

## Expectations for PIs Supervising CaSB Research Capstone Projects

### **Overview of the Student Capstone Experience**

The Capstone experience is a senior-level sequence of two courses integrating the discipline via mathematical modeling, simulation, and active research and report writing. The experience culminates with completion of a senior thesis.

Students are expected to find their own research or project prior to starting the Capstone courses. Students are required to complete, at minimum, two quarters of research supervised by a UCLA ladder faculty member while they are enrolled in the Capstone courses. Students are advised, however, to start early, ideally finding a project in their junior year.

The Capstone options are designed to be parallel to each other. Effective Fall 2021, the Capstone options for students pursuing research in UCLA faculty labs are:

- Option 1: C&S BIO 199 (4 units) and C&S BIO M187 (4 units)
  - Students will engage in supervised research with a UCLA faculty member while taking 4 units of C&S BIO 199, and continue this research while taking 4 units of C&S BIO M187, a research communications course.
- Option 2: C&S BIO 198A (4 units) and C&S BIO 198B (4 units)
  - Students will engage in directed honors research with a UCLA faculty member while taking 4 units of C&S BIO 198A and 4 units of C&S BIO 198B.

### **Expectations for Students**

For their research, students have been asked to identify a ladder faculty member who will agree to supervise their thesis. The goal is to find some part of a project for which they can be the lead person that creates a coherent and contained research story, even if it is contributing to some much larger goal or project by the faculty member/PI (usually it is). The individual part (i.e. the student contribution) should involve some aspect of math modeling, computational simulation, or data analysis, so that there is a quantitative/mathematical/computational piece. The research should also be connected to a biological question. In the end, students should look for a project for which they can explain and justify a goal, and then communicate what they did to achieve said goal. For the purposes of the Capstone classes, the research needs to be enough for a coherent story: a 10-minute presentation, a poster, and an approximately 10 pages or longer paper.

**Capstone Deliverables**—to be completed by student by completion of C&S BIO M187 (for Option #1) or 198B (for Option #2)

*Presentation* – The presentation should consist of approximately 10 slides that cover the following topics: Title, Background, Question that is being addressed by this research, Methods, Results, Conclusions, Future Directions, Acknowledgements. The presentation should be presented at the lab meeting of the host lab and recorded. The presentation can be done in person or remotely via video-conferencing. The recording should be filed with the CaSB Undergraduate Office.

*Poster* – The poster should be printed on a large (48”x 36”) sheet. The Poster should contain a title, authors, abstract, figures of all results, conclusions, and references. A PowerPoint template is included.

*Research Thesis* – The research thesis should follow standard guidelines for a scientific publication. The paper should be at least ten pages single-spaced. It should include the

following sections: Title, Authors, Affiliation, Abstract, Introduction, Methods, Results, Conclusions, Acknowledgements and References. The references should follow the guidelines of a journal that is relevant to the research topic, and there should be at least ten references. The paper should also include at least four figures. Each of the four figures can contain multiple panels and should include a caption. Figures should be embedded within the text of the thesis rather than added to the end of the report. The final report should be submitted in pdf format.

### **General Mentoring Guidelines for Faculty**

- Work with students to outline research project that will meet expectations for CaSB Capstone. Fill out a “Research Compact” to outline goals and expectations for the project.
- **Meet frequently (at least weekly) with students even for brief updates.**

### **Supervising a Student Pursuing Capstone Option 1:**

Faculty supervising a student pursuing Capstone Option 1 are asked to:

#### 199

- Sign the C&S BIO 199 contract at the start of the quarter, outlining the project and the tangible evidence of work completed (in the form of a culminating paper or project) to be submitted by the student to the faculty member and the CaSB Undergraduate Office by the end of the quarter.
- Meet with the student and give feedback on research on a regular basis.
- Assign final grade based on tangible evidence submitted at the end of the quarter.

#### M187

- Continue to supervise student and provide feedback in the lab while student is enrolled in C&S BIO M187, provided student is still actively working in lab.
- If possible, provide opportunity for student to present their research during a lab meeting in the quarter in which the student completes C&S BIO M187.
- Provide feedback and sign off on students’ final thesis paper at the end of the quarter in which the student completes C&S BIO M187. The student will receive extensive feedback on their Capstone deliverables from the instructor of C&S M187 and their classmates. The grade for C&S BIO M187 will be assigned by the instructor of that class.

### **Supervising a Student Pursuing Capstone Option 2:**

Faculty supervising a student pursuing Capstone Option 2 are asked to:

#### 198A

- Sign the C&S BIO 198A contract at the start of the quarter outlining the project and the tangible evidence of work completed (in the form of a partial draft thesis paper) to be submitted by the student to the faculty member and the CaSB Undergraduate Office by the end of the 198A quarter.
  - The thesis draft should follow standard guidelines for a scientific publication. The paper should be at least five pages single-spaced. It should include the following sections: Title, Authors, Affiliation, Abstract, Introduction, Methods, Results (if applicable), Next Steps, and References. The references should follow the guidelines of a journal that is relevant to the research topic, and there should be at least five references. If figures are included, they should include a caption and

be embedded within the text of the thesis rather than added to the end of the report. The draft thesis should be submitted in pdf format.

- Meet with the student and give feedback on research on a regular basis.
- Mentor the student as they work towards completing the 3 Capstone deliverables: presentation, poster, and research thesis.
- Collect thesis paper draft submitted at completion of 198A and provide feedback to student. In progress grading- grade will be submitted upon completion of 198B.

#### 198B:

- Sign the C&S BIO 198B contract at the start of the quarter outlining the project and the tangible evidence of work completed (this should align with the 3 Capstone deliverables) to be submitted by the student to the faculty member and the CaSB Undergraduate Office by the end of the 198B quarter.
- Continue to mentor the student as they work towards completing the 3 Capstone deliverables: presentation, poster, and research thesis.
- Provide opportunity for student to present their research during a lab meeting.
- Collect and assign final grade for 198A and 198B based on completion of the 3 Capstone deliverables.