CS 191: Computer Science Capstone
Spring 2024

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Department of Mathematics and Computer Science
Drake University

Class Meeting Time and Place: We will meet in person twice weekly for lecture sessions. Section-specific information is as follows:

- Time: Monday/Wednesday 3:30 pm - 4:45 pm
- Location: Collier-Scripps#301

Office hours: The instructor will hold weekly office hours, either in person or online via Zoom. Please see Blackboard for up-to-date times and URLs. If you cannot make office hours, contact the instructor to make a separate appointment.

- Office hour#1: Monday: 1:00 pm - 3:30 pm
- Office hour#2: Wednesday 1:00 pm - 3:30 pm
- Location: Collier-Scripps#323

Course Communication: The course content will be posted on the course Blackboard page. Any announcements will be sent using Blackboard's announcement feature (as well as email). It is a personal goal of mine to respond to student emails within 24 hours of receipt.

Course overview: The purpose of a capstone is for students to undertake a project that applies and synthesizes what they have learned in their major. This course is typically taken in one of the student's final two semesters at Drake. One outcome will be a presentation of their work to the students and faculty of the department.

Learning objective: After successfully taking this course, you will be able to:

- Make significant contributions to a team-developed software project
- Integrate ideas from multiple areas of computer science into a software development project
- Independently learn about new computer science concepts and apply them to a software development project
- Demonstrate effective programming practices including proper use of abstraction (objects, functions, procedures, etc.), sufficient documentation, and selection of appropriate algorithms and data structures
- Effectively communicate details of a software project appropriately for the audience
- Discuss issues related to a software product's testing and deployment, including performance considerations, correctness, and interaction with other systems and hardware

Who should take this course: If you are a junior or senior student with a computer science major, who is looking to do a group capstone project–this class is for you!

Course Logistics: The lectures and most course content will be hosted at `https://drake.blackboard.com`. Coursework will include attending weekly lecture sessions, and completing individual (and collaborative) activities.

Schedule, readings, and resources will be available via Blackboard, `https://drake.blackboard.com`.

Grading and requirements:

- *A0: Intro Questionnaire Slack Intro (Individual):* 5%
- *P0: Team Formation and Project Proposal (Team):* 20%
- *P1: Sprint 1 Demo (Team):* 20%
- *P2: Final Demo, Presentation, and Poster (Team):* 20%
- *Individual Project Reflection (Individual):* 20%
- *Peer and Self Evaluations (Individual):* 15%

Grading scale: The tentative grading scale for this course would be as follows (subject to change upon Instructor's discretion):

A (93%-100%)	A- (90%-92.9%)	B+ (87%-89.9%)
B (84%-86.9%)	B- (80%-83.9%)	C+ (77%-79.9%)
C (74%-76.9%)	C- (70%-73.9%)	D (60%-69.9%)
F (0%-59.9%)		

Team Software Development Project Students will be placed into teams of three (possibly with a few groups of two or four if necessary) which will develop a software product of significant size. Teams will determine the scope and features of their software, and are encouraged to focus on the implementation of new features for previously existing designs, ideas, or projects with which they may be familiar (e.g., from work in previous courses).

Teams will organize their work using agile values and principles, loosely based on the Scrum framework. Work will be divided into two sprints, with a demonstration of the software once in the middle of the semester and once at the end.

Peer and Self Evaluations For each team deliverable, there will be a peer and self-evaluation component. You will fill out the following evaluation for yourself, and your group members. These evaluations will be converted to a score such that Strongly Agree is a 5 and Strongly Disagree is a 1. These scores will make up 20% of your final grade.

You will be asked to rate the extent to which you agree or disagree (on a scale where Strongly Agree is a 5 and Strongly Disagree is a 1) with the following statements about yourself, and then for your other group members.

- Responsible for completing fair share of work.
- Courteous and timely in communications.
- Contributed positively to the development and revision of materials.
- Resourceful in addressing challenges and moving the project forward.
- Overall a proactive and productive contributor.

