

This course differs from many other undergraduate courses in that much of what you will do is not predefined. You and your team will need to explore the possible design and implementation options as you develop a working prototype as proposed by our customer. In this sense, the course is more of a hybrid between a graduate and undergraduate level course.

The main activity of this course is to develop a software system for a customer according to their needs. All other materials and activities are designed to support your development and to introduce you to concepts and techniques used in the field of software engineering.

The main concept is that engineering involves analysis, planning and design as well as implementation. This is not a course about coding although you will be doing a lot of coding, probably with software you have not worked with before. Note that although you will be developing a working prototype (minimum viable product), this is not a hackathon. Your coding and design will be done in an organised manner as part of a team effort under the management of a student in the COMPSCI 429 seminar.

By participating in the project development and completing the assigned activities you will have the opportunity to experience the software engineering process as it is practised in industry. The success of this process depends on the quality of your collaboration with a team of other developers.

CS 320 is an *integrative experience* course. It focuses on developing communication, reflection, and learning-aware learning skills. You will be able to:

- engage in an in-class discussion at the start of the semester about what they will learn in CS 320 and how the skills they have acquired in their general education requirements will help them.
- engage in a reflective in-class discussion at the end of the semester about what they actually learned, and which learning activities were the most effective.
- work extensively in groups.
- present your work orally in class.
- participate in active-learning activities with significant reflection components (including one on design, system understanding, and security in software).
- reflect on submitted assignments and improve and resubmit the work, and
- be guided by CS 429 students and their experience having previously taken CS 320.

Learning Objectives

At the conclusion of the course you should be able to:

1. work effectively in a software development team using agile methodology.
2. analyse a proposed system and produce a set of requirements.
3. produce an efficient, modular design for a proposed software system.
4. understand the process of building software to specification on a schedule.
5. apply the discipline of software engineering to the process of developing high-quality software with a limited amount of time and resources.

Prerequisite: COMPSCI 220 or equivalent course.

Instructional Components

Lectures and Reading Material

Lecture material is provided in the form of pdf documents and video recordings. There is no textbook for this course. There are required readings that are assigned, mostly in the first part of the course. This material covers the basic concepts in software engineering, most of which, but not all will relate directly to your project development. The goal of this material is to provide a broad overview of topics in the discipline, while your development will be more specifically focused.

Homework

There will be several homework assignments and quizzes based on the reading and lecture material. These will be assigned in the first half of the course.

Discussion section

This time will be utilised for several purposes:

1. Presentation of lecture material.
2. Guest presentations, including presentations by our 429 managers.
3. Activities that are relevant to the course.

See Moodle for the discussion topics for each week..

Development Team Meetings and Presentations

You are required to complete a brief INITIAL SURVEY about your programming background and experience in the first week of class. You will be assigned to a team of 10 students based on your responses to the survey. Please note that this course is open to all students who are admitted to this class, so please do not worry about your level of experience. It's best to complete the survey as accurately as possible.

Once you have been assigned to a team (with a CS429 manager), you will attend ***weekly team meetings***. Attendance and participation at these meetings is required. Starting in week 3, your team will present a ***report on your team's progress*** in developing the project for our customer. These reports are presented by two team members. You will present at least two of these reports during the semester. Attendance at all of the presentations is required whether you are presenting or not.

Please note that ***attendance*** at all course meetings ***is required***.

Peer and Manager Evaluations

Evaluations are a prevalent form of providing feedback to managers and team members in the software industry. You will participate in three rounds of evaluations during the semester. Each round consists of ***two evaluations:*** you evaluate your manager, and you evaluate your team members including yourself. These evaluations are valuable opportunities to reflect on the project development process of you, your team, and yourself. The data from these evaluations is very helpful feedback for managers and team members to make any changes that improve the group development effort.

1-Manager evaluation: you will evaluate your manager on the quality of their management from your point of view. This is a short **Moodle questionnaire**. Please be sure to write feedback in the comment field in addition to the rating questions as that is very useful information for managers. Again, your name will not be seen by your manager.

2-Peer Evaluation: You will evaluate yourself and your team members on the level and quality of their participation. Peer evaluations are done in the **CATME** system- a link is provided on the Moodle page. Some of the categories you will report on in the peer survey include:

- Contributing to the Team's Work
- Interacting with Teammates
- Expecting Quality
- Team Conflict
- Team Satisfaction
- Team Cohesiveness
- Psychological Safety

You are required to complete ***BOTH*** of these evaluations. Because the data from these evaluations is time-critical, there are **NO EXTENSIONS** to the due dates of these evaluations. Your grade will be affected if you fail to complete any of these evaluations, so make sure you note the due dates for these time-critical evaluations.

Note that the evaluation data will be seen by your manager and peers but in anonymized form; your name will not be associated with the results. This data is important feedback- especially the comment field.

Course-related Communication

Please use the "Forum for Course Communication" on Moodle for all course-related communication. You may make a public or private (only for instructor) post for any course-related questions. Make a private post for administrative and grading matters. Please do not use email to communicate with the instructor or staff.

Grading Components

Integrative Experience Essays (5%) *Individual grade.*

- Two essays: one assigned at the beginning and one towards the end of the semester.

Participation (30%). *Individual grade.*

- Attendance at team meetings. 40%
- Your manager's evaluation* of your contribution to the project. 50%
- Completing peer and manager evaluations (three rounds per semester). 10%

Presentations (10%) *Individual grade.*

- Presenter evaluations- two presentations per semester.

