Syllabus
COMP402 — Senior Project Implementation

Spring 2020

1 Logistics

- **Where:** Center for Science & Business, Room 303
- **When:** Th 10:00am–10:50am
- **Instructors:**

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- **Website:** `http://jlmayfield.github.io/teaching/COMP401-402/`
- **Credits:** $\frac{1}{2}$ course credit

2 Course Content and Goals

The senior project is the culminating experience of a student's major in Computer Science and draws upon everything the student has learned over the course of their studies. The project itself is a means to an end and not the ultimate goal of the capstone experience. Sufficiently interesting and complex projects rely on an abundance of existing research and fundamental principles of computing. The project is, from this perspective, a concrete instantiation of these ideas and principles. By carrying out the project and presenting their work to technical and non-technical audiences, students can demonstrate their understanding and mastery of some core element of the computing sciences as it appears in the real world context of their project.

Students are ultimately working towards pinpointing general, abstract, or theoretical concepts that support their project and clearly articulating how their work is a specific instance of these concepts. An important part of this process is the identification of seminal scholarly work that addresses the concept and its applications. Students too often attempt to reinvent the wheel in the course of their capstone work. Occasionally they're unaware that the wheel already exists. The emphasis on fundamentals is about identifying the wheels, the documents that lay out the general principles of those wheels, and focusing on applying those principles to the specific needs of the project. In doing so the student will better understand where their work sits in the broad spectrum of computing and can present it as such.

COMP 402 is focused on the implementation of the plans proposed by the student in COMP 401 and the identification of the concrete instantiation of fundamental principles of computing at play within the various facets of the project. Each student in the class will give checkpoint presentations on a semi-regular basis in order to receive feedback from peers and faculty regarding the current state of student projects and their understanding of the project's underlying fundamentals. Towards the end of the semester, students will use their project as the basis for a Scholar's Day poster and accompanying presentation.

3 Attendance and Expectations

Students in this course are expected to be respectful of their peers and the instructors. As this course is comprised entirely of student presentations, it is crucial that all students are always present and always on time. Failure to arrive on time and be a productive member of the course will have a detrimental effect on the final grade and leaves a bad impression with faculty that are likely targets for job and graduate school recommendations.

4 Course Deliverables

The following elements of COMP402 contribute to the overall capstone grade:

- Checkpoint presentations
- A Scholar's Day Poster
- A Final Presentation
- A publicly available, completed project
- A bibliography of foundational work
- Sucessful Completion of the Major Field Test in Computer Science

4.1 Checkpoints

The class will meet for regular project checkpoints. At these checkpoints each student will give a **five to seven minute presentation** that covers:

1. The state of the project (1–2 minutes):
   (a) The expected state for this checkpoint based off the current time line
   (b) The actual state with a demonstration of progress
   (c) The expected state for the next checkpoint
2. Computing Fundamentals (4–5 minutes)
   (a) Concepts, theories, and abstract principles
   (b) Seminal research and literature
   (c) Project specific instantiations

It is important to note that the bulk of each presentation is dedicated to the presentation of computing fundamentals as they appear in the project. The goal is to get accustomed to presenting the project in the context of a larger issue in computing as opposed to simply presenting the project.

4.2 Scholar's Day Posters & Final Presentations

By the midpoint of the semester students will have identified at least one fundamental principle that acts as a cornerstone of their project. One of these principles will become the subject of the Scholar's Day poster. It is important that students understand that *the project is not the subject of the poster but the vehicle by which the actual subject is presented.*

The poster is to be done in the standard scientific research style. The CSB is ripe with examples of this kind of poster. Students will begin submitting drafts of their posters beginning shortly after midterm, and the final posters will be presented as a part of the Scholar's Day poster session.

The final presentation will be a 7–10 minute self-evaluation and debrief about your capstone experience. During this time you should briefly discuss the final state of your project, what you think went well this semester, what could have gone better, and what advice you might have for current and future 401/402 students as they begin working on their project.

4.3 Completed Project

By the end of the semester each student must have a completed project. It may not entail everything proposed in COMP401 but it should be complete by some measurable sense of the word. For example, it may be a rough prototype of the proposed project or lack some of the originally proposed features, but still carries out some clearly identifiable part of the project as proposed. What's important is that it stands on its own and that the student presents it as such. Too often students lament the features they didn't get to and overemphasize what the project might have been as opposed to what it finally ended up being.

The final version of the project must be submitted to the instructors by Scholar's Day. In addition to submitting their work to the instructors, students must also find a means of making their work publicly available. Standard paths to this include, but are not limited to:

- Making the project Open-Source and hosting the code on a site like Github.
- Making a completed application available on an app-store or some similar means of distribution.
- Uploading a paper to a pre-print archive.
- Submitting a paper for publication.
- Hosing a website on a public server.