Individual Project Reflection In addition to team deliverables for the project, each student will submit an individual paper in which they provide evidence for each of the course's learning objectives to demonstrate their individual contribution and learning. Let's take the learning objectives one by one:

- Show that you made significant contributions to the project – you may document this with Github or otherwise describe which portions of the project you were responsible for. It is not expected that each team member contributes the same amount, but merely that your contributions were of sufficient quality and value to the overall product.
- Discuss how you incorporated ideas from multiple computer science courses into this project.
- Detail something that you had to learn to get something done in this project.
- Give examples of code you wrote that show good programming practice – e.g., show examples where you used abstraction techniques and data structures that were appropriate for the problem (and explain why they were appropriate).
- Discuss how you communicated effectively for your audience – tell stories of how you communicated technical information to others on your team or the instructor, or explain specific choices you made when giving demos/presentations.
- Write something that shows you know what the issues are with correctness, performance, or interaction with other systems that relates to your project – whether or not they were addressed in the two sprints you completed. Which of these issues (not features to be implemented, but things necessary for the deployment environment) would need to be addressed for this product to ship, and how could these problems be tackled?

Rubric: Each item will be graded on a scale of 0-2. A "2" means that the learning objective was fully demonstrated. A "1" means that a serious attempt was made, though there was something wrong or missing in the work or evidence provided. A "0" means that the learning objective was not demonstrated.

Capstone Showcase At the end of the semester, each group will create a poster that will clearly and concisely represent the work that they have completed on their capstone project throughout the semester. This poster will

include a demonstration of their final product. The capstone showcase will be open to the public, and there will be judges from the Math and Computer Science faculty who will submit their judgments.

There will be two possible prizes that you and your group could win:

- **Computer Science Capstone of the Year:** judged by the computer science faculty
- **People's Choice Capstone of the Year:** judged by people who come to the capstone showcase

Attendance/Participation: Active participation is an expectation and the norm. You will receive credit for participating in class which will be counted towards your final grade. I will keep track of your participation. I respect your privacy. If you encounter challenges (physical health, mental health, or life in general) that interfere with your ability to participate in the course or complete your work, I will not require any kind of documentation. You also do not need to explain; you can simply inform me that you are experiencing problems and we will work together to figure out a plan that will enable you to complete the course if you want to. For example, if for some reason, you are unable to make the in-person class session, please email me and I will provide you with the Zoom link for the day so you can attend class virtually.
If you are unable to participate in the course for a prolonged period, we will discuss whether an incomplete is the best option.

Academic Integrity Policy: *We take academic integrity very seriously.* You are required to abide by the Drake University policy on academic integrity, as described in the Statement on Academic Dishonesty: Cheating and Plagiarism (`https://www.drake.edu/studentlife/handbook-resources/handbook/academic/`). It is your responsibility to understand these policies. Students agree that by taking this course, papers and source code submitted to us may be subject to textual similarity review, for example, by Turnitin.com. These submissions may be included as source documents in reference databases solely for the purpose of detecting plagiarism of such papers or codes.

Access and Success Accommodations: Accessibility is very important to me. I've done my best to design this course such that it is as universally designed as possible–flexible attendance, recording lectures, removing timed exams, etc. However, I am more than happy to work with you if there are other accommodations that I can provide to help you succeed in this course.

In my opinion, academic accommodations are severely underutilized. While I am committed to designing my courses to be accessible to everyone, I know that there are times when accommodations make a huge difference. Please, if you are neurodivergent, or have other disabilities that could lead to accommodations, consider setting up an appointment with Access and Success to have access to accommodations. I am in your corner for this, please don't hesitate to reach out to me if you have any questions.

Academic Accommodations: Drake University is committed to providing equitable access to learning opportunities for all students. The Disability Services office (107 Old Main) collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, autism spectrum disorders, chronic health, traumatic brain injury and concussions, vision, hearing, mobility, or speech impairments), please contact: **Michelle Laughlin**, Student Disability Services Coordinator (x1835), *michelle.laughlin@drake.edu* to arrange a confidential discussion regarding equitable access and reasonable accommodations. The process for communicating academic accommodations is as follows:

- When students request accommodations, they must provide documentation to Access & Success.
- First-year students, students new to requesting accommodations, and transfer students are required to make an appointment with Access & Success. Access & Success work together with the student to determine reasonable accommodations for each of the student's classes.
- Returning students can fill out an accommodation request form, found on the Access & Success website, www.drake.edu/access-success. The same process will be followed as above, however, returning students do not need to meet with Access & Success unless their accommodations need to be changed.

Holiday Observance: If you miss class because of a holiday or observance, you can fill out the form to automatically notify me (faculty). You can find the form on the `https://www.drake.edu/diversity/initiatives` for Initiatives and Programs, or click here to directly access the `https://drake.qualtrics.com/jfe/form/SV_d5qfVUKtuTQdg7b`.