Senior Capstone Experience — Mathematics and Computer Science

Each student majoring in mathematics or computer science completes a “capstone project,” intended to be a project serving as a culmination of your studies within the major(s), completed with the aid of a faculty member within the department, called your thesis advisor (who may or may not be your academic advisor). Appropriate topics for the project may synthesize several areas of study in the student’s coursework, extend ideas and/or results from previous courses, or develop a topic that is not normally covered in the existing curriculum but can be approached by techniques and ideas in the student’s academic background.

Additionally, each student participates in the “senior seminar” (MATH 497 or CSCI 497), which does not have course credit. It meets primarily for the first half of the fall semester, when we will critique previous senior projects and discuss project proposals. Thereafter, it will meet less regularly for discussion of students’ progress with their projects.

Your capstone project will culminate in both a written paper (the thesis) and a public presentation. The thesis will be archived among the orange folders in the department library (MCRey 321); you are welcome to browse these theses to see what students have done in the past.

Roughly speaking, there are four possible categories of senior projects. All categories are equally valid to pursue.

**Expository:** You research what other people have written on a topic (which should be suitably academic in nature) and complete a summary synthesizing this work.

**Research:** You undertake to answer a question that nobody has yet answered.

**Discovery:** (typically mathematics) You work on a question without yourself knowing an answer, though your advisor uses knowledge of the problem to guide you.

**Implementation:** (typically computer science) You design and implement a software system performing something interesting.

Your thesis will form the major component (and possibly the entirety) of your portfolio. Your portfolio might also include earlier undergraduate projects, problems submitted to journals, exceptional projects or papers from classes within the department, and a list of presentations and activities in the department.

The timeline for senior projects is as follows.¹

**Sep 1:** Submit a typed one- or two-page description of your project to Dr. Burch. This description should describe your proposed project and identify your advisor. Consider identifying milestones you will reach, along with dates when you will reach them. You and your advisor should already have discussed your proposal by this point.

**Nov 27:** You will present a 10-minute formal presentation about your progress thus far (no computer-based presentations). As a rule of thumb, you should be about half-complete with your project by this point. (You will discuss your progress in the seminar at other times during the year, but they will be less formal.)

**Feb 5:** Submit a draft of the project to Dr. Collins. This draft should be a substantially complete version of your thesis. It will be distributed to several department faculty for their comments; we will try to return them to you by Feb 15.

¹The later portion is roughly correct, but it is subject to change.
**March 19:** Seniors will give 20-minute public presentations of their work, both to other students and to department faculty. You will be required to attend other seniors’ presentations. (The presentations will likely be somewhat later than March 19, and they will be spread over a week.)

**Apr 9:** Submit your final portfolio, including your thesis, to the department chair (Dr. Campbell).

**Apr 26:** The department chair will notify you of your comprehensive grade by this date. This “capstone experience grade” will appear separately on your transcript; unlike course grades, half-grades are possible, such as B+ or C−.

Your comprehensive grade will be based primarily on the quality of your portfolio, including:

- academic content of the work
- organization and quality of writing
- preparedness and quality of presentation

In addition, your comprehensive grade will also take into account:

- attendance and participation at senior seminar events
- completion of the progress checkpoints in the above timeline