Homework/Quiz Assignments (15%) *Individual grade.*

- Assigned homework and quizzes.

Semester project (40%) *Team grade.*

- Weekly Check-in and Demo presentation content evaluations. 50%
- Final deliverables doc. 50%

*Contribution includes work done on tasks and level of communication with your team.

Note that a ***lack of engagement*** with your development team may result in a failing grade for this course regardless of your individual grades. Please be sure you communicate with your manager and the instructor if you encounter any issues which affect your participation in this course as soon as possible.

Please do not hesitate to contact the instructor if you have any concerns about the course, including any external events that may hinder your participation. All students are expected to conduct themselves in a professional and mature manner. Please let the instructor know if you feel that you are experiencing any behaviour that is not acceptable.

Course Number (as percentage) map to Letter Grade:

100.00 %	93.00 %	A
92.99 %	90.00 %	A–
89.99 %	87.00 %	B+
86.99 %	83.00 %	B
82.99 %	80.00 %	B–
79.99 %	77.00 %	C+
76.99 %	73.00 %	C
72.99 %	70.00 %	C–
69.99 %	67.00 %	D+
66.99 %	60.00 %	D
59.99 %	0.00 %	F

Accommodations: How learning is accessible to you

Accommodation for Disabilities

The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If you have a disability and require accommodations, please register with Disability Services (161 Whitmore Administration building; phone 413-545-0892) to have an accommodation letter sent to me. Information on services and materials for registering are also available on their website www.umass.edu/disability. Please contact me if you have any questions or concerns about disabilities or any issue that may impact the quality of your learning. It is my goal to provide the best possible learning experience for all students.

Getting Extensions for Assignments

It is possible that you may need an extension for a submission. Contact me at least 24 hours before the assignment is due. Medical conditions, religious or funerary events, university-related event (athletic event, field trip, or performance), extenuating non-academic reasons (military obligation, family illness, jury duty, automobile collision) that need extension will be accommodated with written documentation. Do note that problems with computer or internet access, holiday, or family travel are not valid reasons for granting extensions.

Getting Excused for Attendance

Should you need to miss any mandatory events, please let us know in advance. If you miss more than two class/discussion sessions, we need to meet to figure out how you can still pass the course as attendance counts towards your grade. Medical conditions, religious or funerary events, university-related events (athletic event, field trip, or performance), extenuating

non-academic reasons (military obligation, family illness, jury duty, automobile collision) will be accommodated with written documentation.

Academic Honesty: Why it matters what you do

UMass Amherst has a Academic Honesty Policy that includes cheating and plagiarism as forms of dishonesty. What is plagiarism? Generally speaking, it is any attempt to take credit for work done by another person. Yet, all scholars rely on the work of others to shape their own knowledge and interpretations.

If you have any questions about what may constitute plagiarism, please consult the Academic Dishonesty Guide for Students.

Inclusive Learning: Why you are welcome

Your success in this class is important to me. 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 me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. There are also a range of resources on campus, including:

- Writing Center - http://www.umass.edu/writingcenter
- Learning Resource Center - http://www.umass.edu/lrc
- Center for Counseling and Psychological Health (CCPH) - http://www.umass.edu/counseling
- English as a Second Language (ESL) Program - http://www.umass.edu/esl

Classroom conduct: Why you matter

The following applies equally to in-person as well as any online meetings:

In this course, each voice in the classroom is valued. We honor UMass's commitment to embrace diverse people, ideas, and perspectives to create a vibrant learning and working environment.

You are welcome 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.

This course requires students to work in groups and to present material in class. As such, it is expected that all students will observe a "workplace" level of social decorum at all times when interacting with managers and peers. You are expected to treat your work in this class in a professional manner and to treat all individuals with dignity and respect. Please consult the UMass Guidelines for Classroom Civility and Respect: http://www.umass.edu/dean_students/codeofconduct/classroomcivility.

Compsci 320 Topics List

This is a list of topics that are usually covered in my section of 320. The topics are listed roughly in order that they are covered, but that does not have to be the case. Note that several of these topics are usually revisited during the semester as teams gain experience and confidence developing a project, and can better absorb some of the finer points of topics they were exposed to at the beginning of the semester.

Process Models	Processes and products. Continuum from spec first to no spec: waterfall, spiral, agile(scrum, etc.), mvp á la Eric Ries.
Teamwork	How to work as a team Good workplace environment, behavioral awareness.
Analysis	Functional and nonfunctional requirements, user categories. What is an MVP.
Presenting Technical Material	Key aspects of effective communication from engineers to stakeholders. Visual communication- diagrams, oral presentation skills
Architecture	Modules and their connections (interfaces). Logical vs physical views, definition of an API, REST API.
Choosing 3rd-party Software	Evaluate software libraries and frameworks- key aspects to consider.
Data Models	Entity-relationship modeling, a model is an abstraction, not an implementation. Data dictionary, what is a schema.
Testing	“Theory” of testing, levels of testing: user, integration, unit, black box vs glass box, how to test an interface.
Ethics	Personal ethics, cultural (workplace and societal) ethics, software and its effects on users/society- who’s accountable? Duty of care regarding data curation and privacy.
UI Design	Key aspects of good UI design and usability, accessibility issues.