The exact means by which projects are made publicly accessible must be approved by the instructors ahead of time. Projects must be publicly accessible by Scholar's Day.

4.4 Project Bibliography

The poster and presentation are in depth demonstrations of the students ability to connect their work to a singular larger issues in computing. This bibliography is a demonstration of the student's ability to continue this practice across a broader range of issues as they relate to their the project. Over the course of COMP 401 and COMP 402 students should have accumulated several key texts related to the foundational computer science that underlies their project. The project bibliography should list and cite all of these sources. Some of these will be cited on the poster and presentation, some will not. Multifaceted projects will rely on many different ideas and should thereby have a lengthier bibliography. More constrained projects might have shorter bibliographies as a reflection of their narrower focus. Either way, the bibliography should accurately reflect the breadth and scope of the project.

4.5 Major Field Test

At about the midterm point, students will take the Major Field Test in Computer Science. This test is meant to provide both the students and the department with an objective measure of their knowledge of the fundamental ideas in computer science. The score a student receives will not have an affect their grade in the course but failire to complete the test will have a strong negative impact. We hope that pride and

professionalism will drive each student to do their best. For information about the test, including sample questions, see `https://www.ets.org/mft/about/content/computer_science`. In short, the test consists of 66 multiple choice questions and should take about two hours.

5 Grading

At the completion of this course, the grade for both COMP401 and COMP402 is determined. Students will typically receive the same grade in both courses to reflect the work throughout the capstone project and not in one individual phase of the project. Grades will be determined based on the following items:

- Appropriateness of project difficulty
- COMP401 checkpoints
- COMP401 Technical Presentation
- COMP401 Proposal Poster
- CMP401 Written Proposal
- COMP401 Proposal Presentation
- COMP402 Checkpoint Presentations
- COMP 402 Scholar's Day Research Poster
- COMP 402 Final Presentation
- A Completed Project
- A Project Bibliography
- Completion of the Major Field Test

More abstractly, what all of the above elements should reflect is a student's:

- effective use of technical and problem solving skills befitting a major in Computer Science
- professionalism
- ability to make informed, mature decisions as they relate to a larger-scale project
- understanding and appreciation of the computing disciplines

The following examples provide an idea of what we are looking for in the above items. **These are rough guidelines only!** Assessment can vary considerably depending on the project.

- **A/A-/B+ range**. Steady progress is made (more or less) from start to finish. The student takes ownership of the project and approaches it the right way, with an occasional mishap. The real key is that **progress can be explained and justified by the student**.
- **B range**. Attempts are made to explain/justify work, but explanations often lack a certain level of understanding. Students with projects in this range are clearly saying what they think they need to say, sometimes reciting technical information taken verbatim from various sources.
- **B-/C+ range**. Little to no real planning and research in 401. An idea is proposed and the student talks a lot about what they want to do, but they never really engage in the problems they'll encounter when developing the project. But the student regroups in 402, working the right way and providing some level of understanding in their work.

- **C range**. Little to no real planning and research in 401 that carries through to 402. The student is unable to explain and justify their work beyond showing that something happens. Something works, but there are lots of bugs or missing features, sometimes including large components. *The student did not take the major field test.*
- **C- range or worse** Little appreciable progress throughout 401 and 402. The student is unable to explain what they did, nor what is really going on in the code. The code works sometimes but not most times. The student shows clear signs of stringing together code or material from other sources with no understanding.

6 Schedule

Checkpoint presentations will occur on roughly a bi-weekly basis. *This calendar is subject to change based on the circumstances of the course.*

Week	Dates	Notes	Assignment
1	1/16 — 1/17		Initial Meeting
2	1/20 — 1/24		Checkpoint 1.
3	1/27 — 1/31		
4	2/3 — 2/7		Checkpoint 2.
5	2/10 — 2/14		
6	2/17 — 2/21		Checkpoint 3.
7	2/24 — 2/28		
8	3/2 — 3/5	SPRING BREAK (F)	Checkpoint 4. Poster Draft.
	3/9 — 3/13	SPRING BREAK	
9	3/16 — 3/20		**MFT**
10	3/23 — 3/27		Checkpoint 5. Poster Draft.
11	3/30 — 4/3		Poster Draft.
12	4/6 — 4/10	EASTER (F)	Checkpoint 6. Poster Draft.
13	4/13 — 4/17	EASTER (M).	Poster & Bibliography Due.
14	4/20 — 4/24	SCHOLAR'S DAY (Tu).	
15	4/27 — 5/1		Presentations.
16	5/4 — 5/8	READING DAY (Th)	
Final's Week			

6.1 Course Engagement Expectations

The weekly workload for this course will vary by student but on average should be about 5–7 hours per week. Since we meet only one hour a week, we expect students to dedicate at least 4–6 hours a week towards the development of their projects. Being a capstone project, it is likely that your weekly work will exceed the expected amount.